CORRIGENDUM NOTICE – 5

NAME OF DEPT./BOARD/ CORP./AUTH	OLD REFERENCE/ NIT/ EOI NO.	NATURE OF CORRIGENDUM	WEBSITE OF THE DEPT./BOARD CORP./AUTH	NODAL OFFICER/ CONTACT DETAILS/EMAIL
Haryana Power Generation Corporation Limited (HPGCL)	E-NIT No.: 03/HPGCL/DCRTPP/EPC/800MW Dated 16.01.2023 (Tender ID: 2023_HBC_253991_1) & Corrigendum-1 Dt 15.02.2023 & Corrigendum-2 Dt 23.02.2023 & Corrigendum-3 Dt 27.03.2023 & Corrigendum-4 Dt 09.06.2023	**Corrigendum / Addendum / Amendment of the Tender for setting up of 1x800 MW Super Critical Expansion Unit at DCRTPP, Yamuna Nagar on EPC basis through ICB route appended as under:-** **CORRIGENDUM – 5A** 1. Technical Bid File.pdf – HPGCL response to Pre-Bid queries (Technical & Commercial) and attachments. **CORRIGENDUM – 5B** 2. BOQ PriceFormatsR1.xls – Bid Forms and Price Bid **NOTE:** The "HPGCL responses to Pre-Bid queries (Technical and Commercial) and attachments" for Technical Bid corrigendum and "Bid Forms and Price Bid" for BOQ corrigendum, have been uploaded on websites of 'https://etenders.hry.nic.in' and 'www.hpgcl.org.in'. All other terms & conditions of the bidding documents shall remain same as per NIT (E-NIT No. 03/HPGCL/DCRTPP/EPC/800MW Dated 16.01.2023; Tender ID: 2023_HBC_253991_1)	www.hpgcl.org.in https://etenders.hry.nic.in	Chief Engineer/ Projects, HPGCL, Panchkula Phone No.: 0172-5022424 Email Id: ceprojects@hpgcl.org.in

Chief Engineer/Projects
HPGCL, Panchkula

1 X 800 MW SUPER CRITICAL EXPANSION UNIT DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT

BIDDING DOCUMENT NO. 03/HPGCL/DCRTPP/EPC/800 MW

Pre- Bid Queries of BHEL and HPGCL Responses

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
Annexure-1								
1	IV	Ch:1	Electrical/Scope of work	10/930	1.02.22	Roof top solar at the top of all RCC buildings including existing Administrative Building, VIP Guest House in Colony, Field Hostel in Colony, Subordinate Rest House in Colony and Medical Health Centre in Colony.	Installations in Colony involve additional scope of work & thus, require following clarifications - 1. Spare feeders in the existing LT panel of respective building will be made available for solar power evacuation. Please confirm. 2. It is believed that single electrical connection for entire colony is available. Please clarify on replacing existing meter with bi-directional meter. 3. Please confirm that at all locations, 3 phase 415V electrical power is available.	1. Confirmed 2. Confirmed. The existing meter is not to be replaced with bi-directional meter. 3. Confirmed
2	IV	Ch:33	Roof Top Solar System	831/930	33.01.01	The estimated indicative capacity for roof top solar PV installation shall be exceeding 250 kW peak.	1. It is gathered that minimum 250kWp capacity is to be installed. Please confirm. 2. Kindly define the upper limit of the capacity.	1. Confirmed. 2. 350KWp capacity solar PV capacity shall be installed.
3	IV	Ch:33	Roof Top Solar System	831/930	33.01.03	List of buildings identified for installation of roof top solar system	Please inform followings - 1. Area of installable portion of identified rooftops in sqm. 2. Height of each proposed building.	Bidder to visit site for details.
4	IV	Ch:33	Roof Top Solar System	832/930	33.02.01 h)	All PV modules shall be cleaned regularly, and water washed at least once in a Month.	It is understood that O&M is NOT involved. So, this statement seems irrelevant. Please clarify.	O&M till completion of Trial operation is in bidder's scope.
5	IV	Ch:33	Roof Top Solar System	832/930	33.02.01 i)	As per connectivity regulation for renewable energy plants notified by CEA, measurement of Total Harmonics Distortion, DC injection and Flicker at point of connection is to be done annually. The bidder shall provide all the equipments in this regard.	It is understood that scope is limited to supply of instruments to measure referred parameters. Annual measurement is NOT in our scope of work. Please confirm.	Demostration of proper working of system is in bidder's scope. Measurement is in the scope of bidder till FTO by the Owner.
6	IV	Ch:33	Roof Top Solar System	837/930	33.03.03 (iii)	MMS Steel shall be as per latest IS 2062:2011	Nowadays, cold rolled sections are being used as MMS in solar systems. Please allow corresponding IS 811 also.	Acceptable
7	IV	Ch:33	Roof Top Solar System	837/930	33.03.03 (vii)	The upper edge of the module must be covered with wind shield so as to avoid build air ingress below the module.	The wind shield arrangement is not clear. Please elaborate.	Refer clause no. 33.03.03(vii).

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
8	IV	Ch:33	Roof Top Solar System	838/930	33.02.05 (i)	Net meter & Generation meter	1. Net meter - it is required at electric power injection point only (ie, replacement of existing HT meter for colony & it is not required in power plant premises) & not on each rooftop solar systems. Please confirm. 2. Generation meter - In case of single string inverter on a rooftop, inbuilt generation meter (in string inverter) is sufficient. However, if more than 1 string inverter is installed on particular rooftop, an AC combiner box having MFM will be provided. Please confirm.	1. Confirmed 2. Confirmed
9	IV	Ch:33	Roof Top Solar System	839/930	33.04.00	An appropriate solar PV module cleaning & water washing system complete GI pipes, valves, hose pipes, wipers, mops etc. shall be provided for regular cleaning and water washing of the roof top solar PV modules.	Please allow HDPE pipes for cleaning system.	Bid specifications to be followed.
10	IV	Ch:33	Roof Top Solar System	839/930	33.07.00	Bidder has to aggregate Data from each Inverter to a Single PC in Control Room.	Please confirm followings - 1. It is understood that cloud based monitoring system is required. Data shall be provided through single login ID & password. 2. Internet for the requirement will be arranged from respective building LAN network. No separate hard-wired network is to be laid for solar monitoring. 3. Internet/Portal charges will be borne by HPGCL.	1. Cloud based monitoring system is not required. 2. Confirmed. 3. Confirmed
11			Roof Top Solar System			General	Please confirm that solar power evacuation will be on 3 phase 415V only.	Confirmed.
12			Roof Top Solar System			General	In absence of knowing exact solar capacity, please explain the methodology followed for releasing the order & payment thereof wrt solar installation.	Installation of solar roof top is a part of EPC contract. So, the query is irrelevant.
13			Roof Top Solar System			General	Please confirm that identified existing building rooftops are strong enough in terms of load bearing capacity ie, having minimum 80kg/sqm (RCC) or 25kg/sqm (metallic shed) load bearing capacity.	Confirmed, however, being a part of EPC job, bidder to visit site for further details.
14			Roof Top Solar System			General	Illumination of rooftop solar area is OUT of our scope. Please confirm.	Confirmed.
Annexure-2								
1	III-Mechanical Works	Ch-1		85 of 186	Cl.-11.2, Point (a)	LDO firing system shall also be used for cold start up of Steam Generators, generation of auxiliary steam using auxiliary boiler.	Though the aforesaid clauses of tender mentiones sporadically reg. Auxiliary Boiler for 1x800 MW Yamunanagar Extn TPS, but there is no clarity reg. requirement of Auxiliary Boiler nor its detailed specfications. Please clarify, if Auxiliary Boiler is required for this project. If Yes, then please furnish the required specifications w.r.t Aux Boiler Sizing, Operating Parameters, Fuel, Draft etc.	Requirement of Auxiliary Boiler has not been envisaged. Auxiliary Steam required for commissioning shall be tapped from the existing 2 x 300 MW Auxiliary Steam Header and connect the same to the new plant. However, bidder may also arrange auxiliary steam, if required, from a portable auxiliary boiler on returnable basis, which can be taken away after use.
		Ch-2		13 of 87	Cl.-1.1.5, Point (e)	Bidder to further note that when auxiliary steam is being tapped from auxiliary boiler, auxiliary steam will be available only at low temperature of 210 °C.		

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		Ch-2		70 of 87	Cl.-7.8.14, Point (c)	Bidder may however note that it is not envisaged to start the unit with TDBFP when auxiliary steam is available only from auxiliary boiler at 210°C.		
		Ch-25		8 of 36	Cl.-25.2.1, Point (l)	Air Conditioning System for (l) Auxiliary Boiler control Room.		
2	VII	Tender Drawings	FLOW DIAGRAM-AUXILIARY STEAM SYSTEM	7 of 120	Dwg. No. 111-11-0300	Low Temp Aux Steam Header is connected to an Auxiliary Boiler	Is the Auxilairy boiler mentioned in the Flow Diagram-Auxiliary Steam System is to be supplied by Bidder or is an exisiting Auxiliary Boiler.	
3	VII	Tender Drawings	Plot Plan			Plot plan mentioned in the Index	Plot plan not found in the Tender drawings. Please furnish the plot plan.	Plot Plan is attached at Page-57, Volume VII.
Annexure-3								
1	V	PART B/Ch 12	PLANT PERFORMANCE ANALYSIS, DIAGNOSIS & OPTIMIZATION SYSTEM	1 OF 6	12.00.01	The Bidder shall provide OWS & server based On-line Plant Performance Analysis, Diagnosis & Optimization System (PADO) for the plant. The PADO shall incorporate the complete thermal design model of the Unit & Offsite packages/common auxiliaries.	PADO are off-line packages. PADO only takes data from DCS, HPGCL may please modify the requirement	Bid specifications to be followed.
2	V	PART B/Ch 3	BURNER MANAGEMENT SYSTEM (BMS)	39 OF 86	3.43.02.02	BPS System shall be of True Triple modular redundant (TMR) configuration, SIL 3 complaint, IEC 61508 compliant and TUV Rheinland certified as to ensure 99.9% availability of system.	It is clarified that Turbine Generator controls shall be implemented in BHEL make VALMET DNA DDCMIS. BPS System of Boiler shall be configured using proven fail safe configuration in line with latest edition of IEC 61508 guidelines and OEM recommendations. The certification is through third party International certification authority, EXIDA USA. In view of the above, TUV certification is not envisaged. Kindly note that we have executed various project for NTPC/ State electricity	International certification authority EXIDA USA, SIL3 can also be considered, if bidder provides document regarding 99.9% availability of the system.
3	V	PART B/Ch 3	POWER SUPPLY, GROUNDING, CABINET/PANELS, ETC.,System Cabinets/Panels	33 OF 86	3.33.03	The DDCMIS cabinets shall be grouped into physically separate cabinets as follows: (a) (b) Marshalling cabinets (c)	Marshalling shall be done at the backside of the DCS cabinet, separate marshalling cabinets are not envisaged. Kindly update the requirement.	Bid specifications to be followed
4	V	VOL– V, Part B/Ch 1	General Information and Design Criteria, STANDARDISATION AND UNIFORMITY OF HARDWARE	4 OF 10	1.04.01	Bidder shall ensure that various C&I instruments /equipment like vibration monitoring system, 4-20mA 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 interchangeability and efficient spare parts management	BHEL make Valmet DNA based DCS System is offered SG,TG, Station C&I, Vibration monitoring System and most of the BoP /Offsite packages.	Bid specifications to be followed.
Annexure-4								

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1	Volume IV Electrical Works	Ch 17 :	Electrical Actuators With Integral Starters	Sheet 3 of 10	17.06.01 (i)	All actuators shall be certified for SIL 2 or better.	The non-intrusive , SIL-2 compliant actuators are imported and about 3-5 times costlier. Considering the initial cost, maintenance as well as spares costs and the indigenous non-availability, bidder request owner to consider actuators with integral starter (without non-intrusive and SIL-2)	Bid specifications to be followed.
2	Volume IV Electrical Works	Ch1:	Electrical Scope of Work	Sheet 58 of 58	1.50.01	LV switch board, PMCCs, MCCs, PDBs and MLDBs shall be provided with 20 % spare feeders or one no. of each type and rating whichever is higher shall be provided at the time of handing over the plant (irrespective of the spares finalised during detailed engineering).	Considering the space constraint and overall optimisation, bidder proposes to provide 10% spare feeder in panels as per standard practise. The same is being followed for other EPC projects. Owner may kindly review and confirm.	In Clause 1.50.01 of Ch-1 at Sheet 58 of 58 of Vol-IV, the figure ''20%'' be read as ''10%''
3	Volume IV Electrical Works	Ch 12 :	Service Transformers	Sheet 5 of 17	12.03.05	Maximum kVA rating of all service transformer rating shall be limited to 2.5MVA. If the calculated rating crosses 2.5 MVA, bidder has to provide one more separate switchgear with suitable capacity (2x100%) transformers for Main plant. However, in case of BOP area, wherever load exceeds 2.5MVA, 3x50% configuration shall be adopted instead of 2x100%.	a) Bidder understands that if the calculated rating crosses 2.5 MVA in FGD service transformers , then 3x50% configuration can be adopted instead of 2x100%. Kindly review and confirm. b) Bidder understands that as per SLD, one service transformers is applicable per ESP. Also, a common standby transfomer is applicable for 3 ESPs. Hence, total of 8 ESP service transformers are applicable. Owner may kindly review and confirm.	a) Confirmed b) Confirmed
4	Volume II General & Schedules	Ch 9 :	Mandatory Spares	Sheet 13 of 103	26 (m)	Transformer-rectifier set intermitter range controller complete 4nos Rapper controller complete 1nos	Bidder shall provide Transformer rectifier which provides combined rapping control . Hence mandatory spares separately for rapping and communication controller are not applicable. Owner may confirm the bidder understanding.	Confirmed.
5	Volume V Instrumentation & Control Works	Part B/Ch 2:	Field & Measuring Instruments	Sheet 49 of 64	2.19.06	3 D TYPE ACOUSTIC WAVE LEVEL TRANSMITTER Type: Acoustic Wave Level Transmitter (3 D type) Application: Level, Volume, quantity & Mass of each Fly Ash storage silo/Bunker, each coal bunker and each ESP Hopper (First Field),FGD Silos	The 3D Acoustic Wave Level Transmitter is yet to be commissioned and proven for ESP hopper applications for the existing power plant projects which are envisaged with 3D Acoustic Wave Level Transmitter. In case of ESP , the ESP flyash will be falling on the 3DLS system during rapping (unlike bunkers). The cost is about 15 times the cost of conventional Ash level indicators, and the vendor availability is limited. Hence, Owner may kindly consider conventional ash level indicators instead of 3D acoustic level scanner for ESP hopper applications. Owner may kindly review and confirm.	For all ESP hoppers, RF type level switches and indicators shall be provided
6	Volume IV Electrical Works	Ch1:	Electrical Scope of Work	Sheet 37 of 58	1.27.02	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. Though the motors are designed for continuous duty, their operation is intermittent and hence energy efficiency is not applicable for ESP rapping motors and hence not provided. Owner may kindly review and confirm.	Confirmed.
7	Volume II General & Schedules	Ch 9 :	Mandatory Spares	Sheet 75 of 103		POWER AND CONTROL CABLES: 10% of installed quantity	Bidder proposes to provide 5% of installed capacity as mandatory spare as per standard practise. Owner may kindly review and confirm.	Bid specifications to be followed.
8	Volume IV Electrical Works	Ch 13 :	415V Switchgears & DC Boards	Sheet 3 of 43	13.01.11	All 415V PCC, PMCC & MCC including Stacker Reclaimer MCC shall generally be of intelligent type compatible with IEC 61850 Communication protocol.	The ESP rapping motors are controlled by the ESP controller / rapping controller. The ESP rapping has to be carried out in close coordination with the ESP controls for achieving the desired emission parameters. The ESP rapping motors are also fractional horse power motors that are operated inter-mittently. Hence ESP rapping motor feeders should not be controlled at MCC end and hence not provided with the IMC (intelligent motor controller). This query is for clarification purpose, considering the special requirements of	Confirmed that ESP PMCC / MCC motor feeders shall be non intelligent type, fuse less, draw out type having closed door operation.

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9	Volume IV Electrical Works	Ch 13 :	415V Switchgears & DC Boards	Sheet 3 of 43	13.01.11	However, utility MCCs as mentioned in the single line diagram shall be non-intelligent type.	Bidder understands that MCC of intelligent type is not applicable to FGD. Owner may kindly review and confirm.	Intelligent type MCC shall be provided for FGD and for all 415V PMCC/MCC/ PCC except for PMCC/ MCC/PCC of Service Building, Workshop, HVAC, ESP (Motor Feeders) and Soot Blower.
10						General Technical Query-1	The design margin for LT service transformer sizing is not mentioned in tender. Bidder proposes 10% design margin as per standard practise which is being followed for other projects. Owner may kindly review and confirm.	Confirmed.
B)ESP								
11	III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	11.00.00 ESP SIZING CRITERIA	174 of 186	6.3	Minimum specific collection area- Guarantee Point- 260m2/m3/s, for guarantee and design point	The minimum specific collecting area mentioned is 260m2/m3/sec @ GP and DP corresponding to the electrode spacing of 300 mm. BHEL offers all fields with 400mm for all the fields and accordingly, the minimum Specific Collecting Area (SCA) corresponding to the electrode spacing of 400 mm worked out as 195 m2/m3/sec (260 * 300/400) = 195 m2/m3/sec. As the design point condition is first field out of service condition, hence we are considering SCA of 195 with one field out of service at design point corresponding to an electrode spacing of 400 mm.	Noted.
12				177 of 186	S.No: 9 k)	Spacing between the collecting electrode (c/l to c/l) transverse to gas flow*.... 300mm…		
13				178 of 186	Note: i)	A spacing of 400mm for the last two series fields is also acceptable....(corresponding to 400mm, SCA shall be 195m2/m3/s)		
14	II General & Schedules	Ch 8: FG & LD	3.8 METHOD OF COMPUTING TEST EFFICIENCY OF ESP & SUSPENDED PARTICULATE MATTER EMISSION OF ESP.	20 of 57	3.8.2 e)	The corrections for the flue gas flow and ESP inlet flue gas temperature in excess of the values for these parameters under guarantee point conditions, shall be allowed only in case and to the extent such variations are caused solely due to changes in specified coal properties and ambient conditions. Further, the corrections for the flue gas flow and temperature lower than the guarantee point values shall be applied based on actually measured test values. Subject to the above, 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 procedure indicated in next para.	The tender indicates that estimating and applying corrections to parameters for their variation to the extent of change in specified coal properties and ambient conditions (during PG test), while assessing ESP performance. This is applicable even for ESPs included in SG package as the change in parameters are not due to ESP. It may kindly be noted that ESP is designed for a specified set of parameters and is operated at actual condition. Hence, corrections will be applied for variation on actual test parameters (viz. gas flow, temperature & inlet dust) from guarantee point parameters while assessing ESP performances. If the measured values are higher and corrected values are lower, corrections for design values will be taken for calculation of ESP efficiency. Corrections are allowed for actual measured values for all direct ESP contracts including recent NTPC projects like Mouda, Solapur, etc.	Bid specifications to be followed, however issue may be discussed during detailed engineering
15	II General & Schedules	Ch 8: FG & LD	3.8 METHOD OF COMPUTING TEST EFFICIENCY OF ESP & SUSPENDED PARTICULATE MATTER EMISSION	20 of 57	3.8.3	Ca. Cb .Cc etc. are Correction factors for flue gas at temperature, ESP inlet dust loading, sulphur based on correction curve furnished by the Bidder and approved by the Owner.	The corrections for variation in flue gas flow, gas temperature, inlet dust concentration, sulphur content will be considered and the same will be submitted during contract stage.	Bid specifications to be followed, however issue may be discussed during detailed engineering

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16	II General & Schedules	Ch 8: FG & LD	3.9 AUXILIARY POWER CONSUMPTION	23 of 57	3.9.1 Note 4	Method of computation of Aux. Power consumption for ESP: 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: a) Power consumption of ESP will be measured pass wise and for one pass (Say ESP-A) at a time with the help of energy meter in ESP MCC. b) Energy meter reading will be taken before starting the collection efficiency test and after completion of collection efficiency test. c) 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.....	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.	Bid specifications to be followed, however issue may be discussed during detailed engineering
17	III Mechanical Works	Ch1: Steam Generator & Auxiliaries	2.00.00 MODEL STUDY	165 of 186	2.01.01 (b)	The model study shall include the design of all connecting duct work from the air preheater gas outlets to the induced draft fans inlets, induced draft fan outlet to chimney flue inlet including the inlet duct transition piece, including all dampers, turning vanes and distribution devices.	The ESP Physical Flow Model will include the design of all connecting duct work from the air preheater gas outlets to the induced draft fans inlets only. Physical modeling for Induced draft fan outlet to chimney flue Inlet including the inlet duct transition piece is excluded from Physical Flow Model study as we are not measuring air velocities in the Physical Flow Model beyond ESP Casing, as per ICAC standard, flow correction devices if any, beyond ID fan is not required since this will not have any significant impact on Flow Model study.	Noted.
18	III Mechanical Works	Ch1: Steam Generator & Auxiliaries	1.29 Selective Catalytic Reduction System (SCR)	29 of 186	1.29.5 1)	Cyclone Separator shall be used to reduce inlet dust concentration at the inlet of SCR reactor	Customer may pl confirm the applicability of cyclone separator in the scope as we are not considering cyclone separator for SCR nowadays.	Requirement of Cyclone seperator is deleted.
	C)GATE AND DAMPER							
19	Volume II (General & Schedules)	Chapter 9	Mandatory Spares	Sheet 14 of 103	--	Air & Gas Duct Dampers (for each type & size) a) Complete dampers along with drives- 1 no.	Complete Dampers located in various air & flue gas ducts are of huge size, and these Gates & Dampers will run the entire life cycle of the power plant. Already Spares required for these Gates & Dampers (Bearings, Shaft, Sealing arrangement, Gasket, Nut & bolt, actuators etc) are covered under various Mandatory Spares clauses of this tender specification. If Complete Gate & Damper are additionally given as spares under this clause (a. Complete dampers along with drives), there is no space available at site to store large quantity of Gates & Dampers, and these will be lying unused for decades. It is to be noted that these are very costly items and Complete assembly of Gate/Damper is not required. Also, Electrical Actuators are already considered under Clause (ELECTRICAL ACTUATORS WITH INLEGRAL STARTERS: 10% or 1 no. of each type, class, size and model whichever is more) in Sheet 73 of 103 of Ch.9 (Mandatory Spares). Consideing all the above aspects, request Customer to delete Mandatory Spares Clause: a) Complete dampers along with drives- 1 no. in Sheet 14 of 103 of Volume II, Chapter 9: Mandatory Spares.	Bid specifications to be followed, however complete damper along with drive shall be provided only for flue gas path.

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20	Volume II (General & Schedules)	Chapter 9	Mandatory Spares	Sheet 48 of 103	FGD--> 1 --> A. Dampers & Gates --> a)	FLUE GAS DESULPHURIZATION SYSTEM 1. Flue Gas System A. Dampers & Gates a) Seals - 1 set of each type (Set means that required of single damper of each type)	Already Seals for all Gates & Dampers (including FGD Gates & Dampers) are considered under Volume II --> Chapter 9: Mandatory Spares--> SG & its Auxiliaries --> 7. Dampers (air and flue gas ducting)--> c) Sealing arrangement (if any): 1 set of each type in Sheet 7 of 103. Therefore, bidder is not considering the same seals under the clause (FGD System--> 1. Flue Gas System --> A. Dampers & Gates --> a) Seals - 1 set of each type), in Sheet 48 of 103. This is to avoid duplication of same items, and also these items are very costly, increasing the overall project cost. Please confirm.	Confirmed.
21	Volume II (General & Schedules)	Chapter 9	Mandatory Spares	Sheet 48 of 103	FGD--> 1 --> A. Dampers & Gates --> b)	FLUE GAS DESULPHURIZATION SYSTEM 1. Flue Gas System A. Dampers & Gates b) Actuators - 1 set of each type (Set means that required of single damper of each type)	Already Electrical Actuators are required under Clause (ELECTRICAL ACTUATORS WITH INLEGRAL STARTERS: 10% or 1 no. of each type, class, size and model whichever is more) in Sheet 73 of 103 of Ch.9 (Mandatory Spares). Therefore, those Spare Actuators which are repeating in more than one clause will be considered only under any 1 clause. This is to avoid duplication of same items, and also these items are very costly, increasing the overall project cost. Please confirm.	Confirmed.
22	Volume III (Mechanial Works)	Chapter 1	Steam Generator & Auxiliaries	Sheet 21 of 186	1.18 Dampers --> 5.	1.18 Dampers --> 5. Full gas tight, motor operated gates ….. Before and after of RAPH on air side…	This clause mentions that Gates are required Before and after of RAPH on air side. However, this clause is contradicting with the detailed technical specification and the tender P&ID (air and flue gas) whether Double multi louver (Biplane) type Damper is required Before and after of RAPH on air side. As per Volume III (Mechnical Works) --> Ch.1 (SG & Auxiliaries) Sheet 104 of 186 --> Clause 13.2 Dampers --> IV.b), Double multi louver (Biplane) type dampers are required at location Clause no: 13.2 (I) (e), i.e., at each of the Regenerative Air Pre-Heater. Also, as per "Flow Diagram- Air and Flue Gas, DWG. NO. 111-11-1200) of Volume VII (Tender Drawings), Double multi louver (Biplane) type Damper symbol is only shown before and after RAPH on air side. It shall be noted that RAPH Inlet and Outlet Duct is coming inside the boiler house, therefore, only Double multi louver (Biplane) type Damper can be installed, and Guillotine Gate cannot be installed due to vertical headroom requirement for Gate's superstructure. It may be noted that only multi louver dampers were supplied for all these services in all the projects till date and these are in satisfactory operation till date. Therefore, in-line with Volume III (Mechnical Works) --> Ch.1 (SG & Auxiliaries) Sheet 104 of 186 --> Clause 13.2 Dampers --> IV.b) & also in-line with tender P&ID, please confirm that Before and after of RAPH on air side, only Double multi louver (Biplane) type Damper is required, and gate is not required at this location.	Double multi louver (Biplane) type Damper before & after RAPH on air side shall be provided in line with tender drawing.
23	Volume III (Mechanial Works)	Chapter 1	Steam Generator & Auxiliaries	Sheet 44 of 186	1.18 Installation of FGD System --> 2. b)	b) The ducting and supporting structure to be designed to take care of Guillotine damper to be installed between the two tap offs before chimney.	Between the two tap offs before chimney, FGD Bypass duct is located. As per the referred clause, Guillotine damper is to be installed at this location. This is contradicting with the detailed Technical Specification- Volume III --> Ch.30. FGD System (Sheet 8 of 93) --> Clause No: 1.3 Absorber System --> c), where multi louver/ bi-plane damper shall be provided in the FGD Bypass duct. Also, as per Volume III --> Ch.30. FGD System (Sheet 29 of 93) --> 1.10.1. Types of Dampers --> c), multi louver/ bi-plane damper shall be provided in the FGD Bypass duct. Technically, please note that only multi louver/ bi-plane damper can meet the emergency open timing of 10-20 seconds mentioned in this tender specification, and Guillotine Gate cannot meet this open-close timing requirement, and will have to be kept in Open Condition all the time and thus serves no useful purpose. Therefore, please confirm that in the FGD Bypass Duct, only multi louver/ bi-plane damper is required, and Guillotine Gate is not applicable in the FGD Bypass duct.	In the FGD bypass duct, only Multi louver/bi-plane damper shall be provided in line with Chapter-30 Volume III of specification.

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24	Volume III (Mechanial Works)	Chapter 1	Steam Generator & Auxiliaries	Sheet 97 of 186	13.1 Duct Work ----> I. Sizing Criteria: --> c)	c) Interconnection in cold air duct (primary & secondary) as applicable shall be provided with suitable damper arrangement	As per bidder's proven practice, Guillotine Gates are provided at each PA Fan Outlet & each FD Fan Outlet. Also, at Inlet to Regenerative Air Pre Heater on Air side, Biplane Dampers are provided (i.e. Primary Air APH Inlet Damper & Secondary Air SCAPH Bypass Damper). This facilitates proper operation of PA Fan, FD Fan, APH etc even when 1 equipment/ 1 stream is out of service. Therefore, as per bidder's design practice followed for all 660 / 800 MW projects till date for all customers and projects, Dampers are not applicable in the Cold Air Interconnection duct (for both primary & secondary).	Bid specifications to be followed.
25	Volume III (Mechanial Works)	Chapter 1	Steam Generator & Auxiliaries	Sheet 103 of 186	13.2 Dampers -----> I --> d) & h)	d) At inlet & outlet to each of the Regenerative Air Pre-Heaters on flue gas side & h) At economizer by pass duct, SCR Inlet duct, SCR outlet duct (only incase of Bi-sector APH) & SCR bypass duct	As per boiler layout, the duct at Flue Gas Regenerative Air Pre-Heater Inlet is same as SCR bypass duct. The Guillotine Gate at Inlet to each of the Regenerative Air Pre-Heaters on flue gas side is located in the SCR Bypass duct.Therefore, please confirm that the Guillotine Gate at Inlet to each of the Regenerative Air Pre-Heaters on flue gas side is same as SCR Bypass Gate.	Bid specifications to be followed, however issue may be discussed during detailed engineering.
26	Volume III (Mechanial Works)	Chapter 1	Steam Generator & Auxiliaries	Sheet 103 of 186	13.2 Dampers ----->I --> h)	h) At economizer by pass duct, SCR Inlet duct, SCR outlet duct (only incase of Bi-sector APH) & SCR bypass duct	Please confirm that SCR Inlet Guillotine Gate is to be located before the Cyclone Separator for each SCR reactor.	Bid specifications to be followed, however issue may be discussed during detailed engineering.
27	Volume III (Mechanial Works)	Chapter 1	Steam Generator & Auxiliaries	Sheet 103 & 104 of 186	13.2 Dampers -----> I --> d) & '13.2 Dampers -----> II --> b)	13.2 --> I --> d) At inlet & outlet to each of the Regenerative Air Pre-Heaters on flue gas side & 13.2 --> II --> b) On common duct from Primary and Secondary regenerative Air-Pre heater to ESP on flue gas side in case of Bisector APH or on duct from RAPH outlet to ESP on flue gas side in case of Tri-sector RAPH	The referred 2 clauses are contradicting. As per Clause 13.2 --> I --> d), Guillotine Gate is required at Flue Gas RAPH Outlet. Whereas, as per Clause 13.2 --> II --> b), Double multi louver (Biplane) type damper is required at Flue Gas RAPH Outlet duct. Also please note that as per tender P&ID in Volume-VII Tender Drawings (Flow Diagram- Air and Flue Gas (DWG No. 111-11-1200, Rev.0), Damper symbol is shown at Flue Gas RAPH Outlet duct. Please inform whether Guillotine Gate (OR) Double multi louver (Biplane) type damper need to be considered in Flue Gas RAPH Outlet duct.	Double multi louver (Biplane) type Damper at RAPH outlet on flue gas side shall be provided.
28	Volume III (Mechanial Works)	Chapter 1	Steam Generator & Auxiliaries	Sheet 104 of 186	13.2 Dampers -----> V	V. Damper Gas Tightness The dampers at mentioned at Clause No. 13.2 (IV) (a & b) above shall have a guaranteed gas tightness efficiency (on flow) along the duct as well as from the duct to atmosphere or from atmosphere to the duct, depending on the pressure in both the damper open and damper closed condition without the use of seal air fans of the damper, as follows: ..... 13.2(I) (c,d & h): 99.95% Without Seal Air	For Guillotine Gate located in the Economizer Bypass Duct, sealing efficiency of 99.80 % (without seal air) and 100 % (with seal air) is only technically possible to be achieved. For economizer bypass duct, the temperature is in the range of 450 to 500 deg.C and pressure is about -100 mmWC. Due to very high temperature flow medium, Sealing efficiency of only 99.80 % is technically possible to be acheived instead of 99.95 %. However with seal air, the sealing efficiency will be 100%. For SCR Inlet, SCR Outlet & SCR Bypass Gates, 99.95 % leak tightness efficiency without seal air will be complied.	In first coulmn of last row of table at Sheet 104 of 186, the figure "13.2 (I) (c, d & h)" be read as "13.2 (I) (c & d)" . In first coulmn of second last row of table at Sheet 104 of 186, the figure "13.2 (I) (b & g)" be read as "13.2 (I) (b, g & h)" .
29	Volume III (Mechanial Works)	Chapter 1	Steam Generator & Auxiliaries	Sheet 136 of 186	23.1.4 DUCTING SYSTEM --> 12. Dampers and Gates ---> ii)	12. Dampers and Gates (for SCR system) ii) The motor operated gates shall be guillotine gate type and shall be provided with 2x100% pressurization fans to achieve 100% sealing efficiency.	The operating pressure of SCR outlet duct is in the range of -250 to -280 mm WC i.e. much below ambient pressure. Hence, atmospheric seal air is sufficient to achieve 100% sealing efficiency for SCR Outlet Guillotine Gate and pressurization fans are not required. Please accept.	Bid specifications to be followed, however issue may be discussed during detailed engineering.

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30	Volume III (Mechanial Works)	Chapter 30	Flue Gas Desulphurisation System	Sheet 8 of 93 & Sheet 29 of 93	1.3. Absorber System ---> c) & '1.10.1. Types of Dampers --->i) c)	c) One number hydraulically operated multi louver/bi-plane damper shall be provided in the FGD bypass duct.	To meet the emergency opening time of 10 to 20 seconds mentioned in the Technical specification, pneumatic operation is strongly recommended for FGD Bypass multi louver/bi-plane damper. As per BHEL's proven practice followed for all FGD projects (more than 60 projects) in the last decade, pneumatic operation has been supplied for FGD Bypass Damper, which can easily meet emergency opening time of 10 to 20 seconds (or even less than 10 seconds). Pneumatic actuator system is easier to maintain and has fewer parts compared to hydraulic actuator system. Hydraulic systems require much higher maintenance, chances of leakage of hydraulic fluid, chances of heavy vibration in oil supply line and subsequent failiure of joints in the hydraulic fluid line, requirement of additional parts like hydraulic sump and pump, requirement of periodic hydraulic oil flushing, and also any foreign particles or debris in the hydraulic oil or pipeline will severely affect the working of hydraulic system. These can severely affect the reliability of the FGD Bypass Damper and safety of the boiler, if the FGD Bypass Damper fails to open in case of any emergency. Till now, bidder has never supplied hydraulic actuator for FGD Bypass Damper application. Hence, BHEL strongly recommends Pneumatically Operated FGD Bypass Damper. Please review and accept pneumatic operation as an option to hydraulic operation.	Hydraulic or Pneumatic operated multi louver / bi-plane damper shall be provided in the FGD bypass duct.
31	Volume III (Mechanial Works)	Chapter 30	Flue Gas Desulphurisation System	Sheet 33 of 93	Table: DAMPERS ---> 1. FGD Inlet Damper (Absorber Inlet) ---> a. Type of Damper	1. FGD Inlet Damper (Absorber Inlet) a. Type of Damper : Biplane Damper	The type of damper at FGD Inlet (Biplane damper) mentioned in this clause is contadicting with Clause No: 1.10.1. Types of Dampers --->i) in Sheet No: 29 of 93 of Volume III Ch.30 FGD system, where Guillotine gate type damper shall be provided at Inlet of Absorber (FGD Inlet). Please confirm that only Guillotine Gate type damper needs to be considered at FGD Inlet (Absorber Inlet) and Biplane Damper is not applicable at this location.	Confirmed
32	Volume III (Mechanial Works)	Chapter 30	Flue Gas Desulphurisation System	Sheet 33 of 93	Table: DAMPERS ---> 1. FGD Inlet Damper (Absorber Inlet) ---> b. No. of Dampers	1. FGD Inlet Damper (Absorber Inlet) b. No. of Dampers: Two	In the ducting layout, if there is only 1 no. of FGD Inlet Duct, then 1 no. of guillotine gate type damper (with larger size) will be provided. If the ducting layout has 2 nos. of FGD Inlet Ducts, then 2 nos. of guillotine gate type damper (each with smaller size) will be provided. Please confirm.	Confirmed.
33	Volume III (Mechanial Works)	Chapter 30	Flue Gas Desulphurisation System	Sheet 33 of 93	Table: DAMPERS ---> 1. FGD Inlet Damper (Absorber Inlet) ---> h. MOC --> Blade Assembly	1. FGD Inlet Damper (Absorber Inlet) h. MOC --> Blade Assembly (IS 2062 E 250 BR, Alloy C - 276 min 2 mm thk)	As per Clause No: 1.10.2. Salient features of Dampers --->i) in Sheet No: 31 of 93 of Volume III Ch.30 FGD system, "The blades and frames of the dampers provided at the outlet of ID fan in the untreated gas path shall be made of carbon steel". For FGD Inlet Damper, please confirm that Blade Assembly Material is IS 2062 E 250 BR and SEAL material is C-276.	Confirmed
34	Volume III (Mechanial Works)	Chapter 30	Flue Gas Desulphurisation System	Sheet 33 of 93	Table: DAMPERS ---> 1. FGD Inlet Damper (Absorber Inlet) ---> h. MOC --> Shaft	1. FGD Inlet Damper (Absorber Inlet) h. MOC --> Shaft Assembly (ASTM A 276 Type 321) & Stub Shaft (ASTM A 276 Type 321)	For FGD Inlet Guillotine Gate type damper, the Shafts are coming outside the flue gas path (in the Guillotine Gate's superstructure area above/outside the duct). Therefore, as per bidder's proven practice, SA193B7 material is considered for FGD Inlet Guillotine Gate's shaft.	Noted.
35	Volume III (Mechanial Works)	Chapter 30	Flue Gas Desulphurisation System	Sheet 33 of 93	Table: DAMPERS ---> 2. FGD Outlet Damper (Absorber Outlet) ---> a. Type of Damper	2. FGD Outlet Damper (Absorber Outlet) a. Type of Damper : Biplane Damper	The type of damper at FGD Outlet (Biplane damper) mentioned in this clause is contadicting with Clause No: 1.10.1. Types of Dampers --->i) in Sheet No: 29 of 93 of Volume III Ch.30 FGD system, where Guillotine gate type damper shall be provided at downstream duct of Absorber (FGD Outlet). Please confirm that only Guillotine Gate type damper needs to be considered at FGD Outlet (Absorber Outlet) and Biplane Damper is not applicable at this location.	Confirmed.

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36	Volume III (Mechanial Works)	Chapter 30	Flue Gas Desulphurisation System	Sheet 34 of 93	Table: DAMPERS ---> 2. FGD Outlet Damper (Absorber Outlet) ---> h. MOC --> Blade Assembly	2. FGD Outlet Damper (Absorber Outlet) h. MOC --> Blade Assembly (S-TEN1, ALLOY C-276 (UNS N10276))	As per Clause No: 1.10.2. Salient features of Dampers --->i) in Sheet No: 31 of 93 of Volume III Ch.30 FGD system, "In the FGD outlet treated gas path, the frame of the damper shall be made of STEN-1 or better material, the blades shall be made of STEN-1 or SS317LMN or superior proven material and the seals shall be made of Alloy C-276 or superior proven material". For FGD Outlet Damper, please confirm that Blade Assembly Material is STEN-1 or SS317LMN or superior proven material and SEAL material is ALLOY C-276 (UNS N10276).	Bid specifications to be followed.
37	Volume III (Mechanial Works)	Chapter 30	Flue Gas Desulphurisation System	Sheet 34 of 93	Table: DAMPERS ---> 2. FGD Outlet Damper (Absorber Outlet) ---> h. MOC --> Shaft Assembly & Stub Shaft	2. FGD Outlet Damper (Absorber Outlet) h. MOC --> Shaft Assembly (SS 317LMN (UNS SS31726)) & Stub Shaft (ASTM A 276 Type 321)	For FGD Outlet Guillotine Gate type damper, the Shafts are coming outside the flue gas path (in the Guillotine Gate's superstructure area above/outside the duct) and not exposed to acid dew point corrosion. Therefore, as per bidder's proven practice, SA193B7 material is considered for FGD Outlet Guillotine Gate's shaft.	Noted.
38	Volume III (Mechanial Works)	Chapter 30	Flue Gas Desulphurisation System	Sheet 34 of 93	Table: DAMPERS ---> 3. FGD Bypass Damper ---> g. Sealing Efficiency	3. FGD Bypass Damper g. Sealing Efficiency: 99.9% on CSA, 99.95% without Seal Air Fan & 100% with Seal Air Fan	The sealing efficiency of 99.95% (without Seal Air Fan) mentioned for FGD Bypass Damper in the referred clause is contradicting with Clause No: 1.10.3. Damper Gas Tightness - in Sheet No: 32 of 93 of Volume III Ch.30 FGD system, where 99.5% Sealing Efficiency (without seal air) and 100 % (with seal air fan) is mentioned. For Multilouver (biplane) dampers, there are many blades (flaps), and multiple blade to blade contacts, therefore the sealing surfaces are more, and hence, 99.50% sealing efficiency is only possible for Multilouver/Biplane Dampers. Also, as per Volume III (Mechanical Works), Ch. 1 (SG & Auxiliaries) Sheet 104 of 186 , clause no: V. Damper Gas Tightness, the Sealing efficiency for Biplane Dampers is mentioned as 99.50 % (Without Seal Air) and 100 % (With Seal Air). Therefore for FGD Bypass Multilouver (Biplane) Damper, please confirm that Sealing efficiency shall be 99.50 % (Without Seal Air) and 100 % (With Seal Air).	Sealing Effiicency without Seal Air Fan against S.No. 3(g) at Sheet 34 of 93 / Chapter-30 / Vol-III be read as 99.5% instead of 99.95%.
39	Volume VII (Tender Drawings)	Flow Diagram- Air and Flue Gas	(DWG No. 111-11-1200, Rev.0)	--	--	In this drawing, at Flue Gas Inlet to each Regenerative Air Pre-Heater, 1 no. Biplane Damper + 1 no. Guillotine Gate is shown in series in the same duct.	In this drawing, at Flue Gas Inlet to each Regenerative Air Pre-Heater, 1 no. Biplane Damper + 1 no. Guillotine Gate is shown in series in the same duct. As per tender specification for this project, SCR Reactor is required in the duct from Economizer Outlet to Regenerative APH. However, the SCR Reactor along with SCR Inlet Gate, SCR Outlet Gate, SCR Bypass Gate, Economizer Bypass Gate and Economizer Bypass Control Damper are not shown in this P&ID. Bidder understands that SCR and associated Gates & Dampers are applicable as indicated above. Therefore, 1 no. Biplane Damper + 1 no. Guillotine Gate shown in series in the duct between Economizer and Regenerative APH is Not applicable. Please confirm. Instead, SCR Gates & Dampers will be supplied. For isolation of flue gas inlet of Regenerative APH, SCR Bypass Gate and SCR Inlet/Outlet Gate will be used. Please confirm.	Bidder's understanding is correct. SCR and associated Gates & Dampers are applicable as indicated in Volume III of specification.

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40	Volume VII (Tender Drawings)	Flow Diagram- Air and Flue Gas	(DWG No. 111-11-1200, Rev.0)	--	--	In this drawing, No Guillotine Gate is shown at FGD Outlet. In the FGD Bypass duct, 1 Guillotine Gate is shown.	a) In this drawing, No Guillotine Gate is shown at FGD Outlet. However, as per tender specification for this project, at FGD Outlet (Absorber Outlet), Guillotine Gate is required. Bidder understands that Guillotine Gate is required to be provided at FGD Outlet (Absorber Outlet). b) In the FGD Bypass duct, 1 no. of Guillotine Gate is shown. However, quick acting FGD Bypass multi louver/ Biplane Damper is not shown in the FGD Bypass Duct. This is contradicting with the detailed Technical Specification- Volume III --> Ch.30. FGD System (Sheet 8 of 93) --> Clause No: 1.3 Absorber System --> c), where multi louver/ bi-plane damper shall be provided in the FGD Bypass duct. Also, as per Volume III --> Ch.30. FGD System (Sheet 29 of 93) --> 1.10.1. Types of Dampers --> c), multi louver/ bi-plane damper shall be provided in the FGD Bypass duct. Technically, please note that only multi louver/ bi-plane damper can meet the emergency open timing of 10-20 seconds mentioned this tender specification, and Guillotine Gate cannot meet this open-close timing requirement, and will have to be kept in Open Condition all the time and thus serves no useful purpose. Therefore, please confirm that in the FGD Bypass Duct, only multi louver/ bi-plane damper is required, and Guillotine Gate is not applicable in the FGD Bypass duct.	a) Bidder's understanding is correct. b) Confirmed.
41	Volume VII (Tender Drawings)	Flow Diagram- Absorber System	(DWG No. 111-13-5210, Rev.0)	--	--	For FGD Inlet Gate, FGD Outlet Gate & FGD Bypass Damper's Seal air system, Flow Switch (FS), Temperature Switch (TS) & Temperature Transmitter (TT) are shown in this Absorber System P&ID.	Already Pressure Transmitter (PT) is shown in the P&ID for the measurement of Pressure in Seal Air pipe for FGD Inlet Gate, FGD Outlet Gate & FGD Bypass Damper. Additional instruments (i.e., Flow Switch (FS), Temperature Switch (TS) & Temperature Transmitter (TT)) shown at seal air fan discharge does not serve any useful purpose. Therefore, please delete these Flow Switch (FS), Temperature Switch (TS) & Temperature Transmitter (TT) from the seal air system. Pressure Transmitter (PT) alone will serve the purpose of Seal air pipe pressure measurement.	Bid specifications to be followed, however issue may be discussed during detailed engineering.
D)FANS								
42	Volume II (General & Schedules)	Chapter 9	Mandatory Spares	5 of 103		5 A h) ID Fan impeller liner – 2 Sets	Offered ID Fans are Axial Reaction blade pitch control Fans and impeller liners are not applicable as per OEM design standard. These items cannot be offered. Customer is requested to issue suitable amendment in this regard.	Refer Clause 1.1 f) of Chapter 9 at Sheet 1 of 103 in Vol-II for information & compliance. However if impeller liners are found applicable, these will be supplied by the bidder.
43	Volume II (General & Schedules)	Chapter 9	Mandatory Spares	5 of 103		5 A i) ID Fan casing liner – 1 Set	Offered ID Fans are Axial Reaction blade pitch control Fans and casing liners are not applicable as per OEM design standard. These items cannot be offered. Customer is requested to issue suitable amendment in this regard	Refer Clause 1.1 f) of Chapter 9 at Sheet 1 of 103 in Vol-II for information & compliance. However if casing liner is found applicable, it will be supplied by the bidder.
44	Volume IV)	Chapter 1	Electrical	37 of 58	1.27.06	Maximum continuous motor ratings shall be at least 15% above design duty point or the maximum load demand of the driven equipment …..	Bidder would like to clarify that the FD, ID, PA & Seal Air Fans design point is arrived after taking suitably margin over operating Points and Fan design point is the maximum load demand of the driven equipment and hence bidder recommends the drive motor KW shall be at least 10 % over the Fan design power requirement. This will lead to optimum auxiliary power consumption and optimum size of motor. Customer is requested to issue suitable amendment in this regard	Specifications be followed as per Clause 16.10.01 of Chapter-16 at Sheet 5 of 22 in Vol-IV.
E) APH								

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1	III	1	Steam Generator & Auxiliaries	66 of 186	9.1 V (4) ii	The maximum air-in leakage to flue gas after 3000 hours continuous operation of the boiler with coal shall be guaranteed and demonstrated. The Bidder shall also demonstrate that the drift in air heater leakage (percentage change in air-in-leakage) does not exceed 1%, one year after demonstration of above guaranteed air-in-leakage. Within this period of operation till all air heater leakage demonstrations are completed only external adjustments of seals, without needing any shut down for replacements and without internal adjustments, shall be allowed. The seal design/construction shall be such that the above requirements are satisfied.	Boiler tuning is mandatory for conducting APH Leakage test. Hence the test shall be conducted along with Boiler PG test within or just after completion of 3000 hours. The drift in leakage shall be 1 to 2%. Prior to boiler PG test, internal inspection / adjustment of Air Preheater Seals & Sealing surfaces is required as per Air preheater test code ASME PTC 4.3.	Bid specifications to be followed.
2	III	1	Steam Generator & Auxiliaries	68 of 186	XII (a)	Sufficient space provision for future installation of minimum additional 15% of APH heating surface area shall be made in the design so that, the same can be installed if required.	In boilers with SCR application, the Air Preheater heating elements are subjected to Ammonium bisulphate (ABS) deposition since part of the heating elements falls under the ABS formation temperature zone. Hence, it is important to limit the ABS formation temperature zone within cold end layer (deep cold end) to retain all the ABS deposition in cold end for effective using HP water cleaning. Cold end heating element is designed to absorb all the ABS in the cold end layer itself. Accordingly, proportion of cold end depth to total APH is decided. Further adding elements either at hot end or cold, the temperature zone shifts up or down. Adding future element in hot end will shift the ABS zone upward in to the intermediate layers which may lead to chocking. Future provision space also reduces the effectiveness of cleaning, since the cleaning nozzle to heating element surface distance is increased. Because of this, cleaning (steam) jet has to travel the future provisional space before actually impinging on the heating element surface thereby losing the effectiveness of cleaning. It may also be noted that original APH is selected for maximum effectiveness, adding future element will not help in further heat recovery. Considering all the above, Future element space is not recommended.	Bid specifications to be followed, however it will be reviewed and finalised during detailed engineering.
3	III	1	Steam Generator & Auxiliaries	67 of 186	VI (10)	Air leakage (at 100% TMCR i.e 800 MW unit load for complete range of coals) : Less than 7.5% of flue gas weight entering Air heater	Air heater leakage shall be less than 8% flue gas weight entering APH at 100% TMCR-DC	In 3rd coulmn of table against S.No.-10 at Sheet 67 of 186, Chapter-1, Vol-III, the figure "7.5%"be read as "10%". In 3rd coulmn of table against S.No.-5 at Sheet 65 of 186, Chapter-1, Vol-III, the figure "7%"be read as "10%".
4	III	9	Mandatory spares	8 of 103	12	a) Worm & worm wheel for gear reducer - 1 set b) Coupling - 1 set c) Bearing & Seals for cleaning device - 1 set g) Bushing for worm gear reducer - 1 set	Long Retractable cleaning device (LRNR) is used for this project. The enquired items are not applicable (not used) for LRNR. Hence the following equivalent spares items applicable for LRNR will offered instead of the enquired items. A) Chain for LRNR cleaning device b) Glands for LRNR cleaning device c) Gaskets for LRNR cleaning device g) Bushing for LRNR cleaning device	Refer Chapter 9, Clause 1.1 f), VOL.II for compliance.
5	III	9	Mandatory spares	8 of 103	12 k	Motor bearing - 1 set each for APH	The requirement (which motor bearing) is not clear. Hence, bearing for APH main drive motor will be offered.	Bid specifications to be followed.
6	III	9	Mandatory spares	9 of 103	15 d	Reduction gear box & motor for air preheater soot blower oscillation	These items are not applicable. Power pack assy which is the single equivalent item will be offered	Refer Chapter 9, Clause 1.1 f), VOL.II for compliance.

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Annexure-5								
1	Vol:III	2	TG & AUX.	39	2.2 (a)	The duel pressure condenser shall be designed for heat load corresponding to unit operation for VWO, 1% make-up and design condenser pressure...	BHEL understand that "VWO output 0% make-up condition is 105% of rated output." Please confirm.	Confirmed.
2	Vol:III	2	TG & AUX.	38, 39	2.1 (h) (m)	Water box, tube plates and support plates material carbon steel as per ASTMA-285 Gr.C or equivalent and suitable for intended duty. Shell material shall be carbon steel conforming to ASTMA-285 Gr.C or equivalent and suitable for intended service...	It shall be as per IS 2062 Gr-BR E250 (Impact tested). BHEL has been using material as per IS 2062 in all the 800MW/ 660MW/ 500MW/ 250MW sets supplied to various utilities which are in operation for last 25-30 years. Further, it is confirmed that the material offered is equivalent to the material specified and is suitable for intended purpose.	Noted
3	Vol:III	2	TG & AUX.	38, 39	2.1 (g) (q)	Tubes shall be welded type stainless steel as per ASTMA-249-TP304 and meeting the ASME specification for general requirements... The condenser tube must be SS seamless tubes (ASTM A-213-TP304).	Welded tubes are mention in the clause 2.1 (g) and Seamless tubes are mention in the clause 2.1 (q) & Table- condenser design parameters 1 (i). kindly clarify and consider the welded tubes for condenser. Tube shall be welded as per ASTM A-249-TP304. 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.	Condenser tubes may be Welded Tubes as per ASTM A-249-TP304 OR SS Seamless tubes as per ASTM A-213-TP304.
4	Vol:III	2	TG & AUX.	38	2.1 (h)	..Titanium cladding of required thickness (5 mm minimum) shall be provided on water side of tube sheet plate...	Tube Plate shall be of IS:2062 Gr-B without Ti cladding. A) As per the water chemistry and CoC of cooling tower for the given project, there is no need of Ti cladding. B) It shall be as per IS 2062 Gr-BR E250 (Impact tested). BHEL has been using material as per IS 2062 in all the 800MW/ 660MW/ 500MW/ 250MW sets supplied to various utilities which are in operation for last 25-30 years. Further, it is confirmed that the material offered is equivalent to the material specified and is suitable for intended purpose.	a) Noted. b) Noted.
5	Vol:III	2	TG & AUX.	38	2.0 (g)	Maximum oxygen content of condensate leaving the condenser shall be 0.015 CC per litre over the entire load range.	As Supercritical thermal set runs on oxygenated regime, oxygen levels in system will be much higher. Hence, conductance of such test is not technically feasible at all loads. The referred Dissolved Oxygen levels shall be demonstrated in Start-up up to 35% load with zero makeup & in-line with HEI.	Bid specifications to be followed.
6	Vol:III	2	TG & AUX.	41	2.2 table-1 (3)	Water box test pressure 1.5 times the design pressure.	Test Pressure shall be 1.3 times of Design Pressure. This is in line of ASME Sec. VIII, Div.1	Noted.
7	Vol:III	2	TG & AUX.	44	2.6 (c)	..cooler used in vacuum pumps shall be with SS seamless tubes (ASTM A-213-TP304)...	Tube shall be welded as per ASTM A-249-TP304. Welded Tubes are weld Eddy Current and Hydro Tested. Hence, Welded Tubes are in no way inferior to Seamless Tubes.	Noted.
8	Vol:III	2	TG & AUX.	45	2.6 (i)	..materials for vacuum pumps and seal water recirculation pumps as below:- (2) Shaft – Stainless Steel (3) Impeller - stainless steel	Impeller shall be Nodular Cast iron. Shaft Material shall be CS EN-8. Proposed material is suitable for intended purpose and is being supplied in all Vacuum Pumps for 660 MW / 800 MW rating sets.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
9	Vol:III	2	TG & AUX.	29	1.18 (d)-4	...Further all the parts of lube oil coolers (tubular or plate type)…	BHEL proposed to supply of Oil cooler - plate type. Kindly provide the technical details for plate type cooler as already mention in clause no. 1.18 (d)-4.	Bid specifications to be followed.
10	IV	ch.2	Generator & Accessories	11 of 43	13 (D)	At least six (6) numbers of optical sensor type vibration picksups 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.	Clarification- Information of Turbine Superrvisory system and End winding vibration monitoring system shall be available independently on DCS.	Bidder may provide a stand alone system for vibration monitoring. However, bidder is to provide details and past performance of the system during detailed engineering.
11	IV	ch.2	Generator & Accessories	11 of 43	13 (D)	Online partial discharge (PD) monitoring-Permanently connected independent sensing unit for each generator shall be provided along with necessary terminal equipment. 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.	Online PD monitoring system performance and their noise cancellation effectiveness is not proven and is not verifiable against any reference.	Generator online partial discharge monitoring system is not required, accordingly following Clauses stands deleted: i) Sr. No. (13) (F) (Online partial discharge (PD) monitoring) of clause no. 2.05.00 at page 11 of 43 of Chapter 2 of Vol.IV. ii) Sr. No. 33 (Generator on-line Partial Discharge Real Time Monitoring System) of clause no.35.03.00 at page 25 of 31 of Chapter 35 of Vol.IV
12	Vol - I / Sec - III. Vol - II	Ch - 8	Conditions of Contract : Commercial & General FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS	50 of 60 9 of 57	12.2 3.2	Adjustment Factors For Bid Evaluation. Amount of Liquidated Damages (LD) Applicable Under Category-I Guarantees.	Liquidated Damages (LD) are generally higher than Bid evaluation rates. Here we found it is same for both Bid Evaluation as well as LD. May please be re-examined.	Bid specifications to be followed.
13	Vol - I / Sec - III. Vol - II Vol - II	Ch - 8	Conditions of Contract : Commercial & General FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS TURBINE GENERATOR & AUXILIARIES	50 of 60 4 of 57 34 of 87	12.2 3.1 1.23.1	Turbine Cycle Heat Rate in kcal/kwhr under rated steam conditions at guaranteed optimized condenser pressure with zero make-up at 440 MW Unit Load (i.e. 55% of rated load) and 800 MW Unit Load (i.e. 100% of rated load). Turbine Cycle heat rate in kcal/kWhr under rated steam conditions at guaranteed condenser pressure with zero make up at 440 MW unit load (i.e. 55% of rated load) and 800 MW Unit Load (i.e. 100% of rated load). b) 840 MW VWO output (i.e. 105% TMCR) under rated steam condi-tion at design condenser pressure with zero make up (GUARAN-TEED HEAT RATE).	1. Please clarify & confirm that Heat Rate guarantee is for 100% load & 55% Load. At 55% load, the same to be taken with 1 TDBFP in service. Please confirm. 2. We understand that Guaranteed Optimized condenser pressure (i.e. Condenser Pressure at 105% Load, 1% MU, 32.5 °C CW temp.) will be used for guarantees of Heat rate and generation of Heat Balance diagram irrespective of Heat Load on condenser. Please confirm.	1) Confirmed 2) Confirmed with CW temp of 33 deg C. New para under Vol-III, Ch-2, Clause 1.23.1,is added as below:- z) 320 MW output under turbine throttle inlet steam conditions corresponding to sliding pressure at design condenser pressure with 0% & 1% make-up. New Clause under Vol-II, Ch-8, Clausee 6.7 is added as below: Demonstration of the plant at 40% TMCR (Without oil support) corresponding to the HBD as specified in clause no Clause 1.23.1 (z).

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
14	Vol - II	Ch - 8	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS	4 of 57	3.1	PG test for Turbine cycle Heat Rate & Steam Generator Efficiency shall be conducted simultaneously.	PG test for Turbine cycle Heat Rate & Steam Generator Efficiency shall be conducted simultaneously but independently as requirement for both tests codes are different.	Bid specifications to be followed.
15	Vol - II	Ch - 8	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS	4 & 9 of 57	3.1 & 3.2	Continuous TG output of 800 MW unit load (i.e. 100% of rated load) under rated steam conditions at guaranteed condenser pressure with 0% make-up. For deficiency in Turbine Generator Output of 800 MW (100% rated load) under rated steam conditions, 70 mm Hg (abs) condenser pressure with 0% makeup.	Condenser Pressure for output test to be confirmed.	Bidder to follow Chapter 8 , Sheet 5 of 57, Voume II
16	Vol - II	Ch - 8	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS	5 & 10 of 57	3.1 & 3.2	Condenser Pressure in mm Hg (abs) measured at 300mm above the top row of condenser tubes at 800 MW unit Load, 1% make up, design CW inlet temperature and design CW flow. For deficiency in condenser pressure measured at 300 mm above top row of condenser tube at 840 MW of unit load, 1% make up, design CW inlet temperature & design CW flow	Output for condenser test to be confirmed.	Shall be read as ''Condenser Pressure in mm Hg (abs) measured at 300mm above the top row of condenser tubes at 840 MW unit Load, 1% make up, design CW inlet temperature and design CW flow"
				53 of 57	6.6	During Performance/ Acceptance test, following tests shall be carried out for T.G. set with test grade instruments as per ASME code. (i) Guarantee Turbine Cycle Heat rate test at 840 MW (105% rated load) corresponding to the heat balance diagram specified in the tender specification. (ii) Guarantee Turbine Cycle Heat rate test at 800 MW (100% rated load) corresponding to the heat balance diagram specified in the tender specification. (iii) Guarantee Output test of 840 MW (105% rated load) corre-sponding to the heat balance diagram specified in the tender specification	Clarification: (i) To be deleted. (ii) Noted. (iii) As per guarantee schedule output test to be done at 800 MW. To be deleted. (iv) Noted. (Demonstration test) (v) Same as Point - ii above. To be deleted (vi) Noted. (vii) To be deleted as not envisaged in guarantee schedule. (viii) – (ix) To be deleted. (x) To be deleted	Following changes are made in below mentioned sub clauses of Clause 6.6 of Chapter-8 at Sheet 53/54 of 57, Vol-II:- (i) & (iii): The word "Guarantee" stands deleted. (v) & (viii): Deleted. (ix) & (x): Figure "3%" be read as "0%"

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
17	Vol - II	Ch - 8	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS			tender spec-ification. (iv) Maximum continuous output corresponding to both strings of HP heaters out of operation, corresponding to the heat balance diagram specified in the tender specification. (v) Turbine cycle Gross heat rate at 100% load on the unit/s corresponding to the heat balance diagram. (vi) Output test of TMCR corresponding to the heat balance diagram. (vii) Capability of unit/s at VWO conditions, corresponding to the heat balance diagrams with 3% make-up. (viii) Auxiliary power consumption tests at 100% load on the unit/s at rated steam condition, 3% make-up and designed condenser pressure. (ix) Maximum continuous output corresponding to one HP heaters out of operation, under rated steam conditions at a designed con-denser pressure and 3% makeup. (x) Maximum continuous output corresponding to both HP heaters out of operation, under rated steam conditions at a designed con-denser pressure and 3% makeup.	(x) To be deleted.	
18	Vol - III	Ch - 2	TURBINE GENERATOR & AUXILIARIES	35 of 87	1.23.1	HBD (j) VWO output under rated steam conditions at design condenser pressure with 1% makeup	Please change VWO Output to VWO Flow.	In Clause 1.23.1(j) of Chapter-2 at Sheet 35 of 87 of Vol-II, the word "VWO output" be read as "VWO flow".
19	Vol - III	Ch - 2	TURBINE GENERATOR & AUXILIARIES	35 of 87 & 30 of 87	1.23.1 & 1.20	HBD (r) HP-LP bypass operation under rated steam conditions with steam generator output of 60% of BMCR. a) Ensure HP bypass aggregate capacity not less than 65% of the main steam flow at BMCR condition considering rated main steam parameters at the upstream of valves & CRH steam parameters (pressure and temperature) corresponding to 60% TMCR condition on the downstream.	Condition for HP-LP bypass design is not clear. Please clarify.	Condition for HP-LP bypass design be considered as per Clause 1.20 (a) of Chapter-2 at Sheet 30 of 87 in Vol-III.
20	Vol - III	Ch - 2	TURBINE GENERATOR & AUXILIARIES	12 & 75 of 87	1.1.2	Turbine throttle main steam temp : 600 °C, Reheat steam temp. at turbine inlet : 600 °C. Note - * Maximum operating Main Steam & Hot reheat temperature at turbine inlet shall be 605 ° C. ± 5 °C is operating margin. Turbine shall be designed for 605 °C temperature	Bidder understand that Turbine shall be designed for 600 °C steam temperature for the purpose of bid evaluation and performance guarantee. However short term variation as per guideline shall be allowed. This is in line with current tender practice. Please confirm.	"Note" given at top of the Sheet 12 & 75 of 87 of Chapter-2 / Vol-III be read as:- "The latest IEC-45 design code shall be followed".
21	Vol - III	Ch - 2	TURBINE GENERATOR & AUXILIARIES	5 of 87	2.2 - 9	Boroscopic inspection ports in turbine for in situ inspection of turbine internals shall be provided as per bidder's standard practice with one set of applicable tools.	It is to be clarified if only applicable tools for boroscopic port opening are to be provided. Boroscopic inspection system is not envisaged. To please clarify.	In Sub clause 9 of Clause 2.2 at Sheet 5 of 87 of Chapter-2 of Vol-III, the word "ports" be read as "kit".

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
22	Vol - III	Ch - 2	TURBINE GENERATOR & AUXILIARIES	6 of 87	2.2 - 14	The turbine injection shall be provided with a control valve and a power operated NRV. In Addition to these valves in the injection lines, stop valves shall be provided in order to make possible repair and maintenance work on turbines during shut-down.	The requirement is not clear. May please be elaborated.	In Sub clause 14 of Clause 2.2 at Sheet 6 of 87 of Chapter-2 of Vol-III, the word "and a power operated NRV" stands deleted.
23	Vol - III	Ch - 2	TURBINE GENERATOR & AUXILIARIES	10 of 87	17	Tools and Tackles 1. One set of all special tools and tackles required for the maintenance of equipment / system have to be supplied. These tools and tackles shall be separately packed and brought to site. These shall not be used for erection / commissioning purposes and shall be in an unused and new condition, when they are handed over to the Owner. A list of all such special tools and tackles shall be submitted alongwith the offer. 2. One set of maintenance and repair tools including all special tools and tackles required for the installation and maintenance of equipment/ system for commissioning, testing, calibration, modification and maintenance.	Bidder understand that only One set of special tools & tackles for Steam Turbine to be suplied. Hence Sl 2 to be deleted. This is in line with current tender practice.	Clause 17 of Chapter-2 at Sheet 10 of 87 in Vol-III be read as: "One set of maintenance and repair tools including all special tools and tackles required for the maintenance of equipment / system shall be handed over to the Owner in healthy condition. A list of all such special tools and tackles shall be submitted alongwith the offer."
24	Vol - III	Ch - 2	TURBINE GENERATOR & AUXILIARIES	12 of 87	1.1.4	TMCR (Turbine Maximum Continuous Rating) This means 800 MW electric power output at generator terminal under 0% cycle make up at 33°C design cooling water inlet temperature.	TMCR : This means 800 MW electric power output at generator terminal under 0% cycle make up at 32.5°C design cooling water inlet temperature. Please confirm	Bid specifications to be followed.
25	Vol - III & Vol II	Ch - 2 & 3	TURBINE GENERATOR & AUXILIARIES OPERATING CAPABILITY OF PLANT	14 of 87 2 of 4	1.1.7 3.3 - p	Number of Start ups: Cold : 455, War : 1000, Hot : 4500. Cold : 250, War : 1000, Hot : 4000.	The clauses are contradictory. The requirements of such higher number of starts are not practical. Our recommended number of starts are : Hot start - 3000, Warm Starts : 700 & Cold Start - 100. HPGCL to reconsider the practicability and requested to adopt our proposal.	In Clauses 1.1.7.1 of Chapter-2 at Sheet 14 of 87 in Vol-III and Clause 3.3 (p) of Chapter-3 at Sheet 2 of 4 in Vol-II, Number of Start ups be read as: Cold : 150, Warm : 1000, Hot : 4000.
26	Vol - II	Ch - 3	OPERATING CAPABILITY OF PLANT	2 of 4	3.3 - m	TG output for house load operation may be considered 40 MW atleast for 1 hour.	House Load of at least 50 MW may be considered.	In Clause 3.3 (m) of Chapter-3 at Sheet 2 of 4 in Vol-II, the figure "40 MW" be read as "50 MW"
27	Vol - III	Ch - 2	TURBINE GENERATOR & AUXILIARIES	27 of 87	1.18-b (1)	The above particle size and moisture content shall be demonstrated with inlet oil quality confirming to 21/18 as per ISO: 4406 and 1500 PPM moisture respectively in one pass.	It seems typographical error. Particle size and moisture content shall be demonstrated with inlet oil quality confirming to 21/18 as per ISO: 4406 and 15000 PPM moisture respectively in one pass.	In Clause 1.18 (b) (1) of Chapter-2 at Sheet 27 of 87 in Vol-III, the figure "1500 PPM" be read as "15000 PPM"
Annexure-6								
1	II	Chapter 9	Mandatory Spares	61 of 103	1.01.05	Brush holder of each type (one set should include all types and sizes of brush holder for one generator excitor) (details of quantity) (for static excitation only)	Not applicable as Brushless Exciter will be offered. HPGCL to accept.	Spares as applicable for the offered system to be supplied.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	II	Chapter 9	Mandatory Spares	61 of 103	1.01.06	Carbon brush (details of quantity) (for static excitation only)	Not applicable as Brushless Exciter will be offered. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
3	II	Chapter 9	Mandatory Spares	61 of 103	1.01.07	Slip ring with brush	Not applicable as Brushless Exciter will be offered. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
4	II	Chapter 9	Mandatory Spares	62 of 103	1.02.00-g	Temperature, Pressure and temperature pressure switch	Not offered, as no temperature and pressure switch used in gas system. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
5	II	Chapter 9	Mandatory Spares	63 of 103	1.02.00-h	Bearings & seals for fan and gas drier	Not applicable as Refrigeration Gas Drier will be offered. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
6	II	Chapter 9	Mandatory Spares	63 of 103	1.02.00-j	Dessicant for gas drier	Not applicable as Refrigeration Gas Drier will be offered. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
7	II	Chapter 9	Mandatory Spares	63 of 103	1.02.00-k	Thermometers	Not offered, as no thermometer used in gas system. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
8	II	Chapter 9	Mandatory Spares	63 of 103	1.03.00-e	Vacuum pump spares (1 set bearing rotor with shaft, gas ballets valve gaskets. 'O' rings, felt filters, other filter elements)	Not applicable as Double flow seal oil system is offered. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
9	II	Chapter 9	Mandatory Spares	63 of 103	1.03.00-k	Vacuum pressure gauge	Not applicable as Double flow seal oil system is offered. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
10	II	Chapter 9	Mandatory Spares	63 of 103	1.03.00-n	Vacuum valves of all sizes and types	Not applicable as Double flow seal oil system is offered. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
11	II	Chapter 9	Mandatory Spares	63 of 103	1.05.00-a &b	Pump & Motor	Complete pump and motor set in assembled condition shall be offered. HPGCL to accept.	Accepted

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
12	II	Chapter 9	Mandatory Spares	63 of 103	1.05.00-c	Float for level regulator	Not Applicable as per OEM Standard. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
13	II	Chapter 9	Mandatory Spares	63 of 103	1.05.00-e	S.S. 3 way cock	Not Applicable as per OEM Standard. HPGCL to accept.	Spares as applicable for the offered system to be supplied.
14	II	Chapter 9	Mandatory Spares	15 & 16 of 103	2.1-A-XIX 2.1-B-k 2.1-C-n	Front pedestal oil guard ring (Complete set of oil guard assembly for front & rear with fixing material)	In each of mentioned three clauses, requirement is same. Whether the requiremnt is only for Front pedestal oil guard ring or other oil guard rings are also required. Clauses may be modified accordingly. HPGCL to confirm.	Bid specifications to be followed.
15	II	Chapter 9	Mandatory Spares	16 of 103	2.1-C-a 2.1-C-b 2.1-C-c	a. Expansion ☐ 1 Bellows 1 set b. Expansion ☐ 2 Bellows 1 set c. Expansion ☐ 3 Bellows 1 set	Since all applicable expansion bellows are covered at clause 2.1-C-d, then which bellows are require against clauses 2.1-C-a; b & c HPGCL to confirm.	Bid specifications to be followed.
16	II	Chapter 9	Mandatory Spares	16 of 103	2.1-C-r	All type of fasteners of LP turbine and its piping	Since all fasteners of LPT are covered at clause 2.1-C-j, then which fasteners are asked at this clause.	Bid specifications to be followed.
17	II	Chapter 9	Mandatory Spares	17 of 103	2.1-I (a,b,c,d)	Turning Gear a Stationery Blades/Nozzle 1 set b Rotating Blades 1 set c Gear internal with shafts, bearing, bushes, lock washers, oil seals, 'O' rings. 1 set d 25% nozzle segments & moving blades and complete set of sealing strips with caulking material (If hydraulically operated). 1 set	Loose items mentioned in the specification are Not Applicable . In leu of these listed loose items, only complete assembled Hydraulic Turning Motor can be offered. HPGCL to accept.	Noted
18	II	Chapter 9	Mandatory Spares	18 of 103	2.1-BB	Bladders, filters, seal/O rings	These spares are required for which equipment / assembly. HPGCL to inform.	Bladders, filters, seal/O rings shall be supplied for all equipment having these components.
19	II	Chapter 9	Mandatory Spares	93 of 103	1.00.16-B	Mandatory spares for each type of critical applications special control valves. a) Soft Goods Kit Valve 1 Set b) Metal seat 1Set c) Seat Ring 1Set d) Spindle 1Set e) Actuator Soft Goods kit 1 Set f) Feed back transmitter unit 2 NOS. g) Electronic Position Transmitter 2 NOS. h) Solenoid valves 2 NOS. i) Air Filter Regulators 2 NOS. j) Air Lock Relay 2 NOS. k) Complete actuator for 1 Set each type and model	What is definition of critical applications special control valves. Which valves are to be considered under this clause. HPGCL to inform.	Refer Clause 11.09.00, Sheet 8 of 10, Chapter 11/Part B, Volume V.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
20	II	Chapter 9	Mandatory Spares	94 of 103	1.00.16-D	Common spares for HP By Pass & Spray control valves system and LP By Pass & Spray control valves system separately: i) Feedback transmitter 2 NOS. ii) Electronic positioner 2 NOS. iii) Proportional Valve 2 NOS. iv) Quick opening device 2 NOS. v) Seal sets 4 Sets vi) Solenoid Valves 2 NOS. vii) Filters for Oil Units 1 set viii) Supply manifold for oil units 1 No ix) Hose for each service 1 each x) Seal set for oil unit 1 Set xi) Complete actuator for each 1 set type and model	HP Bypass system ans LP Bypass system are two different systems. There are no common spares between these two systems. This clause should be deleted / modified. HPGCL to confirm.	Listed Spares shall be supplied separately for HP Bypass and LP Bypass system
21	II	Chapter 9	Mandatory Spares	94 of 103	1.00.16-E	1 No of Nozzle for each PRDS De Super heater & Spray water desuperheater and orifice plate for CEP flow.	Requirement is for which assembly / equipment. HPGCL to inform.	Bid specifications to be followed.
22	II	Chapter 9	Mandatory Spares	18 of 103	2.1-R-a	All HP & LP heaters safety valves (water box & shell side)	LP Heaters-1&2 is 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 provided in LP Heaters-1&2. HPGCL to accept.	Bid specifications to be followed.
23	II	Chapter 9	Mandatory Spares		General	Definition of "Set"	We understand that a "set" means items required for the assembly / sub assembly required for complete replacement in one equipment / system as the case may be. HPGCL to confirm.	Confirmed.
24	II	Chapter 10	Mandatory Spares		General		In case of repetitive requirement, bidder will supply the spares in the clause where maximum quantity is called for. HPGCL to accept.	Bid specifications to be followed.
Annexure-7								
1	Volume III Mechanical Works	Chapter 24	Inert gas flooding syst	12 of 66	Cl. No. 24.4.5.1,	Intert gas system shall be provided in a) Main Control rooms under false flooring, above false ceiling, and inside the rooms' voids. b)Electronic equipment rooms, Computer rooms, UPS rooms battery and battery charger room.	Bidder understands that the Inert gas system shall be provided in , main control rooms, Electronic equipment rooms, UPS rooms , battery & battery charger rooms of TG Building only. Please confirm	Bid specifications to be followed.
2	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	21 of 66 24 of 66	Cl. No. 24.4.7.1, e Cl. No. 24.4.7.1, h Cl. , n	UPS power supply	As plant UPS system is already available bidder proposes to take redundant power supply for Fire alarm panels,Operating work station, printer from Plant UPS. Please confirm	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	21 of 66	Cl. No. 24.4.7.1, i	Repeater panel	i)Bidder understands that only one repeater panel to be considered and the same will be placed in existing fire station. However as per Volume V,Part B/Ch 14: Annexure-A page 2 of 12 "Repeater Panel shall be provided at different locations in plant like each at fire station building, Cooling water pump house, Switchyard control room etc and at any other location as mentioned in the technical specification elsewhere. " which is contradictory to the clause in volume -III . please clarify.	Bid specifications to be followed as per Volume V, Part B/Ch 14: Annexure-A page 2 of 12.
4	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	22 of 66	Cl. No. 24.4.7.1, n	Emergency Voice Communication System	As plant EPABX system is already available in the scope of this tender, separate voice communication system is not required. In view of this Emergency voice communication system is not envisaged by bidder. Please confirm. If required FDA system shall be interfaced with EPABX system.Please confirm.	Bid specifications to be followed.
5	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	22 of 66	Cl.no b),C)	Multi criteria type smoke detectors,combination of both multisensor and photoelectric smoke detectors	Bidder proposes to provide MSD (multi sensor detectors) instead of smoke detectors & photo voltaic smoke detectors.Please confirm	Bid specifications to be followed.
6	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	23 of 66	d)	Linear Heat sensing Cable (Digital type) detection system for coal conveyors, and cable galleries covered under MVW Spray Systems.	Please note that the mentioned clauses are contradicting please clarify if LHS cable is Digital or optical type.	Bid specifications be followed as per Clause 9.02.10,(2.00.00) at Sheet 21 of 36 Chapter-9/Part-B/ Volume V.
	Volume V Control and Instrumentation	Part B - chapter-9	LINEAR HEAT SENSING CABLE	21 of 36	9.02.10,(2.00.00)	LINEAR HEAT SENSING CABLE Type-Non electrically operated Optical Fibre type linear heat sensing cable.		
7	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	23 of 66	g)	Oil filled type L.T. Transformers (up to and including 2500 KVA rating) However, no oil filled L.T. Transformer has been envisaged inside power house.	Requirement of heat detector is not clear. Heat detection systems are not envisaged for outdoor system. Please confirm	Heat detector for oil filled type Transformers (up to and including 2500 KVA rating) for outdoor is not required.
8	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	24 of 66	r)	Two (2) sets (1 working & 1 standby, 100% capacity) of 24 Volt (12x2V) sealed type maintenance free lead-acid battery with charger for each Satellite fire alarm panel, Fire Detection and Alarm panels in CCR, CHP and Master Fire Alarm Panel in Fire Station.	Bidder understands that each Fire alarm panels shall have 2 nos of power sources i.e. i) 1 feeder from UPS power and ii) 1 no of 24V dedicated battery shall be provided for each fire alarm panel as the second power supply source Please confirm.	Bid specifications to be followed.
9	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	24 of 66 47 of 66	s) a) ,b)	Fire survival cables (power & control)	Since laying and bending of MICC cables is not convenient also since these cables are theft prone bidder proposes to provide MICA fire survival cables meeting the requiremnts of CWZ class .Please confirm.	It is clarified that MICC type fire survival cables is to be provided.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
10	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	27 of 66	24.4.7.2 , C	LHS cable	Bidder understands that only for coal conveyors SS braided LHS cable shall be provided. All other areas whereever LHS cable is applicable Nylon/PVC type LHS cable can be envisaged by bidder . Please confirm	Confirmed.
11	Volume III Mechanical Works	Chapter 24	Relay Modules	29 of 66	K, i),ii)	No of contacts per relay shall be 2 SPDT or DPDT. 20% spare wired relay shall be provided in each relay module.	The requirements mentioned are vendor specific and the same discussed and finalized during detail engineering	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
12	Volume III Mechanical Works	Chapter 24	Repeater Alarm Panel in Fire Station	31 of 66	C, i)	The repeater panel shall be located in the existing Plant Fire Station	Please furnish the route length from Employer's existing Plant Fire Station to proposed bidder's battery limit.	Bidder to visit site for details.
13	Volume III Mechanical Works	Chapter 24	DESIGN PHILOSOPHY FOR FIRE DETECTION, ALARM, PROTECTION AND CONTROL SYSTEM.	21 of 66	24.4.7.1,C	Fire Detection and Alarm Panel in the Central Control Room shall be provided with hardwired contacts for Group Alarms for the fire Protection, detection & Alarm system and to be connected to the DDCMIS.	Please confirm/ clarify the following i)FDA & DCS system shall be connected through- hardwire connectivity please confirm. ii) PLC & DCS shall be connected through soft connectivity please confirm iii) PLC & FDA system shall be connected through soft connectivity .Please confirm.	Bid specifications to be followed.
	Volume III Mechanical Works	Chapter 24	OPERATIONAL PHILOSOPHY & TECHNICAL REQUIREMENT:-	36 of 66	24.4.7.4	Fire system (as a whole including PLC control systems) shall be provided with necessary interface hardware and software for dual fibre optic connectivity & interconnection with station wide LAN for two–way transfer of signals for the purposed of information sharing.		
	Volume V Control and Instrumentation	Part B - chapter-14	CONTROL AND INSTRUMENTATION FOR PLANT AUXILIARY SYSTEMS	1 of 22	14.00.06	PLC systems related to Fire Protection systems shall be interconnected with Fire Alarm panels also and redundant interface to DDCMIS from Fire Alarm panels is also envisaged. The alarm signals from PLC system & fire alarm system shall be provided to DDCMIS by interconnection of FAP at CER with DDCMIS. Hardwired signals shall be provided for interlock, protection & alarm from Fire alarm panels to main plant DDCMIS and respective off-site DDCMIS/PLC.		
14	Volume III Mechanical Works	Chapter 24	Detection System for Coal Conveyors	41 of 66	K	The performance of the proposed IR detector model for detecting moving fires shall be demonstrated to Owner as per test procedure acceptable to Owner before supply of the same at site. Such demonstration test shall be conducted in a typical coal conveyor test set up at works or in a plant.	Bidder can also furnish the previous test reports and performance report instead of demonstartion tests as mentioned in the specified clause. Please confirm.	Bid specifications to be followed.
15	Volume III Mechanical Works	Chapter 24	Detection System of Cable Galleries	41 of 66	b	LHS cable (Detection System of Cable Galleries)	Bidder understands that LHS cable can be laid straight in conveyors. Please confirm.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
16	Volume V Control and Instrumentation	Part B - chapter-9	FS cables	17 of 36	9.02.08	For Fire alarm, detection & Protection System, requirements for FS cables indicated in Vol. III shall also be complied by bidder. Complete cables for FDPS shall be Fire survival only..	Please note that as per Volume-III chapter 24,page 24 of 66, cl.S the fire survival cables are applicable to only CHP area, whereas as per the mentioned clause complete cables for FDPS system shall have Fire survival cables. Please clarify.	Bid specifications to be followed, however MICC fire survival cables shall be provided in CHP. For other areas of FDPS applications, cable shall be fire survival type (withstanding 750 deg. C for a time upto 3 hours) in line with specifications provided in Vol-IV.
17	Volume III Mechanical Works	Chapter 24	Fire Water and Jockey Pumps	18 of 66	A2 e)	Motor driven Fire hydrant pumps shall be VFD Driven	Please note that, it is not recommended to drive the Hydrant Pump motor through VFD due to following reasons:- 1. The Hydrant / spray Pumps are fixed speed pumps, for which variable speed through VFD is not required 2. These pumps are required for critical service hence introducing VFD as an extra component will only reduce the reliability of the system and complicate the operation in case of emergency 3. In all other project requirements seen by us so far, these pumps are never operated through VFDs. Customer / consultant may inform us the operating philosophy of asking VFD in this project for these pumps, however we recommend for not using VFDs	Clause 24.4.6 (A2)(e) of Chapter-24 at Sheet 18 of 66 in Vol-III be read as: "Motor driven Fire hydrant pumps".
Annexure-8								
4	Vol:III	2	TG & AUX.	54	6.1 (a)	LP heater tubes shall be SS seamless (ASTM A-213-TP304).	Welded tubes are mention in the clause 6.0 (i) and Seamless tubes are mention in the clause 6.1 (q). kindly clarify and consider the welded tubes for LP Heaters. Tube shall be welded as per ASTM A-688-TP304. 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.	Last line of Clause 6.1(a) of Chapter-2 at Sheet 54 of in Vol-III be read as: "LP heater tubes shall be SA 688 TP304."
Annexure-9								
1	IV	Ch1:	Electrical Scope of Work	Sheet | 2 of 58	1.02.06	Augmentation & Modification of existing 220 kV switchyard including ACSR busbars, Bus Coupler Bay, protection & metering system, SCADA system (SAS), extension of shield wires, fencing, earth mat, trenches, roads, drains, shifting of existing Main-Bus I & II EMVT and transfer Bus EVT (from Bay 14 side toward Bay 1) etc. and all other interfacing provisions are in the scope of EPC Bidder.All components requiredfor Integration of protection relay and IEDs being proposed under this contract with the existing stage-I switchyard SAS system for control and protection shall be in the scope of bidder. Protection & Control system shall be provided with Numerical relays. Cyber security guidelines issued by CEA/GOI shall be followed while designing and configuring SAS. Bus bar protection integration in the existing Stage-I bus bar protection for all 220kV bays under present scope shall be in bidder's scope.	A. Kindly provide following drawings/ details of existing 220kV Switchyard, 1. Earthmat 2. Tower details 3. SAS architecture B. Please clarify that whether new 400kV GIS SAS is to be integrated with exsisting 220kV SAS or not. Please provided 400kV SAS architecture and Key Protection SLD.	A. Available drawings enclosed at Attachments 1 & 11. However this being EPC job, Bidder is requested to visit site for further details. B. New 220kV bays is to be integrated into existing SAS. Further, for monitoring purpose complete status& parameters display of exisiting SAS shall be available in new 400 kv switchyard control room. Similarly, for monitoring purpose complete status& parameters display of new 400 KV SAS should also be provided in the existing 220 KV switchyard control room. 400KV SAS architectutre is attached as attachment-15.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	IV	Ch1:	Electrical Scope of Work	Sheet | 6 of 58	1.02.30	ABT meters (Main Meter and Check Meter) shall be provided for 400 kV outgoing lines, Bus Reactor (only space provision), 400 kV Transformer feeders (GT,ST). ABT meters (Main Meter for HV side of ICT and Check Meter for LV side of ICT) shall be provided for ICTs of 315 MVA rating.	1. We understand that Bus reactor (only space provision) means civil foundation with rail cum road is required and no ABT meters are required for Bus reactor bay. Please confirm. 2. We understand that all the ABT (main and check) meters shall be installed in new 400 kV GIS control room building. Please confirm.	1. For reactor bay only GIS equipment needs to be supplied at present. All balance items including civil works, outdoor bay duct and outoor equipments shall not be in the bidder's scope.Bidder shall provide space provision in layout for the Outdoor reactor bay equipments,duct & fondation etc. 2. It is clarified that ABT meters mentioned at clause 1.02.30 will be installed in 400 kV GIS control room. ABT mentioned at Cl. 1.02.31 will be installed in main control room.
3	IV	Ch1:	Electrical Scope of Work	Sheet | 8 of 58	1.03.01	400kV Switchyard: Complete up to line take off tower (Take off tower by others).	We understand that scope is up to 400 kV switchayrd gantry, beyond switchyard gantry including string insulators is scope of others. Please confirm.	Confirmed. 400 kV switchyard termination point will be upto outgoing line take off gantry. Jumper of take off gantry to line shall be provided by the bidder.
4	IV	Ch1:	Electrical Scope of Work	Sheet | 8 of 58	1.03.02	PLCC & FOTE System including 48V DC System for 400 kV Lines.	1. Please confirm that supply of Remote end Equipemnt like CVT and Wave trap for PLCC are not in scope of Bidder. 2. Please clarify the supply and ETC scope of remote end Communication equipment like FOTE, PLCC panel LMUs, HF cable.	Work at remote end of outgoing 400 kV lines is not in the bidder's scope. Bidder to provide only outdoor equipments like CVT, Wave Trap & connecting cables required for PLCC/FOTE systems at Power Plant switchyard end only. PLCC & FOTE System including 48V DC System at both ends of 400 kV Lines shall not be in the bidder's scope. Bidder shall only provide space for installation of the same at power plant end.
5	a	Ch1:	Electrical Scope of Work	Sheet | 18,19 of 58	1.13.00	ELECTRICAL CONTROL & RELAY PANEL	We undersatnd that Station Transformer (ST) Control, Protection & Metering Panel both HV and LV to be placed/installed in 400 kV GIS Switchyard Control Room. Kindly confirm.	Confirmed.
6	IV	Ch1:	Electrical Scope of Work	Sheet | 32 of 58	1.24.12	Energy Accounting & Audit Meters and associated Instrument Transformers (Meters & CTs – 0.5s and PTs-0.5 accuracy class) shall be of communicable, multifunction, electronic digital integrated type meter, (meter and metering CTs shall comply the relevant CEA metering regulation 2006 and its latest amendments) suitable for measurement, recording and display of cumulative energy with date & time, having a built-in calendar & clock and shall have high sampling rate.	Bidder understands that dedicated Intrument CT and PT separate from protection function are required for ENERGY ACCOUNTING & AUDIT METERING. Whether these equipment are outdoor or part of GIS. Kindly confirm.	Bidder to comply clause 1.28.00. However, multicore single CT complying all the specification for protection and metering can be used. For 400 kV system CTs and PTs shall be part of GIS. 400 KV CTs should have 6 cores (2 metering, 3 protection and 1 spare).
7	IV	Ch1:	Electrical Scope of Work	Sheet | 45 of 58	1.36.00	In areas, where acid/ alkali ingression is likely (such as Battery Room, WTP, PT Plant, etc) to occur, Fibre Reinforced Plastic trays with fire retardant corrosion resistance properties shall be used.	Kindly confirm whether the FRP tray are to be used in 400 kV GIS building area and 220 kV AIS area.	FRP trays shall only be used inside Battery Room of 400 kV switchyard.
8	IV	Ch4:	GIS	Sheet | 3 of 88	4.02.02	G. Gas insulated busduct with SF6 to oil bushings for direct connection to transformer for ICT bays.	Whether SF6 to Air buishing with air termination with ICT is acceptable, kindly confirm.	Bid specifications to be followed.
9	IV	Ch4:	GIS	Sheet | 4 of 88	4.02.02	R. Circuit breakers of line bays to be provided with PIR, if the Line Lengths are more than 200 KM (as Applicable). Also, circuit breakers for Line, GT, ST and ICT shall be provided with CSD (Controlled switching device).	Please provide the line lengths to decide requirement of PIR.	As per preliminary information received from Haryana Transmission Utility, line length of outgoing 400 kV lines will be less than 200 KM. Exact Line length shall be informed during detailed engineering. Accordingly PIR and CSD will not be required in line bays.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
10	IV	Ch4:	GIS	Sheet | 5 of 88	4.02.04	pl refer to Extract of Tender darwing no 112-10-100 sh 2 of 2. I. Two (2) Sets of 220 V Ni Cad/Lead Acid Plante type battery with 1x100% float charger and 1x100% float cum Boost chargers for each battery bank connected to a DCDB.	As per Tender Drawing 2 nos. main chargers and 1 no. standby charger required however as per clause (I) 2 nos. chargers are required. Please clarify.	Clause 4.02.04 is clarified as below:- (I) 2X100% Sets of 220 V Ni Cad/Lead Acid Plante type battery alongwith 1x100% float cum boost charger for each set of Battery bank and 1 No. standby float cum Boost battery charger common for both battery banks. The Battery Bank, Battery Chargers and with one no. DCDB shall be part of 220 V DC system to cater to the DC loads of 400 kV switchyard.
11	IV	Ch4:	GIS	Sheet | 4 of 90	4.03.05	The Bidder shall be fully responsible for carrying out all co-ordination & liaison work as may be required with Electrical Inspector, Factory Inspector & other statutory bodies for implementation of the work. The application on behalf of the Owner for submission to the Electrical Inspector & other statutory bodies along with the copies of drawings complete in all respects shall be done by the Bidder & approval/certificates taken well ahead of time so that the actual commissioning of equipment is not delayed for want of inspection and approval by the Inspector & statutory bodies. The Bidder shall arrange the actual inspection work by the Electrical Inspector.	Normally application is submiited in the name of owner of the Faciltity and Electrical Inspector/statuary bodies only accept owner application not the bidder/contractor's, however all necessary support shall be provided by bidder. Request you to amend the clause accordingly.	Bid specifications to be followed. Statutory clearances are in the scope of Bidder. However HPGCL will facilitate /assist regarding required clearances from the concerned authorities.
12	IV	Ch4:	GIS	Sheet | 10 of 88	4.04.14	A wheeled maintenance device shall be supplied with pressure vessel, vacuum pump and all required gauges and fittings for the service of the switchgear.	Kindly specify technical requirement like compressor capacity, vacuum pump capacity etc. for wheeled maintenacne device.	Techical Specification of Gas Processing Unit is enclosed as Attachment-2 .
13	IV	Ch4:	GIS	Sheet | 13 of 88	4.04.48	The material and thickness of the enclosures shall be such as to withstand an internal flash over without burn through for a period of 300 ms at rated short time with stand current.	Kindly accept Burn through period as per IEC62271-203, 2011 .	Bid specifications to be followed.
14	IV	Ch4:	GIS	Sheet | 15 of 88	4.04.36	GIS HALL LAYOUT CRITERIA	Kindly accept GIS hall width as per OEM requirement.	Bid specifications to be followed.
15	IV	Ch4:	GIS	Sheet | 20 of 88	4.08.1	The Circuit Breaker shall be equipped with controlled switching with consequent optimization of switching behavior when used in switching of transformers (ICT's, GT, STs) and Lines. The controller shall be provided in Main & Tie circuit breakers of transformer bays	Bidder understand that CSD is not required for Line bays, Kindly check CSD requirement for Line feeders.	As per clause 4.08.01, CSD device is to be provided for all breakers controlling ICT, GT, ST and Reactor.
16	IV	Ch4:	GIS	Sheet | 27 of 88	4.14.00	Surge arrester shall be of SF6 gas insulated, metal enclosed, gapless metal oxide, heavy duty, station type.	Please confirm whether outdoor type LA is acceptable.	Clarified that as per tender drg no. 112-10-200 (400kV GIS single line diagram) LAs /SA are to be provided as below: i) SF6 gas insulated SA to be provided for the 400kV main bus I & II. ii) SF6 gas insulated SA to be provided in GIB for ICTs. iii) Outdoor type LAs to be provided for Line, GT and ST bays.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
17	IV	Ch4:	GIS	Sheet | 30 of 88	4.19.00	One No. SF6 gas processing unit suitable for evacuating, liquefying, evaporating, filling, drying and purifying SF6 gas during the initial installation, subsequent maintenance and future extension of GIS, shall be provided. The cart shall be equipped with rubber wheels and shall be easily maneuverable by two workers within the GIS building.	Kindly specify technical requirement like compressor capacity, vacuum pump capacity etc. to select sutaible model of SF6 Gas processing unit.	Techical Specification of Gas Processing Unit is enclosed as Attachment-2.
18	IV	Ch4:	GIS	Sheet | 30 of 88	4.31.08	Type tests to be carried out on one (1) complete lightning arrester of each voltage class according to latest revision of IS 3070 (Part-3).	Valid type test report shall be submitted. Kindly confirm.	Surge arrestor (GIS) shall be type tested in accordance with clause no. 1.06.02 & 1.06.03. Surge arrestors (AIS) shall conform to all type tests (as applicable) as per IEC 60099-4 and shall be subjected to routine and acceptance tests in accordance with IEC-60099-4.
19	IV	Ch36:	AIS	Sheet | 2 of 30	36.02.00	Basic Requirements :-In case Control and Relay Panels for two (2) additional bays could not be accommodated in the existing Switchyard than modification/extension of the existing control room will be carried out. The existing Main Bus I and Main bus II and bus coupler bay have to be modified.	1. Kindly confirm whether the Kiosk type room is acceptable in case of additional bays could not be accommodated in existing Building. 2. We understand that other than Main bus-1, Main bus-2 and coupler bay, no other bay have to be modified, owner have checked the suitability of other bays. Please confirm.	1. KIOSK type rooms for 220 kV AIS is not acceptable. 2. Towers & gantries of existing Switchyard are designed for 40kA for 1sec fault level, however the Towers & gantries for new 220kV Bays shall be suitable for 50kA for 1 Sec. Fault Level. Further, it is clarified that Gantaries & Towers of existing Bus section which will be used for extension of 220kV switchyard i.e. Tower at 1586.65N/1034.17E, 1586.65N/1016.17E, 1586.65N/998.17E, 1586.65N/977.17E, 1586.65N/959.17E, 1569.65N/1016.17E & 1569.65N/959.17E along with the Gantries between these towers shall upgraded/augmented by the bidder, to make suitable for 50kA for 1 Sec. Fault Level. However the existing Gantry on South side of tower at 1569.65N/959.17E shall not be modified.
20	IV	Ch36:	AIS	Sheet | 22 of 31	36.03.06	Disc Insulators	Kindly provide Technical Specification for polymers insulator if have to be used as asked in Tender drawing (112-10-300) 220kV SLD.	Techical Specification of Polymer insulators is enclosed as Attachment-3.
21	IV	Ch36:	AIS	Sheet | 29 of 30	36.03.09	DATA SHEET OF CURRENT TRANSFORMER :13.0 Creepage distance:25 mm /KV	As per Technical specification it is understood that creepage is 31 mm/kV, however it is mentioned as 25 in CT data sheet. Please rectify the same.	Applicable ceepage distance shall be 31mm PER KV.
22	IV	Ch4:	GIS	Sheet | 2 of 88	4.02.02	400 KV GIS: v. Bus Reactor Bay : 1 (Spare)	Please clarify whether the Bus reactor bay Bus Duct and Termination to be supplied. If yes, please clarify whether these are to be erected at site or to be handed over in loose.	Bay Bus Duct and termination are not in the bidder's scope for spare Bus reactor bay. Bidder shall provide space provision in layout for the Outdoor reactor bay equipments,duct & fondation etc.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
23	IV	Ch4:	AIS	Sheet | 2 of 30	36.02.00	Basic Requirements:- Augmentation & Modification of existing 220 kV switchyard including ACSR busbars, Bus Coupler Bay, protection & metering system, SCADA system (SAS), extension of shield wires, fencing, earthmat, trenches, roads, drains, shifting of existing Main-Bus I & II EMVT and transfer Bus EVT (from Bay 14 side toward Bay 1) etc. and all other interfacing provisions are in the scope of EPC Bidder.	Kindly confirm whether the Exsisting ACDB and DCDB of 220kV Control room are having sufficient spare feeders to accommodate additional bays auxiliary power requirement.	Following spare feeders are available at site in the existing 220kV switchyard control room: Existing 415V ACDB:- 1. 125A- 02 Nos. 2. 32A- 04 Nos. 3. 20A- 02 Nos. EXISTING 220V DCDB:- 1. 160A- 01 No. 2. 20A- 02 Nos. Bidder shall provide floor mounted sub ACDB/DCDB to cater AC/DC loads of 02 nos. New 220KV ICT bays being supplied by the bidder. ACDB/DCDB shall have dual incommers which shall be fed from feeder of existing ACDB/DCDB. refer revised main SLD attached at attachment -8.
24	II	Ch 9 :	Mandatory Spares	Sheet | 75 of 103		400 KV GAS INSULATED SWITCHYARD	Bidder understand that following items and its sub items are part of GIS: Item no 1.1, 1.4, 1.5, 1.6,1.7, 1.8,1.9 Bidder understand that following items and its sub items are part of AIS: Item no 1.2, 1.3 Kindly confirm.	Noted. However LA (item no. 1.8) shall be part of both GIS and AIS.
25	II	Ch 9 :	Mandatory Spares	Sheet | 79 of 103		AIS (220KV): Isolator arm for 220 kV and 400 kV	Isolator arm for 400 kV AIS not required. Kindly amend the spares requirement suitably.	Noted, spares shall be supplied by the bidder for the applicable equipment only.
26	II	Ch 9 :	Mandatory Spares	Sheet | 79 of 103		AIS (220KV): Disc insulator string 400 kV side	Kindly accept polymer type insulators also for 400 kV side.	Spare insulators shall be same as provided in the switchyard.
27	VII		Volume VII Tender Drawings	Drw no. 112-10-200		400KV GIS SINGLE LINE DIAGRAM	Kindly confirm that SF6 Gas partition as per OEM type tested design shall be acceptable to Owner.	Switchgear shall be suitably sub-divided into individual arc and gas- proof compartments preferably for: a) Bus bars b) Intermediate compartment c) Circuit breakers d) Line disconnectors e) Voltage Transformers f) Current Transformer
28	IV	Ch 5:	Substation Automation System	Sheet | 4 of 37		Bidder shall offer the Bay Controller Unit (BCU) (one HOT and one COLD) for each bay in a diameter (One diameter will consists of three bays) at 400 kV level.	1. Kindly confirm whether the Control Cabling for GIS equipments to BCU shall be separate for HOT & COLD BCU or common. Kindly Provide drawing for conceptualizing the same. 2. Bidder understand that 220 kV does not have Bay Controller Unit (BCU) (one HOT and one COLD) for each bay. Kindly confirm.	Only GT bay shall have 2 BCU (1 working + 1 redundant) for each breaker (main and tie breaker). Cabling for both BCU shall be common. In case of failure of working BCU, redundant BCU shall take over. For other 400 KV bays, single BCU shall be provided with each Breaker. However, 2 Nos. spare BCUs shall be provided by the Bidder as mandatory spares.
29	VI	CHAPTER 2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 1 of 7	2.4	The scope shall also including setting up by the Contractor a complete testing laboratory in the field to carry out all relevant tests as per BIS or other international standards required for the civil works for the project.	Alternatively, the contractor may be permitted to get the testing of the Construction Materials done from the reputed Engineering Colleges approved by M/s HPGCL.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
30	VI	CHAPTER 3	INSTRUCTION TO BIDDERS	Sheet 1 of 5	3.1.3	Detail design criteria proposed to be adopted for each building, structures, foundations, facilities etc.	BHEL proposes to submit the detailed design criteria as "Design Basis Report" during execution. BHEL's proposal may please be accepted.	Noted
31	VI	CHAPTER 3	INSTRUCTION TO BIDDERS	Sheet 1 of 5	3.1.6	Details of thermal insulation for ceiling and detail of false ceiling assumed with manufactures catalogue and areas where they propose.	Requirement shall be detailed during detail engineering only and manufactures catalogue shall be submitted at the stage of execution. This deviation may please be accepted.	Noted
32	VI	CHAPTER 3	INSTRUCTION TO BIDDERS	Sheet 1 of 5	3.1.8	List of equipment to be deployed and rates of labour assumed by the bidder and by other sub-contractors to be associated with him is to be furnished.	List of equipment to be deployed shall be furnished on fortnight basis during execution while labour rates assumed in the quote would be strategic decision of the bidder. This deviation may please be accepted.	Noted
33	VI	CHAPTER 3	INSTRUCTION TO BIDDERS	Sheet 1 of 5	3.1.9	List of softwares proposed to be used against various areas, for analysis, design, construction etc. their source & along with validation report for the softwares.	BHEL uses AUTOCAD for drawing preparation purpose & STAAD Pro for force analysis purpose which are proprietary items and BHEL has their valid licenses. Are these required to be submitted? Kindly confirm.	Yes, Confirmed. BHEL will submit licenses of the softwares proposed to be used.
34	VI	CHAPTER 3	INSTRUCTION TO BIDDERS	Sheet 2 of 5	3.1.11	List of all sub-contractors that the bidder proposes to employ, in case the contract is awarded to him, indicating their addresses with telephone number, experience on similar jobs, name, qualification and experience of persons who shall be involved in the job on behalf of the contractor etc. shall be submitted to Owner. Only the sub-contractor approved by Owner shall be engaged by the contractor on the job.	Being a Government Organisation, BHEL appoints package-wise sub-contractors through open tendering process which is done only after the receipt of the order from its customer however BHEL takes approval of the sub-contractors from the customer before engaging them. In view of above, deviation may be allowed to BHEL.	Bid specifications to be followed.
35	VI	CHAPTER 3	INSTRUCTION TO BIDDERS	Sheet 2 of 5	3.1.12-l)	Bidder to submit a report on foundation proposed for various structures, buildings and facilities based on the data available with the OWNER and further data collected by the BIDDER. Allowable safe bearing capacity for open foundation, depth of foundation, need for pile foundations, type ,length and capacity of piles in case piling is required, soil improvement if any required, special precaution against aggressive soil etc shall also be covered in the report.	BHEL proposes to submit a "Design Basis Report" on foundation proposed for various structures, buildings and facilities based on the data available with the OWNER and Soil Investigation to be done at the start of the project execution. BHEL's proposal may please be accepted.	Noted
36	VI	CHAPTER 4	SUBMISSIONS	Sheet 2 of 4	21)	Total quantity of concrete (grade wise), reinforcement steel (diameter wise) and structural steel (section wise) shall be indicated in all construction drawings.	As per BHEL's practice, quantity of the concrete (grade wise), reinforcement steel (diameter wise) and structural steel (section wise) are not indicated in the construction drawings. Bar Bending Schedule (BBS) of the reinforcement steel (diameter wise) is prepared at the site and accordingly quantity is finalized. In view of above, deviation may be allowed to BHEL.	Noted
37	VI	CHAPTER 5	GEO-TECHNICAL INVESTIGATION	Sheet 1 of 7	5.2	For conveyor gallery (of height less than or equal to 25m) foundation, type of foundation (pile/open foundation) shall be decided based on findings of final geotechnical report. For ESP and stacker reclaimer foundation if open foundation is feasible as per Approved Geotechnical report, bearing capacity corresponding to 25mm settlement of foundation shall be considered.	It is understood that type of foundation (pile/open foundation) for switchyard equipment support structures, where the overall bus height remains upto 10 to 12m, shall be decided based on findings of final geotechnical report for the Geotechnical Investigation to be done by the successful bidder. However, pile foundations are to be considered for Switchyard Towers, GIS & Control Room Buildings, Transformer/Reactor Foundations. Kindly clarify it.	Noted

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
38	VI	CHAPTER 6	GENERAL REQUIREMENT OF BUILDINGS & STRUCTURES	Sheet 1 of 12	6.3	Wherever possible around floor openings an RCC kerb of 100 mm wide 150 mm high shall be provided. All concrete edges, where breakage of concrete corners expected shall be provided with angles of minimum size L 50x50x5 with lugs for edge protection e.g. alround the cut-outs/ openings in floor slab, edges of drains supporting grating covers, edges of. RCC cable/ pipe trenches supporting covers, edges of manholes supporting covers and supporting edges of precast covers etc.	It is understood that most parts of switchyard drains shall be open surface drains where no grating/cover is required. Grating covers will be required only for buildings' garland drains. It is also understood that edge protection shall be provided in the cable trench walls & drain walls (drains where grating cover is to be provided) on inner sides only. Kindly confirm it.	Bid specifications to be followed.
39	VI	CHAPTER 6	GENERAL REQUIREMENT OF BUILDINGS & STRUCTURES	Sheet 5 of 12	6.11	All underground structures (other than Coal handling system) like basements, pump house sumps, liquid retaining/conveying structures etc. shall have plasticiser cum waterproofing cement additives conforming to IS:9103. In addition, limits on permeability as given in IS: 2545 shall also be met with. The concrete surface of these structures in contact with soil shall be provided with minimum two coats of bituminous painting of grade 85/25 conforming to IS:702 mixed with 1% antistripping compound as per IS: 642. Bitumen shall be applied @ 1.7 kg/sq.m (minimum) for water / damp proofing. Also provision shall be made on the inner surface of walls and base slab, so that water proofing grouting can be injected later in case of leakage. All liquid retaining/ conveying structures including sumps of Pump House shall be tested for water tightness as per IS: 3370 & 6494 and in case of soakage, leakage, seepage the same shall be rectified by chemical injection grouting as specified.	This is understood that switchyard tower & equipment foundations, cable trenches, sump pits, drains, transformer's soakpit & foundations, etc are not covered under this clause. Only common burnt oil pit will be covered under this clause. Kindly confirm it.	Bid specifications to be followed.
40	VI	CHAPTER 9	STEEL STRUCTURE	Sheet 1 of 28	9.4	The minimum thickness of various components of a structure and hot rolled sections shall be as follows.	It is understood that this clause is not applicable for switchyard tower-beam & equipment support structures which shall be governed by IS802. Kindly check and confirm it.	Bid specifications to be followed.
41	VI	CHAPTER 22	Switchyard Civil Works	Sheet 4 of 5	22.2.8	The precast covers shall not be more than 300mm in width and shall not be more than 65 kg.	Criteria of weight for precast covers can be followed only for cable trenches having clear width upto 1200-1300mm and it cannot be followed for cable trenches having clear width greater than this. For cable trenches having higher clear width greater than 1200-1300mm, cantilevered slab will be required either from one side or from both sides. May please check and confirm.	Bid specifications to be followed. However, the issue may be discussed detailed engineering.
Annexure-10								
1	Volume I	Conditions of Contract: Commercial & General Section V: ECC	Contractor's site office Establishment	9 of 62	19	The Contractor shall establish an Office at the Site and keep posted an authorized representative for the purpose of the Contract.	It is requested to confirm whether land (within the plant premises) for temporary site office for contractor use will be provided by owner or not.	Land for temporary site office of contractor will be provided by owner within construction site only. If, during construction, site office obstruct the construction work at site, bidder to shift the office at other location. In that case, land for site office is to be arranged by contractor itself.
2	Volume I	Conditions of Contract: Commercial & General Section V: ECC	Contractor's site office Establishment	18 of 62	28.3	The Contractor shall establish a site office at the site and keep posted an authorized representative for the purpose of the contract, pursuant to GCC.		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	Volume VI	Civil, Structural & Architectural Works Ch 11: Buildings Description	TEMPORARY STRUCTURES FOR EXECUTION	1 of 18	11.1.3	Site office Contractor shall provide about 5 00 sqm of office area with A/C and false ceiling for the use of Owner / Owner's representative in addition to t h e Contractor's requirement. Additionally an A/C Conference room to accommodate about 70 people shall also be provided in the site office complex for the Owner's use. In addition to these, basic facilities like toilet for gents and ladies, potable water tanks, soak pit and septic tank for sewage disposal shall also be provided. Covered parking area for parking 10 cars shall also be provided for Owner's use.	It is requested to confirm whether land (within the plant premises) for site office for owner use will be provided by owner or not.	Confirmed. Shall be provided by Owner.
4	Volume VI	Civil, Structural & Architectural Works-Ch 11: Buildings Description	Construction Power	3 of 18	11.1.10	Contractor has to arrange construction power from UHBVN/HVPN as per their rules and regulations at his own cost.	Owner is requested to provide construction power at one or two locations within the plant boundary.Necessary distribution of the power line to the various locations as required shall be executed by the bidder at his cost.	Bid specifications to be followed.
5	Volume VI	Civil, Structural & Architectural Works	Cutting and removing the trees	5 of 7	65	Proposed site is having trees all over the site. Cutting and removing the trees and clearing the site from all other obstruction is in the scope of bidder. Necessary permission to cut the trees from relevant department must be obtained by bidder himself at his own cost.	Owner is requested to provide the location (Approx distance from site) where the trees are to be disposed.	Shall be informed during execution of work.
6	Volume VI	Civil, Structural & Architectural Works- CHAPTER – 19 SURVEYING WORKS	TOPOGRAPHICAL SURVEY	1 of 2	19.1	A single grid pillar will be given by the client with coordinates in plant area. Necessary grids shall be made by EPC contractor including demarcating the structures, buildings and jungle clearance including Cutting, uprooting and removing of trees and dispose the same away from the site etc.		
7	Volume VI	Civil, Structural & Architectural Works- Ch 02: Scope of Work	Scope of Work	6 of 7	84	Permanent store of 6000 sqm area shall be provided by the bidder. Out of this 3000 sqm shall be covered building.	It is requested to confirm whether land (within the plant premises) for permanent store of 6000 sqm will be provided by owner or not.	Permanent Stores stands deleted from the scope of bidder.
8	General	General	General	General	General	The Bidder/its sub-vendor(s)…..	As per the proven-ness document, everywhere it is mentioned as "The Bidder/its sub-vendor(s)", it seems to be applicable to either BHEL or its sub-vendors for the different packages including Civil, Mechanical and Electrical works etc.. Kindly confirm.	Owner's intent is clear.
Annexure-11								
1	III	14	pH METER (BENCH TOP)	5 of 45	14.2.1	Range: -6 to 20 pH, Temperature : - 10 to 120 °C.	Range 0 to 14 pH, Temperature : 0 - 60 °C.	Revised Specs: Range 0 to 14 pH, Temperature : 0 - 100 °C.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	III	14	pH METER (PORTABLE)	5 of 45	14.2.1	Range: -2 to 16 pH, Accuracy: ± 0.01 pH Temperature : - 5 to 125 °C.	Range 0 to 14 pH, Accuracy: ± 0.1 pH Temperature : 0-100 °C.	Revised Specs: Range: 0-14 pH Accuracy: ± 0.01 pH Temperature : 0 to 100 °C.
3	III	14	CONDUCTIVITY METER (BENCH TOP)	5 of 45	14.2.2	Range: 0.1 µS/cm to 200 mS/cm, Accuracy: ± 0.5% Temperature : - 10 to 12 °C.	Range: 1 µS/cm to 20 mS/cm, Accuracy: ± 1% of Full Scale Temperature : 0-60 °C.	Revised Specs: Range: 0.1 µS/cm to 200 mS/cm, Accuracy: ± 0.5% Temperature : - 0 to 100 °C.
4	III	14	CONDUCTIVITY METER (PORTABLE)	6 of 45	14.2.3	Range: 0.1 µS/cm to 200 mS/cm, Accuracy: ± 0.5%	Range: 1 µS/cm to 100 mS/cm, Accuracy: ± 1% of full Scale	Revised Specs: Range: 0.1 µS/cm to 200 mS/cm, Accuracy: ± 0.5% Temperature : - 0 to 100 °C.
5	III	14	BALANCE	8 of 45	14.2.6	Capacity : 230 gm	Capacity : 220 gm	Revised Specs: Capacity: 220 gm
6	III	14	Coal Analyser	19 of 45	14.3.1	Temp range: 50 to 1000 °C. Balance : Sartorius 120 gm, 0.1mg	Temp range: 100 to 1000 °C. Balance Inbuilt / External : Capacity 120 gm, LC: 0.1mg	Bid specifications to be followed.
7	III	14	Automatic Bomb Calorimeter	20 of 45	14.3.2	Resolution: 0.0001 cal/gm	Resolution: 0.1 cal/gm (0.1 cal/gm is sufficient)	Bid specifications to be followed.
8	III	14	Automatic Flash Point Apparatus	26 of 45	14.4.2	Temp range: 40 to 3700 °C.	Temp range: 40 to 370 °C. (Typographical error)	Clarified Temp range: 40 to 370 °C.
9	V	Vol.V:Part A	Ambient Air Quality Monitoring System (AAQMS)	51 of 96	2.3. (I) / S.No.7(b)	i) Mercury analysers Qty.02	i) Mercury analysers Qty.01 (1 analyser is sufficient for a site)	Bid specifications to be followed.
10	V	15/Vol.V:Part B	Ambient Air Quality Monitoring System (AAQMS)	14 of 46	15.02.15	i) CO analysers Range: 0-1 ppm to 0-1000 ppm selectable	i) CO analysers Range: 0-1 ppm to 0-100 ppm selectable (100 ppm range is the range offered by reputed manufacturers)	Revised Specs: CO Analysers Range: 0-1 ppm to 0-100 ppm selectable
11	V	15/Vol.V:Part B	Ambient Air Quality Monitoring System (AAQMS)	16 of 26	15.02.17	i) CO2 analysers Range: 0 to 0-10000 ppm	i) CO2 analysers Range: 0 to 1000 ppm (1000 ppm range is the range offered by reputed manufacturers)	Revised Specs: CO2 Analysers Range: 0-1000 ppm

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
12	III	14	Weather Monitoring Station	30 of 45	14.5	i) Electrical Anemograph 3 cup generator anemometer and electrical wind vane mounted on a supporting mass assembly.It shall be electrically connected by means of cables to the wind speed/wind direction indicator & wind speed/ wind direction, and temperature two channel recorder with spares for start-up & 3 years operation. Range: 0 to 100 knots 0° to 360°(N-E-S-W) Resolution: 1 knot ± 5° Accuracy : ± 2% of span, ± 5° Chart Speed:15 to 60 mm/hr by manual gear change Chart length:Minimum for 15 days A software system into compatible computer with windows operating system for ling terms storage and processing recorded information.	i) WIND ANEMOMETER AND WIND VANE DIGITAL 3 CUP ANEMOMETER WIND VANE SENSOR MOUNTED ON A SUPPORTING MASS ASSEMBLY. IT SHALL BE CONNECTED BY MEANS OF CABLES TO THE DATA LOGGER. DATA LOGGER WILL HAVE ALPHANUMERIC DISPLAY. 1.0 Wind Speed Sensor: Principle : Three cup Anemometer with non-contact Optical Sensing Range : 0.0 to 50 m/sec. Resolution : 0.5 m/sec Accuracy : ± 2% of span. 1.1 Wind Direction Sensor: Principle : Potentiometer type with SS shaft Range : 0-360(N-E-S-W) Resolution : ± 5 degree Accuracy : ± 5 degree 1.2 Mounting Accessories: Supporting mass assembly(Tripod stand) 1.3 A windows based software system will be provided which will be allow long term data storage and process recorded information. 1.4 Computer specification: Core 13 processor, RAM : 8 GB or better, Hard Disk : 1 TB WIN10 Profession 10 operating system, Monitor : 18" TFT colour monitor, Keyboard : Standard Windows keyboard, Mouse : Mouse + Pad, Software : Windows based data logging/driver software with a provision to averaging out data at selectable interval, Black and White Laser jet printer	Noted.
13	V	15/Vol.V:Part B	Ambient Air Quality Monitoring System (AAQMS)	11 of 26	15.02.01	AAQMS supplier's shall have experience & PTR for installation, execution & commissioning of similar type of system in last 5 years in 2 nos thermal power stations of capacity of 500MW or more	AAQMS supplier's shall have experience & PTR for installation, execution & commissioning of similar type of system in last 5 years in 1 nos thermal power stations of capacity of 200MW or more	Shall be read as: "AAQMS supplier's shall have experience & PTR for installation, execution & commissioning of similar type of system in last 5 years in 1 no. thermal power stations of capacity of 500MW or more".
14	V	15/Vol.V:Part B	Ambient Air Quality Monitoring System (AAQMS)	13 of 26	15.02.14	AAQMS shall include Hydrogen Generator	Hydrogen Generator may please be deleted as same is not required for analysis	Noted
15	V	15/Vol.V:Part B	Ambient Air Quality Monitoring System (AAQMS)	13 of 26	15.02.14	AAQMS shall include Hydrogen Generator	Hydrogen Generator may please be deleted as same is not required for analysis	Noted
16	III	14	Laboratory Equipment - Water Analysis	03 of 45	14.2	Vendors Make are mentioned	Vendors mentioned against lab equipments are very old and some of them may be obsolete, so other reputed make may please be added	Bid specification to be followed, however the issue may be discussed during detailed engineering.
17	III	14	Laboratory Equipment - Coal Analysis	18 of 45	14.3	Vendors Make are mentioned	Vendors mentioned against lab equipments are very old and some of them may be obsolete, so other reputed make may please be added	Bid specification to be followed, however the issue may be discussed during detailed engineering.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
18	III	14	Laboratory Equipment - Oil Analysis	25 of 45	14.4	Vendors Make are mentioned	Vendors mentioned against lab equipments are very old and some of them may be obsolete, so other reputed make may please be added	Bid specification to be followed, however the issue may be discussed during detailed engineering.
19	III	14	Laboratory Equipment - Meteorological & Pollution	30 of 45	14.5	Vendors Make are mentioned	Vendors mentioned against lab equipments are very old and some of them may be obsolete, so other reputed make may please be added	Bid specification to be followed, however the issue may be discussed during detailed engineering.
20	III	14	Laboratory Equipment - Miscallaneous	33 of 45	14.6	Vendors Make are mentioned	Vendors mentioned against lab equipments are very old and some of them may be obsolete, so other reputed make may please be added	Bid specification to be followed, however the issue may be discussed during detailed engineering.
21	III	14	List of Glassware & Accessories	40 of 45	14.7	All Glassware shall be from Borosil	Glassware from Borosil/Reputed Make	Bid specification to be followed.
22	III	14	List of Chemicals	45 of 45	14.8	All reagents shall be from AR/ER/GR grande only from MRECK/SDFINE CHEMICALS	All reagents shall be of AR/ER/GR grade only from MERCK/SDFINE/REPUTED MAKE	Bid specification to be followed, however the issue may be discussed during detailed engineering.
Annexure-12								
1	Volume VII Tender Drawings		FLOW DIAGRAM-ABSORBER SYSTEM	Page 48 of 120		Vibration Transmitters(VT) and Temperature Elements(TE) for the following pumps: •Gypsum Bleed Pumps •Emergency Absorber Drain Pumps •Emergency Absorber Tank Pumps	As per Bidder's understanding Vibration Transmitters(VT) are applicable only for HT motors and its associated pumps, fans, drives etc. as mentioned in tender. Hence Bidder proposes to provide Vibration Transmitters(VT) and Temperature Elements(TE) if the pump/motor is HT as per bidders standard practise which is being followed for all other FGD projects. For LT pumps/motors Vibration Transmitters(VT) and Temperature Elements(TE) are not provided in FGD projects including similar 800MW projects. Owner may kindly review and confirm.	Bid specifications to be followed.
	Volume VII Tender Drawings		FLOW DIAGRAM-LIME SLURRY PREPARATION SYSTEM	Page 49 of 120		Vibration Transmitters(VT) and Temperature Elements(TE) for the following pumps: •Limestone Slurry Pumps •Mill Circuit Pumps		
	Volume V Instrumentation & Control Works	PART A	(I) OTHER INSTRUMENTS	Sheet 49 of 96		Bidder shall furnish microprocessor based vibration monitoring system for all HT motors and its associated pumps, fans, drives etc. for X, Y & Key Phasor directions, in BTG & BOP /offsite packages.		
2	Volume VII Tender Drawings		FLOW DIAGRAM-ABSORBER SYSTEM	Page 48 of 120		•Density meter(DM) and pH meter(PH) in common discharge line of Emergency Absorber Drain Pumps •pH meter(PH) in common discharge line of Gypsum Bleed Pumps •Density Transmitter(DT) and pH meter(PH) in Absorber Oxidation Tank	Various instruments such as Density meters(DM), pH meters(PH) etc are not required at the locations mentioned in the drawing as per Bidder's standard Control Philosophy. Bidder understands that the tender diagram is indicative in nature. Hence Bidder proposes to provide instruments such as Density meters(DM), pH meters(PH) etc only as required as per Bidder's standard practise which is being followed for all other FGD projects including similar	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
	Volume VII Tender Drawings		FLOW DIAGRAM-LIME SLURRY PREPARATION SYSTEM	Page 49 of 120		•Density meter(DM) and pH meter(PH) in Limestone Slurry Storage Tank 1&2 •Density meter(DM) and pH meter(PH) in Mill Circuit Tank	800MW projects. Owner may kindly review and confirm.	
Annexure-13								
1	Volume II General & Schedules	Ch 2	Project Information	Sheet 8 of 10		APPENDIX - IV DESIGN LIMESTONE ANALYSIS (TYPICAL)	Purity of Limestone to be considered for FGD design and guarantee conditions are not provided. Please provide the same.	Bidder to refer Attachment- 4 for lime stone analysis.
2	Volume II General & Schedules	Ch 8:	FG & LD	Sheet 8 of 57		xiv. Limestone Consumption Rate Limestone consumption of FGD system in kg/hr under guarantee point conditions.	Bidder requests customer to specify the cap for Limestone Consumption Rate.	Bid specifications to be followed.
3	Volume II General & Schedules	Ch 8:	FG & LD	Sheet 46 of 57		(vii) Waste Water The Bidder guarantees that the maximum purge flow rate to waste water treatment system from FGD system for the unit shall be less than 20m3/sec averaged over a 24 hour period for a the range of specified coal(s).	Bidder understands that the value is 20 m3/hr instead of 20 m3/sec.	In clause 5.44(vii) of Chapter 8 at sheet 46 of 57 in Vol-II, 20m3/sec be read as 20m3/hr.
4	Volume III Mechanical Works	Ch 30:	Flue Gas Desulphurisation System	Sheet 35 of 93	1.0	The slurry recirculation pumps shall have motor / pneumatic driven knife gate valve at pump suction and discharge side.	Normally in recirculation pump area, in case of any pump stoppage the gate needs to be quickly closed without leakages in the slurry lines. In case of knife gate valves, there may be leakages after few operations due to wearing of components. In such applications, we propose to provide pneumatic operated butterfly valves that are widely provided in FGD plants. Please accept.	Clause 1.0 A (4) of Chapter 30, Sheet 35 of 93, Vol-III be read as:- "The slurry recirculation pumps shall have motor / pneumatic driven knife gate / butterfly valve at pump suction and discharge side."
5	Volume III Mechanical Works	Ch 30:	Flue Gas Desulphurisation System	Sheet 36 of 93	1.1	Sufficient number of agitators, as per the proven practice of the bidder, shall be provided for thorough mixing of the recirculating slurry. In case the Bidder's Absorber includes side entry agitators, the bidder shall offer and demonstrate mixing arrangement such that n-1 number of agitators are sufficient to avoid the slurry settlement in the absorber tank in case of one agitator under breakdown (n-total no. of working agitators).	As per Bidder's FGD design, under normal FGD Operation Jet Air Sparger (JAS) will keep the slurry in suspension and no agitators are required to be in operation. The agitators are required only during FGD Stoppage to prevent the settlement. For this purpose, we are offering two numbers of agitators.	OEM Standard design is acceptable.
6	Volume III Mechanical Works	Ch 30:	Flue Gas Desulphurisation System	Sheet 56 of 93	7.0	The limestone slurry pipes shall be sized to minimize erosion and avoid settling of the limestone at part load operation. The slurry pipes shall be lined with replaceable rubber lining of 10 mm thickness. Additional thickness of 2 mm rubber lining shall be provided at bends.	1. Bidder provides FRP material with SiC coating for all slurry pipes up to size 400NB as per bidder's standard practice. It is being accepted by many customers and has been used in current executing FGD projects in India. 2.Pipes above 400NB will be provided with replaceable rubber lining of 6 mm thickness. Additional thickness of 2 mm rubber lining will be provided at bends.	Clause 5.0 (2) at Sheet 64 of 93 and clause 7.0 (3) at sheet 56 of 93 of Ch-30, Vol-III be read as:- "Slurry pipes of all sizes shall be of FRP material and these pipes shall be coated internally with minimum 2.5 mm SiC coating. Pipes which are coming in contact externally with slurry / treated flue gas shall be coated externally also with minimum 2.5 mm thick SiC coating."
7	Volume III Mechanical Works	Ch 30:	Flue Gas Desulphurisation System	Sheet 64 of 93	5.0	All the pipes handling slurry shall be provided with replaceable rubber lining of proven quality. The Bidder can provide slurry pipes of size lower than 3" made up of FRP material if it has previous experience of providing the same.		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
8	Volume III Mechanical Works	Ch 30:	Flue Gas Desulphurisation System	Sheet 68 of 93	8.0	3) The bidder shall provide 2 x 100% emergency absorber drain pumps for each absorber to drain the absorber to emergency absorber tank.	Since this pump is used during maintenance time only, standby is not required. Bidder provides 1x100% emergency absorber drain pump as per standard practice.	Bid specifications to be followed.
9	Volume III Mechanical Works	Ch 30:	Flue Gas Desulphurisation System	Sheet 73 of 93		EMERGENCY ABSORBER DRAIN PUMP: Quantity: Four (2W+2S)	Bidder understands that the quantity of pumps is incorrect.	2 x 100% pumps be considered as per Flow Diagram - Absorber System (111-13-5210)
10	Volume III Mechanical Works	Ch 30:	Flue Gas Desulphurisation System	Sheet 73 of 93		FILTERATE WATER PUMP: Quantity: Four (2W+2S)	Bidder understands that the quantity of pumps is incorrect. It shall be 1W+1S.	2 x 100% pumps be considered as per Flow Diagram - Gypsum Dewatering System (111-13-5212)
Annexure-14								
1	III	19	SCOPE OF WORKS(MECHANICAL WORKS)	8	1.1.8 (Sr.no. -56)	Diesel Locomotives - 4 nos.	Quantity mentioned at page 112 is 03. Kindly Clarify	At S.No. 56 of Clause 1.1.8 of Chapter 19, Sheet 8 of 120 of Vol-III, no. of locomotives be 3 Nos. instead of 4 Nos.
2	III	19	M-40, DIESEL LOCOMOTIVE	112	1.0	Three (3) – Diesel hydraulic locomotives of 800 HP capacity shall be furnished for handling of coal and yard shunting in the marshalling yard.	Diesel Hydraulic locomotive is not in our product arange. However, alternatively we can supply equivalent Diesel electric shunting locomotive which is more reliable and user friendly. Even Indian railway has discontinued the diesel hydraulic technology since 1980. Kindly include diesel electric locomotive in tender. We have supplied more than 400 nos. of locomotive in this range for shunting appplication to Various Industries including power palnt. List is attached.	Diesel Electric Shunting Locomotive is also acceptable.
3	III	19	M-40, DIESEL LOCOMOTIVE	114	1(i)	The Loco shall be adequate to haul partial rake of 3120 tonnes at a maximum velocity of approximately 5 KMPH over the gradient of 1:175. Also the Loco shall be capable of starting and accelerating to the speed of 8 KMPH over the track with partial rake.	Kindly confirm that the followings :- 1. Whether 3120 tonne load haulge requiremnts is with single locomotive or with locomotives in MU operation. For single locomotive with permitted axle load of 20 tonne, it is not possible to start 3120 tonne of load on grade of 1:175. Kindly clarify 2. As per our understanding gradient of 1:175 seems very high, Kindly review.	The specified data is for single locomotive operation. Bid specification to be followed, however, the issue may be discussed during detailed engineering.
4	III	19	M-40, DIESEL LOCOMOTIVE	114	1(i)	The Loco shall be provided with 4 driven axles fitted with roller bearings suitable for a nominal axle load of 20 tonnes + 3 percent.	Rail Size mentioned in tender docement is 52Kg/m. As per Indian Railway satndard for 52kg rail size, permissible axle load is 22.5 tonne. Kindly Review.	Permissible Axle Load as per Latest Railway Standards will be acceptable.
Annexure-15								
Heat Exchangers								
1	Vol III	Ch 2		6 of 87	3.0	One set of test kit for measuring oxygen content at deaerator outlet shall also be provided for the station.	Online oxygen measuring provision is being provided by Bidder. Hence, Offline test kit for measuring oxygen content at deaerator outlet is not required. Customer is requested to accept above.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	Vol III	Ch 2		6 ,53 ,54 & 57 of 87	3.0,6.0 ,6.1(a) & 6.3.1(f)	HP/LP Heaters Tube shall be seamless Stainless Steel (SA 213 TP304).	Proposed MOC of tubes: SA 213 TP304N for HP Heaters and SA 688 TP304 for LP Heaters .It has better strength and physical properties and also widely used in supercritical power plants.	MOC of HP Heater Tubes shall be seamless Stainless Steel (SA 213 TP304 / 304N) and MOC of LP Heater tubes shall be SA 688 TP304.
3	Vol III	Ch 2		54 & 57 of 87	6.1(a) & 6.3.1(a)	LP Heaters shall be provided with integral drain cooler. HP Heaters shall be provided with integral de-superheating, Condensing and drain cooling Sections.	De-superheating zone and drain cooling zone shall be decided as per design guideline HEI.	Bid specifications to be followed alongwith HEI guidelines.
4	Vol III	Ch 2		55 of 87	6.3.1(g)	Hardened 400 series stainless steel impingement plates for flashed drain inlet from HP heaters, BFP recirculation, boiler startup drains etc.	As per bidder's experience of super critical plants, Hardened 304 series stainless steel impingement plates are also suitable for this purpose. Customer is requested to amend the clause as " Hardened 400 series or 304 series stainless steel impingement plates"	Bid specifications to be followed.
5	Vol III	Ch 2		55 of 87	6.3.1(h)	All water spray valves, splash plates, trays, vent condenser and other elements in contact with undeaerated water or non-condensable gases shall be of SS-304 or SS-410	Customer is requested to modify the clause as follows Elements in contact with undeaerated water or non-condensable gases shall be of SS304 material / SS304 lining material. This is in line with the Deaerators supplied for all 500 MW and above projects.	SS-304 lining material is also acceptable.
6	Vol III	Ch 2		57 of 87	6.3.1(b)	The water box for high-pressure heaters shall be of forged construction (ASTM-A-266 Class-II).	The water box for high-pressure heaters shall be of Hemi-head pressed of CS plate as per BHEL standard practice for supercritical plants supplied by BHEL. All NTPC supercritical projects supplied with pressed of CS plate type.	Noted.
Drive Turbine:								
1	Vol III	Ch 2		7,67 of 87	8.0.C & 7.8.4 b	Two (2) steam turbine drives for the turbine driven boiler feed pumps complete with ESV, control valves, non-return valves for single admission drives, permanent & temporary steam strainers. Stop Valves to be provided with removable stainless steel steam strainer for normal operation one additional strainer shall be provided for initial operation.	As per BHEL pre-commissioning/initial operation activities of Steam Blowing, the strainer is removed from the line and blanking fixture is used to isolate the steam turbine from steam supply. After steam blowing, the removed strainer is placed in the line again. Hence, we do not need any temporary steam strainer/additional strainer for initial operation. Blanking device will be supplied by BHEL.	Noted.
2	Vol III	Ch 2		7 of 87	8.0 f)	BFP Turbine control oil shall be FRF and its oil coolers should have standby,100% capacity centrifuge, TAN Control, De Humidifier, NAS Control filter with online NAS Monitor hooked to DCS for each steam turbine driven pump.	Combined lube and control oil system considered for the offered BFPDT where FRF oil cannot be used for bearings. Hence Mineral oil is offered. TAN control is not an inbuilt feature of the centrifuge and hence TAN cannot be monitored online. Control oil filter is offered for oil cleanliness, hence online NAS monitor is not applicable. Periodical manual condition monitoring of oil needs to be done at least once in six months for keeping the oil parameters under control.	Noted.
3	Vol III	Ch 2		67 of 87	7.8.5 a	Bearings to be spherically seated, horizontally divided type, with provision of adjustment and alignment of rotor, forced feed lubricated type, lined with babbit or suitable antifriction alloy.	Drive turbine bearings are cylindrical supported as per BHEL design. This is in line with the standard practice followed for all BFP drive turbines supplied to NTPC / Non NTPC projects.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
4	Vol III	Ch 2		68 of 87	7.8.7 e	Particle size impurities test, as detailed out in the technical specification, is to be carried out on one oil centrifuge of BFP drive turbine.	The capacity of oil purifier is 2400 LPH. For this capacity the approved vendors (Alfa Laval and GEA Westfalia) have type tested for particle size and the test was approved for all the recent projects. Hence this test is not envisaged.	Type test details shall be submited for review during detailed engineering.
5	Vol III	Ch 2		23 of 87	1.13.c & d	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 thermal insulation for the turbine casing shall preferably be insulated by preformed ceramic mattress blankets conforming to IS15402 or equivalent. Alternatively, bidder may apply turbine insulation as per their standard practice i.e. sprayed insulation produced by projecting specially prepared mineral wool along with a fine liquid spray.	As per BHEL design, the drive turbine is insulated with mineral wool mattress material with CAT-9 cement layer.	Clarification noted subject to the condition that noise level will be limited to 90dB(A).
6	Vol III	Ch 2		66 of 87	7.8.3 b	Statically & dynamically balanced rotor.	Solid forged rotor is considered for the offered BFP drive turbine and dynamic balancing up to rated speed shall be conducted as per BHEL design. Hence static balancing is not applicable . This is in line with standard practice followed for all exceuted projects of NTPC / Non NTPC.	Noted.
7	Vol III	Ch 2		69 of 87	7.8.9	Design of drive turbines generally in accordance with API 612 & 614 except as modified herein and proven practice of manufacturer and also generally followed in thermal power plants and testing in accordance with ASME PTC-6.	BFP drive turbine design code is IEC 45.	Noted.
8	Vol II	Ch 9		18 of 103	2.1 - V a	Rotating and stationary blades along with labyrinth seals, gland seals, fasteners, coupling along with nuts and bolts	Only rotating blades and stationary blades considered as mandatory spares. Bladed turbine rotor not considered. Fasteners only for following components of BFP drive turbine are considered. 1. Turbine Casing parting plane bolts & nuts. 2. Inlet flange bolts & nuts 3. Guide blade carrier parting plane bolts & nuts as applicable. 4. Turbine and Exhaust hood vertical flange bolts 5. Exhaust hood parting plane bolts.	Noted.
9						General- Drive Turbine (Bearing Housing)	One number grounding brush will be provided due to space constraints in the drive turbine bearing housing. This is in line with all NTPC / Non - NTPC Projects.	Noted.
Pumps:								
1	Vol III	Ch 2		60 of 87	7.1 (l) (2)	ON-OFF type minimum recirculation valve with valve body designed for 40% of design flow.	Modulating type minimum recirculation valve will be provided, in line with the current NTPC projects.	Noted.
2	Vol III	Ch 2		61 of 87	7.1 w	TDH per stage for the main pump shall not exceed 670 mwc at design point	As per NTPC lara II spec.there is not specfic requirement. Request to please delete from specification.	Clause 7.1(w) of Chapter-2 at Sheet 61 of 87 / Vol-III stands deleted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	Vol III	Ch 2		62 of 87	7.1 z (iv)	Shaft sleeves	Shaft sleeves are not applicable for offered BFP.	Clarification noted - as per OEM Design.
4	Vol III	Ch 2		64 of 87	7.3(c)	Mechanical seals life:Not less than 20,000 running hours between Overhauls and having dry running withstand Capability as specified	The mechanical seal offered for main pump and booster pump are of full cartridge mechanical seal with API Seal plan 23.	Bid specifications to be followed.
5	Vol III	Ch 2		71 of 87	7.1.e	Visual Cavitation Test	The Visual Cavitation test of BFP is not feasible to be conducted at our works and same is accepted by NTPC for 2x800 MW Lara II & 1x800 SCCL Singareni tenders. Extract attached for reference.	Noted.
6	Vol III	Ch15		8 of 37 & 30 of 37	15.6 A(a) & DAT SHEET SL.NO1	Three (3) (2 working + 1 stand by) Circulating Water (CW) pumps	Total No of CW pumps (Vertical wet pit pumps) pumps proposed shall be of 5(4W+1S). Similar configuration supplied in 1X800MW TSGenco KOTHAGUDEM which is woking satisfactorily and already supplied to 5x800MW TSGENCO Yadadri project which is under commissioning stage. Hence request to allow 5x25% configuration for vertical wet pit pumps .	Bid specifications to be followed.
7	Vol III	Ch15		17 of 37	15.10(B)	MODEL TEST OF CW PUMPS	Model test is not required for CW pumps (Vertical wet pit pumps) as Shop performance test shall be conducted.	Noted, however sump model test to be performed by bidder.
Annexure-16								
1	IV	9	ISOLATED PHASE BUS DUCTS AND NEUTRAL GROUNDING EQUIPMENT	12	9.04.12 (v)	The allowable air leakage shall be less than 3% of the total enclosure volume per hour. The Bidder shall demonstrate this guaranteed figure during factory test as well as during site acceptance test.	Air leakage rate will be in accordance with IS 8084 Appendix-F Cl. F-4.2. 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. The tender requirement is impossible and never achieved in any power project.NTPC has already removed the 5% requirement in all its latest tenders and accepted the IS:8084 requirement.	Confirmed
2	IV	9		15	9.04.16 (i)	NG cubicle shall be of aluminum alloy	As per standard practice in all power plants, NG cubicle is use to be manufactured by CRCA which is more durable for supporting heavy NGT and NGR. Further u shape extuded channels of CRCA are more effective for maintaining IP class. Customer is requested to accept the same.	Confirmed
3	IV	10	Segregated phase busduct	5	10.04.01 (i)	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.	As per standard practice, we have type tested proven design of SPBD with plain bolted joints. Copper to Copper joint will be electro tinned and Bimetallic strip will be provided for copper to aluminium contacts. This is the standard proctice followed in all power plants.Customer is requested to accept the same.	Bid specifications to be followed.
4	IV	10		6	10.04.01 (iii)	The bus conductors shall be designed to carry rated current under normal site operating conditions without exceeding a hot spot temperature of 85 deg.C. At silver plated joints maximum temperature allowable is 105 C.	The temp. rise limits shall be as per IS:8084	Confirmed, Temprature rise limits shall be as per IS.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
5	IV	10		14	Data sheet-S.No:3.5(b)	Bus Enclosure -Al alloy grade 19501 60% IACS	3 thick al. alloy alloy sheet does not comes in 19501 grade. In SPBD as per standard practice, 31000 grade is used as it is more durable for SPBD strength.	Confirmed
Annexure-17								
CHP,LHP-GHP MECHANICAL								
1	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 10 of 120	1.2.3	Conv. # 3BC-1A / 1B will receive coal either from Wagon Tippler Complex # 3WTC-1 and deliver coal (one to one basis) onto conveyor # 3BC-2A / 2B which in turn will transport coal to Crusher House #3CRH-1.	As shown in the flow diagram divertor gate is shown for feeding the coal to 3BC-2A / 2B which is contradictory with one to one basis as mentioned in Cl 1.2.3. Please clarify this contradiction.	Diverter gate be provided as per CHP flow diagram (Drg no.111-11-5100).
	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-			
2	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 10 of 120	1.2.4	Through the two (2) way chute with diverter gate, Belt conv. # 3BC-3A / 3B will feed ROM coal into vibrating grizzly feeder # 3VGF-1A / 2A & VGF-1B / 2B. Grizzly feeder will separate out (-) 20mm coal from its feed and deliver oversize coal i.e. (+) 20mm lump size into Crusher # 3CR-1A / 2A & 3CR-1B / 2B for crushing coal down to (-) 20 mm product. Chute liner shall be of stainless steel.	Please clarify since Clause is contradictory with the flow diagram. Also bidder understands that since Rod gate with Rack and Pinion gate is shown in the flow diagram Divertor gates are not required and not considered for feeding the coal from 3BC-3A/3B to vibrating grizzly feeders. Customer to kindly confirm.	Bidder's understanding is correct.
	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-			
3	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 10 of 120	1.2.4	Under size material i.e. (-) 20 mm size coal from grizzly feeder bottom will be fed via chute on to belt feeder # 3BF-1A / 1B. Crushed coal of (-) 20 mm lump size from crusher bottom shall be fed via chute onto belt feeder # 3RBF-1A / 1B which will deliver coal onto Conv. # BC-4A / 4B. Chute liner shall be of stainless steel.	3RBF-1A/1B is not shown in flow diagram and Bidder understands as per flow diagram that crushed coal from crusher shall be fed to 3BF-1A/1B for further conveying, hence # 3RBF-1A / 1B is not applicable and not considered. Please confirm.	Bidder's understanding is correct.
	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-			
4	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 10 of 120	1.2.5	Conveyors # BC-4A / 4B are provided with their head ends located in 3JT-2. Fixed trippers 3FT-1A/1B located in 3JT-2 shall feed crushed coal either to coal stockpiles #CCS-1/2 using Rail mounted Stacker cum Reclaimer Machine#SR-1A or onto Conveyors # 3BC-5A / 5B for onwards transport of crushed coal to Coal Bunkers via connected set of conv # 3BC- 7A/7B/8A/8B/9A/9B & bunker filling tripper conv#3TBC-1A/1B/2A/2B. The crushed coal is fed to stockpiles#3CCS-1/2 using reversible yard belt	Clause is contradicting with the scheme shown in flow diagram. Bidder understands that head end of # BC-4A / 4B should be kept in 3JT-4 and conveyor BC-4A/4B with fixed tripper 3FT-1A/1B (located in 3JT-2)conveys coal either to coal stockpiles #CCS-1/2 using Rail mounted Stacker cum Reclaimer Machine#SR-1A or onto conveyor 3BC-7A/7B for further conveying. Hence conveyor 3BC-5A/5B shown in flow diagram is not correct and not required. Please confirm if Bidder's understanding is correct.	Bidder's understanding is correct.
	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-			

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
	Vol-III	Ch:19 Coal Handling System	Data sheet: Belt Conveyors	Sheet 34 of 120	-	conv#3RYBC-1A operating in conjunction with Stacker cum Reclaimer Machine#3SR-1A.		
5	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-		Bidder understands that head end of 3BC-11A / 11B are kept in 3JT-10 and conveyor 3BC-11A/11B with fixed tripper 3FT-2A/2B (located in 3JT-9)conveys coal either to 3TBC-1A/1B or onto conveyor 3TBC-2A/2B. Hence conveyor 3BC-12A/12B shown in flow diagram is not correct and not required.Please confirm if Bidder's understanding is correct.	Bidder's understanding is correct.
	Vol-III	Ch:19 Coal Handling System	Data sheet: Belt Conveyors	Sheet 34 of 120	-			
6	Vol-VII	-	Plot plan	57 of 120	-		As per the flow diagram Conveyor 3RC-1 is feeding coal directly from 3RHC to 3JT-3, however in plot plan 3PH-2 along with an additional conveyor is shown. Customer is requested to clarify this contradiction and provide the scheme with Number of conveyors to be considered by bidder.	It is clarified that 3RC-1 shall convey coal to 3JT-3 through 3PH-2
	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-			
7	Vol-VII	-	Plot plan	57 of 120	-		As per the flow diagram (Dwg No: 111-11-5100)Conveyor 3BC-7A/7B is shown as feeding coal upto 3JT-5.However as per plot plan 3BC-7A/7B discharges coal on to ongoing conveyor from 3JT-4 to 3JT-5 as marked in image beside.Customer to kindly clarify this contradiction and provide the scheme to be considered by bidder since this conveyor shown in plot plan is not indicated in the flow diagram and in Technical Spec.	Please follow the conveyor routing shown in Plot Plan & accordingly provide JT's & conveyors.
8	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-		Since track hopper is not present in scheme of Coal handling system, Dust suppression for track hopper and compressed air system for THC-1 is not applicable and not considered. Pl confirm.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
9	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 11 of 120	1.2.10	Thus under above CHP coal can be fed to coal bunkers as follows: A) Directly from tippler complex# 3WTC-1 to coal bunkers via Crusher House # 3CRH-1 / Conv. # 3BC-4A/4B/ 5A/5B/ 6A / 6B / 8A / 8B / 9A / 9B /10A/10B/11A/11B/ bunker filling tripper conv. # TBC-1A/1B/2A/2B. B)Directly from tippler complex# 3WTC-1 to coal bunkers via Crusher House # 3CRH-1 / reversible yard belt # 3RYBC-1A & connected Conv. # 3BC- 7A/7B /8A/8B/9A/9B/10A/10B/11A/11B /bunker filling tripper conv#3TBC-1A/1B/ 2A/2B. [Note: stockpile by pass facility of M/C#3SR-1A to be used in above route] C)From crushed coal stockpiles # 3CCS -1 / 2 to Coal Bunkers via Bucket wheel of Stacker-cum-Reclaimer M/C # 3SR-1A/boom belt /Yard Belt # RYBC-1A /Conv#BC-7A/7B and connected set of conveyors including bunker filling tripper conveyors # TBC-1A / 1B/2A/2B. F)From crushed coal stockpiles # 3CCS -1/2 to Coal Bunkers via dozers/ reclaim hopper complex# 3RHC vib feeders/conv# 3RC-1 and connected set of conveyors including bunker filling tripper conveyors # 3TBC-1A / 1B/2A/2B. Pay loaders can also be deployed to feed coal from stockpiles to reclaim hoppers	Bidder requests Customer to address the queries in Serial No 5 to 8 above regarding the contradictions in the scheme shown in Flow diagram, plot plan and system description and accordingly the coal flow paths given in clause 1.2.10 shall also be changed and provided.	Refer replies above
10	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 12 of 120	1.3	14.Dry Fog Dust Suppression System: The respirable dust level of 50 microns should be restricted to within 3m radius of application point: (a) 2mg/Nm³ over and above ambient dust level (in closed area) & (b) 5mg/Nm³ over and above ambient dust level (in open area)	Achieving this PG parameter for Dry Fog Dust Suppression (DFDS) is not possible , Pl. revise the parameters in line with industry practice.	Bid specifications to be followed.
11	Vol-III	Ch:19 Coal Handling System	Data sheet for dust suppression system in Wagon tippler	Sheet 93 of 120	1.8	d) Air cleanliness: a)Respirable Dust level shall be restricted to 2mg / Nm³ over and above ambient dust level in closed area b) Respirable Dust level shall be restricted to 5mg / Nm³ over and above ambient dust level in open area	Achieving this air cleanliness parameter for Dust Suppression is not possible , Pl. revise the parameters in line with industry practice.	Bid specifications to be followed.
12	Vol-VII	-	Plot plan	57 of 120	-		Customer to kindly furnish the Minimum Storage capacity to be considered in terms of Number of days of requirement of coal or combined total capacity of both stockpiles in MT.	Maximum possible coal storage capacity is to be developed by bidder as per available area in the plot plan.
13	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 23 of 120	1.9.2		Since track hopper is not present in scheme of Coal handling system, Rotary discharge machine is not applicable. Pl confirm.	Confirmed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
14	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 26 of 120	4	B] Idler units v)…….For Conv. # RBF-1A/1B continuous skirt board along with impact idler @ 400mm spacing shall be provided for entire length.	As mentioned in Sl no 4 query above and As per flow diagram there is no Conv. # RBF-1A/1B. Customer to kindly confirm.	Refer reply at S.No. 4 above.
15	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 29 of 120	4	[G] Seal Plate i)5mm thk. MS (IS:2062) seal plate shall be provided throughout conveyor gallery for all conveyor which are installed in overhead conveyor gallery	As a general engineering practice seal plate of thickness 3.15 mm is provided along conveyor gallaries. Pl confirm bidder's proposition	Bid specifications to be followed.
16	Vol-III	Ch:19 Coal Handling System	Data sheet: Belt Conveyors	Sheet 34 of 120	-		Due to layout constraint, HGTU cannot be provided for Conveyor 3BC-2A/2B.Customer to kindly confirm if VGTU can be provided as per layout feasbility.	Bid specifications to be followed, however issue may be discussed during detailed engineering.
17	Vol-III	Ch:19 Coal Handling System	Data sheet: Belt Conveyors	Sheet 34 of 120	-		Reversible Yard conveyor 3RYBC-1A is a single conveyor as per flow diagram but has been shown as 2 (two) Nos in Conveyor data sheet. As 3RYBC-1B is not applicable, bidder is considering One No Reversible Yard conveyor 3RYBC-1A. Pl confirm	Bidder's understanding is correct.
18	Vol-III	Ch:19 Coal Handling System	Data sheet: Belt Conveyors	Sheet 34 of 120	-	As per the conveyor datasheet type of drive for conveyor 3RYBC-1A(Reversible) is mentioned as Single Snub Drive (Reversible type)	1.Bidder understands that only one motor has to be provided in the --- JT and this motor shall be reversible in nature and shall operate in different directions during stacking and reclaiming. Kindly confirm if our understanding is correct. 2.Since this Single reversible motor is placed in 3JT-3 and since tail pulley will be movable for HGTU purpose, drive house is not applicable for 3RYBC-1A conveyor. Accordingly bidder is not considering drive house. Kindly confirm if bidder's understanding is correct.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
19	Vol-III	Ch:19 Coal Handling System	Data sheet: Belt Conveyors	Sheet 34 of 120	-	As per the conveyor datasheet Location of drive for 3BF-1A/1B is mentioned as at one of the two discharge ends.	Since 3BF-1A/1B is a belt feeder as per the flow diagram and for belt feeder discharge shall be at only one end (i.e. head end), customer is requested to correct the location of drive as head cum discharge end.	Noted.
20	Vol-III	Ch:19 Coal Handling System	Data sheet: Belt Conveyors	Sheet 34 of 120	-	16.4)Tripper Head & Bend(carrying side)drum dia. ,Minimum,mm 16.5)Tripper Bend (return side), Min.	As per conveyor datasheet tripper pulleys are considered for conveyors 3BC-9A/9B and 3BC-10A/10B. However, As per flow diagram Fixed tripper is provided for 3BC-4A/4B, 3BC-11A/11B and travelling tripper for 3TBC-1A/1B/2A/2B hence tripper Pulleys are considered for these conveyors in line with flow diagram. Please confirm	Confirmed.
21	Vol-III	Ch:19 Coal Handling System	Data sheet of fixed tripper	Sheet 57 of 120	2.2		As per flow diagram Fixed trippers are provided on 3BC-4A/4B & 3BC-11A/11B hence Number of fixed trippers is 4 which is contradicting with the quantity provided in datasheet. Pl Clarify	Fixed trippers shall be considered as per flow diagram.
22	Vol-III	Ch:19 Coal Handling System	Data sheet of Vibrating feeder	Sheet 79 of 120	M-20	1.0 Vibrating feeder shall be installed below RCC hoppers of Reclaim Hopper Complex#RHC-1/2/3. 2.0 C) Equipment Designation No./Qty : 3VF-1A/1B,Qty:2 no	As per the flow diagram : 1.There are 4 reclaim hoppers 3RH-3A/3B/4A/4B. 2.Quantity of Vibrating feeders is shown as 4 Nos i.e. 3VF-1A/1B/2A/2B Customer to kindly clarify this contradiction between datasheet and flow diagram	Please follow flow diagram.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
23	Vol-VII	-	Plot plan	57 of 120	-		Customer to clarify if this uncrushed coal stockpile shown in the plot plan is part of this package or not, if so please specify the capacity and all other details of stockpile to be considered along with its purpose.	1. Provision of Uncrushed coal stockepile stands deleted. 2. For feeding crushed coal from 800 MW Unit Coal stockpile to the existing Units of 2x300 MW or vice versa, the area around the proposed ERH & the existing ERH shall be RCC paved for movement of dozers.
24	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-		Tripper arrangement of Stacker Reclaimer shown in flow diagram is incorrect as this is bypass chute arrangement in a unidirectional stacker reclaimer machine. 1. Tripper feeding will be from 3JT-3 side and not from drive house side. 2.an intermediate conveyor on SCR machine will be required. 3.Flap gate is not applicable Generally following arrangement is applicable for bi-directional stacker reclaimer, bidder is considering the same kindly confirm.	Noted, however, the issue may be discussed during detailed engineering.
25	Vol-III	Ch:19 Coal Handling System	Plain water Dust suppression system for Crushed coal stockpiles	Sheet 90 of 120	M-23	1.6……..at inlet of each sprinkler to By-Pass the Solenoid Valve. Stockpile will be wetted by operating one (1) no. sprinkler on each side of any one stockpile [Two (2) nos. sprinklers will be operating at a time for any one of stockpile]. A pair of sprinklers will be started/ stopped manually as per requirement from control panel.	Bidder understands that Two Nos sprinklers shall be operating at a time for one stockpile and also Plain water Dust suppression shall be operated sequentially first for 3CCS-1 and then for 3CCS-2, hence 2 Nos sprinklers shall operate simultaneoulsy. Customer to kindly confirm Bidder's understanding.	Noted.
26	Vol-III	Ch:19 Coal Handling System	Plain water Dust suppression system for Crushed coal stockpiles	Sheet 90 of 120	M-23	1.1 Two (2) no. sprinklers shall operate at a time for one stockpile. When both M/C # SR-1A/1B operate four (4) no. Sprinklers shall operate simultaneously.	As per flow diagram and scheme Only One No. Bidirectional stacker cum reclaimer machine is to be considered. Please confirm.	Bidder's understanding is correct.
27	Vol-III	Ch:19 Coal Handling System	Data sheet plain water dusts suppression	Sheet 90 of 120	M-23	2.0 ii)Location of Pump House # PMH-3A : Refer Layout Plan	As mentioned in the technical spec, Bidder understands that five pump houses(PMH-3A,PMH-1A/2/3B/4) are to be provided, hence bidder requests customer to provide location of these pump houses and water distribution scheme from each of these pump houses	Minimum 03 Nos. Pump houses shall be provided and their location shall be finalized during detailed engineering.
	Vol-III	Ch:19 Coal Handling System	Dry Fog Type Dust Suppression System	Sheet 93 of 120	M-26	Independent Air compressor with accessories, independent centrifugal water pumps with duplex water filter and Monorail & chain pulley block, water tank complete with inlet, outlet, overflow, drain & necessary instrument/ switches/ valve/ necessary electrical etc. shall be provided located suitably in the respective pump house # PMH-1A/2/3B/4		
28	Vol-III	Ch:19 Coal Handling System	Passenger Cum Goods elevator	Sheet 105 of 120	M-36	1.0 Passenger cum Goods lift shall be provided for Crusher House # CRH-1 & Junction Tower Building # JT-7. Lift shall be installed at location where least dust generation occurs & is subject to approval of HPGCL.	As per flow diagram Elevators are shown for 3CRH-1, 3JT-10 and 3JT-2 i.e. 3 Nos, however as per the technical specifications Elevators are 2 Nos and have to be provided at 3CRH-1 & 3JT-7. Please clarify this contradiction as to the Number of elevators and their locations.	02 Nos. Elevators to be provided -- 01 at crusher house and 01 at travelling tripper floor junction tower.
	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-			

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
29								
30	Vol-III	Ch:19 Coal Handling System	Passenger Cum Goods elevator	Sheet 105 of 120	4.0 CONVEYOR COMPONENTS	[A]Belting:.....Electronic Rip detection system shall be provided for steel cord belting. Steel cord belt shall be provided with "Rip Protection" as follows: Bidder shall provide proven experience of Rip protection Belt. Rip protection shall be of Nylon fabric breaker (of weft strength minimum 150kN/m) or steel cord breaker for top & bottom cover. Combination of steel cord for top & Nylon fabric breaker for bottom is also acceptable	Bidder understands from the description that mechanical Rip detction shall be provided and not electronic rip detection. Pls confirm. If bidder's understanding is not correct please provide details of Electronic Rip detection system and its components	Bid specifications to be followed. Sensor loop shall be provided at every 50 meter interval.
31	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-		Bidder understands that it is 3IMWB-1B As per the Clause M-39 Cl 2.2. Pl confirm.	Confirmed.
32	Vol-III	-	GENERAL QUERY	-	-	Limestone handling system	Since Technical Specifications are not provided in any volume of tender documents, Please furnish following details for LHP : 1.Detailed Technical specification for Equipments,conveyor components,Water system,DE system and other auxiliary systems 2.Minimum capacity to be considered for Conveyors, Surface feeder, Crusher, vibrating feeders etc 3.Capacity and technical details of Payloader and Dozer	Please refer Attachment-5.
33	Vol-III	-	GENERAL QUERY	-	-	Limestone handling system	Please confirm if Bucket elevators with belt feeders can be considered to feed limestone from Crusher House to Limestone day silo in case of space constraint in layout.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
34	Vol-III	Ch:30 Flue gas desulphurization system	Limestone handling and grinding system	Sheet 6 of 93	1.2		As per the Bidder's past experience and general engineering practice in FGD projects EOT Crane #EOT-1 is not required for maintanance of equipment in Limeshed, hence shall not be considered by bidder. Customer to kindly clarify and confirm	Requirement of EOT crane in limestone shed is deleted .
35	Vol-III	Ch:30 Flue gas desulphurization system	Limestone handling and grinding system	Sheet 6 of 93	1.2		As per the plot plan One (1) Weigbridge is indicated with facility No 40. Hence Only One (1) Weigbridge common for LHP & GHP is considered by bidder. Pl confirm.	Weigh bridges be provided as per Clause 31.0 of Chapter 31, Sheet 2 of 4, Volume III.
36	Vol-VII	-	Flow diagram of Limestone Handling system	51 of 120	-		1.As per the Limestone flow diagram bidder understands that trucks are in Customer scope and are of self-tippling type and hence truck tipplers are not considered in the scope. Customer to kindly confirm. 2.Pl furnish the maximum height and angle of repose to be considered for limestone stockpile .	Trucks are not in the scope of bidder and truck tipplers are not applicable. Maximum height: 4.5M; Angle of repose: Maximum 37 degree.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
37	VOL-II	Ch 8: FG & LD	Biomass handling plant	27 of 57	3.9.2 f)		Biomass handling system is not mentioned or shown anywhere as per the scheme provided in the flow diagram and the facilities shown In layout plan, hence Biomass system shall not be considered in scope of bidder. Customer to kindly confirm.	It is clarified that:- 1) Biomass handling is in the bidders scope. Biomass shall be fed through ERH provided for CHP. 2) Biomass storage of 500 tonnes shall be provided in a semi covered shed. Side wall shall be minimum 2 metre height.
38	Vol-VII	-	Flow diagram of Limestone Handling system	51 of 120	-		Bidder understands that DAY BIN # 1 and DAY BIN # 2 (image attached)shown in Limestone flow diagram and Limestone Silo-A and Limestone-B (image attached) shown in Lime slurry preparation are same and not different. Customer to kindly clarify and confirm bidder's understanding.	Confirmed.
	Vol-VII	-	Flow diagram - lime slurry preparation	49 of 120	-			
39	Vol-III	Ch:30 Flue gas desulphurization system	Limestone handling and grinding system	Sheet 7 of 93	1.2		One (1) Number common Limestone sampling unit for both conveyor streams has been considered by bidder which shall sample Limestone from either stream but only from one stream at a time . Customer to kindly confirm.	Noted.
40	Vol-III	Ch:30 Flue gas desulphurization system	Limestone handling and grinding system	Sheet 7 of 93	1.2		JNT-1 is not shown anywhere in the flow diagram/Plot plan of Limestone handling system,hence it is not considered by bidder. Customer to kindly confirm.	JT shall be provided by bidder, if required during detailed engineering .
41	Vol-VII	-	Flow diagram of Limestone Handling system	51 of 120	-		Please confirm if Plough diverters can be used in place of Fixed trippers above limestone day silos.	Bid specifications to be followed.
42	Vol-III	Ch:29 Elevators	Elevators	Sheet 6 of 13	29.8	29.8 EQUIPMENT SPECIFICATIONS FOR CONVENTIONAL ELEVATORS 29.8.1 Elevators shall be of conventional type for Service building, TG building, ESP Control room, Boiler area, junction tower, crusher house and FGD area. The elevators shall meet the quality of international standard.	Bidder understands that Elevators provided in the Coal and Limestone handling are conventional rope and sheave type elevator. Customer to clarify and confirm regarding the type of elevator to be provided in CHP & LHP area.	Refer clause 29.13.6 of Chapter 29, Sheet 10 of 15, Volume III of bid specifications.
43	Vol-III	-	Pump house	-	-	General Query	Please confirm whether separate water pump house for limestone handling area & gypsum handling area to be considered or as an alternate same can be clubbed with CHP pump house with common pumps for Plain Water Dust suppression, service water & Potable water. Also please confirm whether Dust extraction system compressed air requirement for limestone handling area can be clubbed with CHP common compressed air system or not.	Separate Water Pump House is not required for Limestone Handling area and Gypsum Handling area and it can be clubbed with CHP pump house. Confirmed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
44	Vol-III	Ch:30 Flue gas desulphurization system	Limestone handling and grinding system	Sheet 12 of 93	1.9	Gypsum shed of 15 days storage shall be considered. Shed shall be provided with side protection. Adequate space inside shed for truck movement shall be provided. Dozer (1 No.) and Pay loader (1 no.) required for gypsum storage and loading into the truck, road connectivity, shall be included in the Bidder's scope.	Both the clauses are contradictory in regard to the number of minimum number of days storage to be considered for Gypsum handling area. Customer to kindly clarify.	Gypsum shed of 15 days storage be considered as per Clause 1.9.
45	Vol-III	Ch:30 Flue gas desulphurization system	Gypsum storage Area	Sheet 76 of 93	1.3	b) One number of covered storage shed for gypsum. The storage shed shall be sufficient to store gypsum equivalent to gypsum generation of minimum 7 days at Design point.		
46	Vol-III	Ch:30 Flue gas desulphurization system	Limestone handling and grinding system	Sheet 13 of 93	1.9	Operator room/Maintenance area/maintenance storage room with arrangement required for the Dozer (1 No.) and Pay loader (1 no.) along with toilet shall also be included in Bidder's scope.	Common Dozer shed shall be provided for dozers and payloaders machines in Gypsum and Limestone handling area and bidder understands that the operator room/maintanance storage room mentioned shall be part of this common dozer shed. Customer to kindly clarify and confirm bidder understanding.	Confirmed
47	Vol-III	Ch:30 Flue gas desulphurization system	Limestone handling and grinding system	Sheet 13 of 93	1.9	1.11 Buildings Bidder shall provide buildings for Limestone grinding System, slurry recirculation pumps & oxidation blowers/compressors, Gypsum Dewatering system, FGD control room, process water pump house, Waste Water Building, Chemical House, Dozer Shed, Waste Water		
48	Vol-III	Ch:30 Flue gas desulphurization system	Limestone handling and grinding system	Sheet 13 of 93	1.9	Operator room/Maintenance area/maintenance storage room with arrangement required for the Dozer (1 No.) and Pay loader (1 no.) along with toilet shall also be included in Bidder's scope.	Please furnish the capacity and technical details of Payloader and Bull dozer to be considered for Gypsum handling system	1. Bucket capacity of tyre mounted payloader shall be 2.5 m3. 2. Capacity of bulldozer shall be not less then 134KW (180 hp) @1850 rpm
49	Vol-III	Ch:30 Flue gas desulphurization system	Gypsum storage Area	Sheet 75 of 93	1	GYPSUM STORAGE SYSTEM 1.0 General Gypsum cake coming from the belt filter shall be discharged to a hopper. The belt conveyor will transport the gypsum to the closed gypsum storage shed.	1.Gypsum Handling system Flow diagram/ scheme is not provided in the Vol-VII Tender drawings. Bidder requests customer to kindly provide this scheme for Gypsum handling system. 2.Gypsum cake coming from Belt filter shall be discharged to the Gypsum conveyors through chute arrangement as per standard practice and hopper is not applicable at this point. 3.Flap gates are not considered below belt filter for the discharge of gypsum on to the Gypsum conveyor and it is One to One feed. Customer to kindly confirm.	Bid specification to be followed. Gypsum handling shall be provided based on guidelines indicated in chpater 30, Volume III.
50	Vol-III	Ch:30 Flue gas desulphurization system	Gypsum storage Area	Sheet 76 of 93	1.3	d) Complete dust extraction system for control of fugitive dust in gypsum storage shed.	Clauses are contradictory as to whether Dust extraction or PWDS to be considered in gypsum storage shed. Customer to kindly clarify and inform the type of Dust control system to be considered.	Dust extraction system is not required for gypsum storage shed, however plain water dust suppression system to be provided for gypsum storage shed.
51	Vol-III	Ch:30 Flue gas desulphurization system	Gypsum storage Area	Sheet 76 of 93	1.2	Plain water dust suppression system for Gypsum storage area shall be provided. All the associated system such as pumps (1w+1s), spray nozzles covering the entire storage area, including electrical, instrumentation and control system shall be provided.		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
52	Vol-III	Ch:30 Flue gas desulphurization system	Travelling tripper Datasheet	Sheet 79 of 93	-	h)Type of discharge chute : Two-way with flap gate having Linear actuator	Bidder understands that it is Three-Way flap gate considering both side discharge and central discharge on tripper conveyor for direct loading at discharge/head end through telescopic spout . Pl confirm.	Confirmed.
53	Vol-III	Ch:30 Flue gas desulphurization system	Gypsum storage Area	Sheet 75 of 93	1.2	Operator room, maintenance room with toilet, SW, PW facility shall be provided.	As per Bidder's experience Operator room, maintenance room with toilet is not required in Gypsum shed, hence the same is not provided. Pl confirm.	Toilet, SW, PW facility to be provided in dewatering building only.
54	Vol-III	Ch:19 Coal Handling System	Data sheet: Belt Conveyors	Sheet 12 of 120	1.3		As the rated capacity of conveyors above and below crusher is 1200 TPH (rated), the capacity of crushers shall be 600 TPH Rated. Pl confirm.	Rated capacity of belt conveyors (1W+1S) is revised to 1400 TPH. Thus, all associated equipments & systems of CHP shall be provided for 1400 TPH conveying capacity.
	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-			
	Vol-III	Ch:19 Coal Handling System	Data sheet: Belt Conveyors	Sheet 75 of 120	3			
55	Vol-III	Ch:19 Coal Handling System	Coal sampling system	Sheet 103 of 120	M-31	COAL SAMPLING SYSTEM 1.0 Auto coal analyser shall be installed for instant GCV monitoring of coal being fed into the units.	In NIT spec, it is mentioned as auto coal analyzer under Coal sampling system. Generally auto coal analyzer and Coal sampling system are two different types of equipment. Coal sampling system involves various sub assemblies like samplers, crushers, belt feeders, bottle collectors etc, however coal analyzer only has a panel/ enclosure which is placed inside gallery above belt conveyor. Also separate sampling tower is not applicable in auto coal analyser. a) So whether bidder should consider coal analyzer only instead of coal sampling system. Then separate sampling tower will not be applicable. Kindly confirm. b) If coal sampling system with sampling tower are to be provided by bidder instead of auto coal analyser, then pls. provide details of CSU like type, 2 stage/ 3 stage, qty., location, data sheet, etc.	Sampling tower is not applicable. Coal analyzer shall be provided as per attachment-6.
	Vol-III	Ch:19 Coal Handling System	Coal sampling system	Sheet 22 of 120	1.9.1	f.Design Basis Report / Flow & P&I Diagram / GA / Layout Drawing For Equipments & Subsystems etc involved with Dust Suppression Systems / Dust Extraction System / Ventilation Systems / Unitary Type Pressurized Ventilation & Water System / Coal Sampling System / Compressed Air System / other system etc.		
	Vol-III	Ch:19 Coal Handling System	Coal sampling system	Sheet 23 of 120	1.9.2	f.Operation &Control Philosophy for Side Arm Charger / Wagon Tippler / Stacker-cum-Reclaimer M/C,Coal Sampling system		
	Vol-III	Ch:19 Coal Handling System	Coal sampling system	Sheet 17 of 120	1.5.24	For Stacker-Reclaimer, Wagon Tippler & Coal sampling System, PLC based control system shall be provided.		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
	Vol-III	Ch:19 Coal Handling System	System Description for CHP	Sheet 16 of 120	1.5.13	One (1) external Independent steel staircase up to roof level [minimum1000 mm (clear) width] shall be provided for Sampling Tower Building# ST-1 with landing facility at all floors. On the other side of gallery, One (1) partial internal staircase commencing from floor level below conveyor floor level to reach other side of gallery/samplers etc shall be provided.		
56	Vol-III	Ch:19 Coal Handling System	pay loader	Sheet 104 of 120	M-35	1.2) Three (3) nos. self-propelled Payloader (Tyre Mounted) shall be provided with a minimum power 113 kw (152hp) (SAE-GROSS) / (Min.) 1.91cum bucket capacity, SAE Rated (nominal heaped).	a) For 1.91cum bucket capacity, SAE Rated (nominal heaped), considering coal density of 0.8T/m3, pay load is coming to only 1.91*0.8 = 1.528 T. This pay load is met with engines of lower rating than 152 hp. So customer to confirm whether lower rating engine can be considered by bidder meeting 1.528MT pay load. b) 152 HP is not a standard engine rating currently as per the standard payloader models of OEMs. Bidder requests customer to relook into the requirement of engine rating of the Payloaders.	It is clarified that 1.91 cu.m bucket capacity Payloader shall be provided.
57	Vol-III	Ch:19 Coal Handling System	Loco Shed	Sheet 21 of 120	1.8		Bidder requests Customer to furnish following: 1. Number of Locos to be considered at a time in Loco shed lengthwise 2. whether loco shed to cover one railway track or it should cover two railway tracks This is required to check location and space availability for required Loco shed.	1.) 03 Nos. loco to be considered at a time in loco shed. 2.) To be decided by bidder.
58	Vol-VII	-	Plot plan	57 of 120	-		As per the layout plan provided in the tender drawings, conveyors of proposed plant are crossing over the Existing plant conveyors (Conv BC-5A/5B, RC-3,#YC-1) and buildings such JT-4, Storage shed (identified with Facility No 8.10 in plot plan), PH-3 and JT-5. Hence customer is requested to provide GA Drawing of Conv BC-5A/5B, RC-3,#YC-1 and GA of buildings such as JT-4, Storage shed (identified with Facility No 8.10 in plot plan), PH-3 and JT-5 so that feasibility of proposed conveyors can be checked.	Bid specification to be followed. Bidder to visit site and check feasibility
59	Vol-III	Ch:19 Coal Handling System	Datasheet of Belt conveyors	Sheet 36 of 120	-	Co-ordinates of all Buildings / Towers length and lift of conveyors/feeders are indicative only and during detailed engineering it may vary. No price variation whatsoever on this account shall be given to the Bidder.	Please note that Co-ordinates of all Buildings / Towers length and lift of conveyors/feeders are not indicated anywhere in Tender drawings, request you to kindly furnish the same along with Conveyor tentative profile drawings.	Coordinates to be finalized by the bidder as per the layout to be finalized during detailed engineering.
60	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-		Bidder understands that By pass has to be provided before crusher as indicated in the Flow diagram. However bidder opines that it is better to provide bypass arrangement before VGF. Customer to kindly confirm.	Requirement of Bypass facility of Ring Granulator is deleted.
	Vol-III	Ch:19 Coal Handling System	Datasheet of Belt conveyors	Sheet 6 of 120	1.1.8 Scope of Work (Mechanical Works)	25.Crusher# 3CR-1A/1B/2A/2B with bypass facility		

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61	Vol-VII	-	Plot plan	57 of 120	-		We propose arrangement as indicated below instead of arrangement shown in the plot plan. Pl confirm	Bid specification to be followed, however, the issue may be discussed during detailed engineering.
62	Vol-VII	-	Plot plan	57 of 120	-		Due to layout constraints the length of stockpile possible is 190m only.Customer to kindly accept and confirm the same.	Bid specification to be followed, however, the issue may be discussed during detailed engineering.
63	Vol-VII	-	Plot plan	57 of 120	-		Due to layout constraints 3CRH-1 location indicated as per the NIT Plot plan drawing is not feasible and 3CRH-1 has to be moved towards 3JT-2 as indicated in the beside image, in that event length of existing coal stockpile has to be reduced by 40m to create access road around 3CRH-1 . Also existing road around 3CRH-1 has to be rerouted.	Bid specification to be followed, however, the issue may be discussed during detailed engineering.
64	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-		Since the rated/ Design capacity of 1200/1320 TPH is less, Bidder proposes the provision of only One Crusher per stream i.e.1x100% duty instead of 2x50% duty per stream which shall reduce the size of the crusher house. Customer to kindly confirm.	Bid specifications to be followed. 2 x 100% crushers shall be provided in each stream.
65	Vol-VII	-	Plot plan	57 of 120	-		As per the layout plan provided in the tender drawings, conveyors of proposed plant are crossing over the Existing plant conveyors (Conv BC-5A/5B,Conv-4A/4B, RC-3,#YC-1) and buildings such JT-4, Storage shed (identified with Facility No 8.10 in plot plan), PH-3,JT-5 and other facilities as marked in the beside image. Hence customer is requested to provide GA Drawing of Conv BC-5A/5B,Conv-4A/4B,RC-3,#YC-1 and GA of buildings such as JT-4, Storage shed (identified with Facility No 8.10 in plot plan), PH-3, JT-5 and other facilities as marked in the beside image so that feasibility of proposed conveyors can be checked.	Bid specification to be followed. Bidder to visit site and check feasibility
AHP MECHANICAL								
1	Vol-III	21	Scope	1of 21	21.1	Ash handling system scope shall include bottom ash system, coarse ash system, fly ash system (wet & dry) and ash disposal system.	We understand that complete ash water recovery system (Inside/Outside Plant boundary) is excluded from the scope of work.Please confirm	Confirmed.
2	Vol-III	21	System description	1of 21	21.2.1	Ash formed due to combustion of pulverized coal in the steam generator shall be collected as bottom ash in the bottom ash hopper or coarse ash in Economiser, SCR, air preheater, duct hoppers or fly ash in ESP hoppers.	No of ash hoppers and ash collection points will be as per boiler's input and ash prediction data. Ash conveying system shall be considered for these ash hoppers as per Ash handling system specification stipulated in chapter-21. Please confirm.	Ash conveying system shall be considered for ash hoppers as per Ash handling system specification stipulated in chapter-21 and its amendments / clarifications issued thereof.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	Vol-III	21	System description	1 of 21	21.2.4	Fly ash from Electrostatic Precipitator hoppers shall be extracted through vacuum system and conveyed to buffer hoppers and subsequently from buffer hoppers to fly ash silos through pressure conveying system. Fly ash shall be further disposed in dry form through closed tankers or in moistened form through open trucks. In addition to the dry fly ash collection system to silos, fly ash collected in ESP hoppers shall be automatically and sequentially extracted in dry form to the collector tanks (located above to buffer hoppers) for wet disposal through vacuum created by vacuum pumps. Dry fly ash while routed to the collector tank shall pass through wetting head where water shall be mixed with the dry fly ash and resultant ash slurry shall be discharged in to collector tank. One air washer shall be provided on each collector tank to clean the air passing to mechanical exhauster. Adequately sized jetting nozzles shall be provided below eac	As per the tender plot plan 111-29-0200 (R-03) Fly ash silos are located near to coordinate (1600N,1500E approx). Having Shorter fly ash conveying distancefrom ESP to FA silo,it is suitable for single stage pressure conveying instead of vacuum+pressure conveying system stipulated in the tender specification. This will result in omission of complete vacuum conveying system (Mechanical/Electrical/Civil/Structure) and also reduce overall auxiliary power consumption. Customer is requested to accept the above and include option of single stage pressure conveying system and fly ash slurrification from fly ash silo to ash slurry sump for bidders to quote.	Bid specifications to be followed.
4	Vol-III	21	DRY FLY ASH HANDLING SYSTEM Compressed air system	4 of 21 4 of 24	21.5.5 23.4.2	Two (2) (1W+1S) adequately rated, oil free, screw type Instrument air compressors with air driers and air receivers shall be provided for supplying instrument air for all needs of ash handling system. Minimum capacity of the instrument air compressors and air driers shall be 1300 M3/hr @ 8.5 kg/cm2 (g). Air compressors and Air Dryers shall be as specified for main compressors as per Chapter 23, Volume III. Three (3) HOC type air drying plants shall be provided (2W +1S) and shall be designed to deliver continuous instrument air. The capacity of each air drying plant shall be provided to match the corresponding 1.10 times capacity of each Instrument air compressor. Discharge pressure available at the outlet of Air Drying Plant shall be minimum 8 Kg/cm2 (g) or more as per requirement.	Please clarify the contradiction in capacity of air dryer for IA compressor.	There is no contradiction. Minimum IA compressor capacity is specified. Two nos. (1W+1S) Air Dryers shall be provided for AHP. The capacity of each air drier shall be 1.10 times the capacity of IA compressor. The type of compressor and air driers shall be as specified in Chapter 23, Volume III. Three (3) HOC type air drying plants specified in Chapter 23, Volume III is for main IA compressor of the power plant.
5	Vol-III	21	DRY FLY ASH HANDLING SYSTEM	4 of 21	21.5.6	Six (6) (4W+2S) rotary oil free lobe type conveying air blowers of suitable capacity with necessary accessories shall be provided for conveying fly ash from the ash vessels (below buffer hoppers) to Fly Ash silos. Temperature of 800 C of fly ash at silo outlet/loading end shall be ensured and demonstrated at the time of performance test.	Ash conveying through conveying air blowers will be difficult for few OEMs as pressure will not be sufficient for their system. Request to consider oil free screw compressors instead of conveying air blowers in the specification.	Clause 21.5.6 of Chapter 21 at Sheet 4 of 21 in Vol-III be read as: "Six (6) (3W+3S) transport air compressors (TAC) of suitable capacity with necessary accessories shall be provided for conveying fly ash from the ash vessels (below buffer hoppers) to Fly Ash silos. TAC shall be oil free screw compressors and the specification of the screw compressors shall be in line with the compressors described in Chapter 23 clause 23.6 Vol-III. The capacity and pressure shall be selected as per ash handling requirement.Temperature of 80 deg C of fly ash at silo outlet/ loading end shall be ensured and demonstrated at the time of performance test."

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6	Vol-III	21	DRY FLY ASH HANDLING SYSTEM	4 of 21	21.5.7	Sixteen (16) (8W+8S) vacuum pumps shall be provided to create necessary vacuum required to convey dry fly ash from ESP hoppers to buffer hoppers	As per the practice followed in all NTPC projects, Please allow to keep vaccum pumps near to ESP 1st field instead of locating in separate vacuum pump house. This will help in utilizing the available space as well as optimizing the layout.	In Clause 21.5.7 of Ch-21 at Sheet 4 of 21 in Vol-III, the words / figures "Sixteen (16) (8W+8S) vacuum pumps" be read as Twelve (12) (6W+6S) vaccum pumps". Fluidizing Blowers alongwith Heaters shall be housed inside. It is confirmed that vaccum pumps be installed near to ESP 1st field.
7	Vol-III	21	ASH DISPOSAL SYSTEM	5 of 21	21.7.2	First stage ash disposal pump shall be provided with variable speed fluid coupling and gearbox. Variable speed fluid coupling shall be designed for (+) 10% and (-) 40% speed variation of the rated pump speed. Balance pumps in the series shall be provided with belt drives.	SLFD doesn't indicates fluid coupling and gearbox. Please confirm that first stage ash disposal pump shall be provided with variable speed fluid coupling and gearbox.	Confirmed
8	Vol-III	21	ASH DISPOSAL SYSTEM	5 of 21	21.7.1 21.7.3 21.7.4	Each pumping series shall be provided with a disposal pipeline up to ash disposal area incluing garlanding. Each disposal pipe length shall be considered as 7 KM from the pump house. The existing ash dyke is located around 5.2-6 km from the proposed ash disposal pump house.Ash slurry pipes shall shall be routed from proposed ash disposal pump house on pipe rack/RCC pedestals. Nearest ash dyke i.e., Ash dyke A is 5.2 KM from ash slurry pump house and farthest ash dyke i.e., ash dyke B is approx 7 KM from ash slurry pump house.	Since distance of existing ash dyke is mentioned as 5.2-6 and 7 km in the same paragraph,Request to confirm the following: 1.distance of farthest existing ash dyke,whether it is 6 km or 7km 2. Maximum ash slurry disposal distance to be considered for sizing of ash slurry pump as 7km only. 3. Terminal point for extent of pipe rack and pedestals to be clearly indicated for bidder's consideration. Whether only pedestals from ash slurry pump house to ash dyke are acceptable and at road crossing, pipe culverts to be provided.	Requisite clarifiactions are under:- 1. Distance of farthest existing ash dyke is 7 KM. 2. Maximum ash slurry disposal distance shall be 8 KM including garlanding on the periphery of the dyke. All civil and structural works for 8KM length of ash disposal pipes shall be considered in the quoted price. 3. Pipe rack shall be considered for pipes routed inside plant boundary and pedestals outside plant boundary up to ash dyke. At road crossings outside plant boundary shall be in culverts.
9	Vol-III	21	ASH DISPOSAL SYSTEM	5 of 21	21.7.4	Each ash dyke shall be having 3 discharge point for all the three lines.	Any Civil work like pedestals,energy dissipitaing steps,toe drains, etc on existing ash dyke shall be excluded from the scope of work. Request to confirm.	The civil works related to ash disposal pipes including pedestals, energy disipating steps etc. on ash dyke shall be in bidder's scope.
10	Vol-III	21	ASH DISPOSAL SYSTEM	5 of 21	21.7.4	A total length of 24000 M shall be considered in the scope of supply for 3 ash disposal pump series.	Each disposal pipe length is to be considered as 7 km then only 21 km slurry pipes are required. Please confirm 24 km slurry pipes will be supplied as per spec but only 21 km slurry pipes shall be considred for erection work and balnce shall be handed over to customer . Please confirm Civil pedestals shall be considered for the route length of 7 km for laying 3 nos x 7km ash slurry pipes.Please confirm	Each disposal pipe length is to be considered as 8 km as per Chapter 21 of Vol-III. It may be understood that Civil pedestals shall be considered for the route length of 8 km for laying 3 nos x 8 km ash slurry pipes which includes garlanding on the ash dyke.
11	Vol-III	21	System description	5 of 21	21.7.4	Nearest ash dyke i.e., Ash dyke A is 5.2 KM from ash slurry pump house and farthest ash dyke i.e., ash dyke B is approx 7 KM from ash slurry pump house. Each ash dyke shall be having 3 discharge point for all the three lines.	As per the tender plot plan 111-29-0200 (R-03),Proposed ash disposal area is marked as legend (33) at key plan area. Tender specification says ash shall be disposed to nearest ash dyke as well as farthest ash dyke. Please clarify whether proposed ash disposal area is an existing ash dyke and is spart of nearest ash dyke or of fathest ash dyke or is completely new ash dyke. Request to clarify and confirm the actual requirement of the tender.	Ash shall be disposed to the existing ash disposal area. Please note that the existing ash disposal area has 2 compartments. Sr. No. 33 is not envisaged.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
12	Vol-III	21	BOTTOM ASH SYSTEM	3 of 21	21.3.5	Flushing apparatus shall create momentum required for continuously removing the economiser ash from hoppers and mixing ash falling under gravity. The removal rate of each Flushing apparatus shall be 4 TPH.	Ash Removal rate from flushing apparatus shall be as per boiler's ash collection data.Please confirm.	Minimum 4 TPH ash removal rate for flushing appratus shall be considered
13	Vol-III	21	Water system	6 of 21	21.8.2	Eco Water Pumps Two (2) (1W+1S) Eco Water Pumps shall be provided for flushing apparatus below economiser hoppers. These pumps shall be located in Boiler area and tapped from LP water pumps header. SLFD of bottom ash handling and Coarse ash handling	SLFD of bottom ash handling and Coarse ash handling doesn't indicates requirement of Eco water pump as specified in the Chap-21 for ash handling system. Please confirm whether separate Eco water pumps in the boiler area to be considered or not. Also Please clarify whether 1w+1S Eco water pump shall be considered for each unit or only 1w+1s to be considered common for both units.	1W+1S Eco water pumps shall be provided by bidder as per Chapter-21, Voll-III.
14	Vol-III	21	Water system	6 of 21	21.8.6		Please clarify which pump source to be considered for jetting nozzles in coarse ash tank.	LP seal water pumps shall be pumping source for jetting nozzles in coarse ash tank as mentioned in Clause 21.8.6, Chapter-21, Vol-III.
15	Vol-III	21 11	Water system ETP	7 of 21 5 of 23	21.8.8 11.2.12	The drains of Vaccum pump house shall be routed to clarifier located adjacent to ash water sump, while the drains from fly ash silo area shall be routed to ash slurry sump. Ash silo area waste water. The waste water generated due to dust seperation and floor cleaning in ash silo area shall be collected in drain sump located in the ash silo area. Drain pumps shall be installed to transfer the ash rich effluent to ash clarifier adjecent to ash water sump.	There is contradiction in disposal location of drain water from fly ash silo. Please confirm that drain water from fly ash silo shall be disposed off to either ash slurry sump or to clarifier based on the optimum ash handling system layout finalized during detailed engineering.	The drain water from fly ash silo area shall be disposed off to AHP Clarifier instead of ash slurry sump.
16	Vol-III	11	ESP Area Wash Water	5 of 23	11.2.11	ESP Area floor wash drains mainly consisting of high TSS. This effluent shall be led to sump cum Pre-settling pit. Overflow from the Pre-settling pit shall be led to a sump. Pumps will be installed to transfer this effluent to Ash water sump.	As per spec, Effluent from ESP floor wash having high TSS to be led directly to ash water sump which is not done generally. Please review the requirement.	Effluent shall be routed to Ash water Sump through AHP Clarifier.
17	Vol-III	21	System capacities	7 of 21	21.9.3	Fly ash system shall be designed to remove fly ash in maximum five (5) hours per shift of 8 hours while firing worst coal and considering six (6) streams operating simultaneously.	As per flow diagram, clause 21.5.1 and 21.5.7 of chap-21 there are 8 fly ash conveying streams . Please clarify the contradiction.	Clarified that 6 fly ash streams shall be considered for conveying ash from ESP hoppers to Buffer hoppers and 3 pressure conveying streams shall be considered for conveying dry fly ash from Buffer hoppers to Fly ash Silos.
18	Vol-III	21	System capacities	7 of 21	21.9.4	Number of pumps in each series shall be decided based on the frictional losses and static rise in the ash disposal system. The number of pumps in each series shall be selected as per system requirement.	SLFD for ash slurry & water system indicates 3 stage ash slurry pumps whereas clause 21.9.4 of chap-21 says it shall be selected as per system requirement. Please clarify the contradiction.	Clarified that no. of ash slurry pumps in each series shall be selected as per system requirement in line with clause 21.9.4 of Chapter 21.
19	Vol-III	21	System capacities	7 of 21	21.9.4	Each pipe on the ash dyke shall be provided with 6 dyke end valves (3 for each dyke). In addition, 6 valves shall be provided for selection of Dyke A or Dyke B for each stream.	Please confirm these valves shall be manual operated only.	Confirmed that manually operated valves with locking arrangement shall be provided.
20	Vol-III	21	System capacities	7 of 21	21.9.5	Fly Ash Unloading System Telescopic chute (below FA Silo) : 180 TPH Ash conditioner (dry ash basis) (below FA Silo) : 180 TPH	Rotary feeders above telescopic chutes and ash conditioners shall be considered without VFDs. Please confirm.	Confirmed

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
21	Vol-III	21	DRY FLY ASH HANDLING SYSTEM	4 of 21	21.5.3 and 21.5.4		There are contradiction in the requirement of fly ash temperature (120 deg or 80 deg) at silo outlet. Instead of demonstration of specific temperature requirement of fly ash at silo outlet, ash flowability shall be maintained while unloading the fly ash at silo outlet. Customer is requested to accept the above.	Temperature of 80 degree C shall be maintained at Silo outlet.
22	Vol-III	21	General requirements	7 of 21	21.10.1	Bottom ash collection including economizer ash : 25% Ash collection in SCR, APH/Duct hoppers : 5% Ash collection in ESP hoppers : 85%	Please confirm the % of fly ash collection to be considered for APH/Duct hopper shall be together 5% (2.5%+2.5%) or 5% each in APH & Duct hoppers.	Fly ash collection to be considered for SCR/APH/Duct hoppers shall be together 10%.
23	Vol-III	21	General requirements	8 of 21	21.10.3	(iii) Friction factor 'C' for Recovery Water lines : 100	Please confirm that ash water recovery system and its pipeline is not part of scope of work.	Confirmed.
24	Vol-III	21	General requirements Water systems	8 of 21 7 of 21	21.10.3 21.8.8	Bottom ash overflow sump : 10 min	Type of bottom ash overflow sump is considered as underground RCC sump.Please confirm as there are contradiction between overflow sump & tank.	There is no contradiction. BA over flow shall be collected in a tank (over ground). BA Hopper area (boiler area) floor drains shall be collected in a sump below ground.
25	Vol-III	21	General requirements	8 of 21	21.10.3	Basis for selection of capacities of various tanks/sumps (i) Bottom ash overflow sump : 10 min (ii) Slurry sump (each compartment) : 5 min (iii) Ash Water Sump (based on water balance): 60 min (iv) Drain sump (ADPH & blowerroom) : 10 min (v) Sludge pit : 10 min	Please furnish basis for selection of buffer hopper volumetric capacity.	Buffer Hopper capacity shall be for 15 minutes.
26	Vol-III	21	General requirements Datasheet: Ash handling system	8 of 21 16 of 21	21.10.5 15.0	All water pumps, vacuum pumps, fluidizing/conveying air blowers, instrument air compressors shall have 15% margin over capacity and 10% over pipe frictional losses.	Please clarify the margin (10% or 15%) to be considered over the calcalated capacity (As per system requirement) of IAC. Further we would like to propose instrument air requirement of ash handling system shall be met with main plant compressed air system in line with practice followed in recent NTPC projects instead of separate 1w+1s Instrument air compressors for Ash handling system. Please confirm.	Clarified that minimum capacity of the IA compressor for ash handling system shall be 1300 cu.m/hr. Margin shall be 15% as per clause 21.10.5 of Chapter 21. Selection of the IA compressor for AHP shall be 1300 cu.m/hr or the actual requirement+15% margin, which ever is higher. Proposal to meet Instrument Air requirement of ash
27	Vol-III	21	General requirements	8 of 21	21.10.6	b) Thermal Pollution: The system design shall be such that a large surface area (provided in the ash dyke) shall adequately cool the recovery water. Besides, it shall be noted that there is, as such, no direct discharge of water to the recipient environment without treatment. Therefore, the stipulations of thermal pollution shall be met.	We understand that Ash water recovery system is excluded from the scope of work. Hence this clause may not be applicable. In case this work is expecetd to be done by bidder, then Please clarify and elaborate the intent of this requirement and what scope of work is expected from the bidder?	Confirmed that Ash water recovery system is not applicable.
28	Vol-III	21	General requirements	9 of 21	21.11.3	All fittings (bends/laterals, etc) for ash conveying (wet and dry) shall be integral wear-back alloy cast iron with minimum 450 BHN hardness. The radius of bends for ash conveying pipes (dry/wet) shall be minimum 3 times the pipe diameter.	Please confirm that cast basalt lined bends (6mm thick MS shell,20 mm thick cast basalt lining having 8 mhos hardness) are also acceptable as an option to ACI bends for ash conveying pipe fittings (bends/lateral).	Confirmed that cast basalt lined bends are also acceptable as an alternate to ACI bends for ash conveying pipe fittings
29	Vol-III	21	General requirements	9 of 21	21.11.4	Fluidizing elements in ESP hoppers, fly ash silos, and ash vessels shall be ceramic tiles and shall withstand temperatures up to 200 Deg C. Two (2) Fluiding tiles shall be provided for each ESP hopper. The hoppers which are under evacuation shall be fluidized.	Fly ash temperature inside ESP hopper will be 150 deg and at the silo it will be less than 100 deg. Customer is requested to accept withstanding temperature of fluidizing elements as per system requirement.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
30	Vol-III	21	General requirements	9 of 21	21.11.5	Fly ash silos, buffer hoppers etc shall be provided with access ladders, Pressure/vacuum relief doors, staircase from ground level to top.	Please clarify these access ladders are meant for inside or outside at Fly ash silos,buffer hoppers. Also material for these access ladders shall be MS.	Clarified that access ladders shall be provided inside Fly Ash Silos, buffer hoppers etc. Material of these ladders shall be MS Galvanized.
31	Vol-III	21	General requirements	9 of 21	21.11.7	Mechanism to unload extra ash from overloaded vehicles to other empty vehicles with the help of vacuum pump/blowers shall be provided.	SLFD for fly ash handling system doesn't indicate any such scheme. Please clarify. Also request to furnish specification for this requirement.	Trolley mounted vaccum pump of 5TPH capacity shall be provided to unload excess flyash from one closed tanker to another tanker. 15 Meter long flexible hose of adequate size and 30 meter long power cable shall be included in the scope of work.
31	Vol-III	21	General requirements	9 of 21	21.11.7	Mechanism to unload extra ash from overloaded vehicles to other empty vehicles with the help of vacuum pump/blowers shall be provided.	Please confirm that weigh bridges are excluded from the scope of work for ash handling system.	Weigh bridge shall be provided as listed in Chapter 31, Volume III.
32	Vol-III	21	General requirements	9 of 21	21.11.8	Automatic water spraying arrangement for cleaning the ash from loaded vehicles body before going out of the plant shall be provided.	SLFD for fly ash handling system doesn't indicate any such scheme. Please clarify. Bidder shall furnish a water tap point near fly ash silo for hose connection for washing vehicles. In case of requirement of automatic spray arrangement, request to furnish specification and schem.	Clarified that Spray nozzle arragement mounted on an inverted U shape pipe header with automatic cleaning of tankers shall be provided.
33	Vol-III	21	Layout requirements	10 of 21	21.12.1.3	The overhead piping shall be routed on pipe rack with clear height of 6 M from Finished floor level (FFL). At road crossings, the clear height shall be 8 M.	600 mm width walkway shall be considered on the AHP piperack having fly ash/ash slurry pipes. Piperack which has only air and water pipes shall not have any walkway. Please confirm	Confirmed
34	Vol-III	21	Maintenance requirements	10 of 21	21.12.2.1	Facilities for carrying out online and off-line maintenance of ash handling system shall be provided. In general, this shall include adequate handling equipment, working space, platforms and safety devices.	Please elaborate about requirement of online maintenance of ash handling system.	In clause 21.12.2.1 of Chapter-21 at Sheet 10 of 21 in Vol-III, the word "online and off-line maintenance" be read as "off-line maintenance".
35	Vol-III	21	Maintenance requirements	10 of 21	21.12.2.4	Maintenance platform of minimum 1 M width with handrails and access ladders shall be provided below economiser, SCR, air pre-heater and duct hoppers.	AHP equipment below APH and Duct happers will be accessible from the ground itself. No separate platforms are required around these hoppers.	If AHP equipment below APH and Duct hoppers are not accessible from the ground level, then separate platforms shall be provided.
36	Vol-III	21	Maintenance requirements	10 of 21	21.12.2.6	All pump houses and buildings shall be provided with adequately rated single girder EOT cranes. Underslung cranes are not acceptable.	EOT crane at respective buildings shall be sized for handling heaviest eqipment/components located in that building. Please confirm.	Confirmed.
37	Vol-III	21	Maintenance requirements	11 of 21	21.12.3.1 (c	Two rolling shutters of 5 m wide x 6m height (min) size shall be provided.	Rolling shutters shall be of 4m x 4m size as per standard engineering practice followed as dimension of 5m x 6m is on higher side . Please confirm.	Bid specifications to be followed.
38	Vol-III	21	Maintenance requirements	11 of 21	21.12.3	The following criteria shall be considered for sizing various buildings:	Vacuum pump cum compressor house is not mentioned in this clause for sizing of various buildings. As proposed above,request to accept location of vacuum pumps near to 1st field of ESP for optimized layout and reduction in cost. There will be AHP compressor house only for TACs after locating vacuum pumps near to ESP 1st field. Please confirm.	Compressor house shall house fluidizing air blowers, air heaters, Instrument air compressors, Transport air compressors and Instrument air dryers.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
39	Vol-III	21	Datasheet Ash handling system	14 of 21	6.3.1		For high temperature application,ACI is not suitable for body of these valves. Instead cast carbon steel body shall be considered for hopper isolation valves below SCR hoppers which is having high ash temperature.	Noted.
40	Vol-III	21	Datasheet Ash handling system	15 of 21	12.50		Vent fan for bag filters are not provided by all AHP vendors. Being vendor specific, Request customer to accept as per vendor's design and their recommendations meeting pollution norms of 30 mg/Nm3 as outlet dust emission.	Noted.
41	Vol-III	21	Ash vessel	21 of 21	31.0 (a	The vessel shall be designed for not more than one lakh cycles of operation annually for the specified ash evacuation rate.	Please clarify the contradiction in design criteria for ash vessel operation cycles.	No. of cycles per hour shall be limited to 20 (max).
42	Vol-III	21	Fluidizing air blowers	17 of 21	16.3		Chap-21 of specification says fluidization air requirement of buffer hoppers and silo whereas SLFD of fly ash handling sytem indicates fluidization of ESP hoppers and fly ash silo. Please clarify the contradiction and confirm about actual requirement to be considered by bidder .	ESP fluidizing blowers shall be provided for fluidizing ESP hoppers and buffer hoppers as per clause 21.5.3, Chapter-21, Vol-III. Silo Blowers shall be provided for Silo fluidizing as per 21.5.4, Chapter-21, Vol-III.
43	Vol-III	21	Coarse ash tank	19 of 21	25	One (1) – 50 M3 capacity 10 mm thick mild steel to IS: 2062 fabricated coarse ash tank shall be provided to collect coarse ash slurry from feeder ejectors.	SLFD of coarse ash handling system indicates 2 nos ash slurry pipes from coarse ash tank to ash slurry sump and same is also shown at ash slurry sump but coarse ash slurry pump is mentioned as 1w+1s. Please clarify the contradiction as there is only one coarse ash tank to be considered as per specification. Also request to revisit capacity of coarse ash tank as 50 m3 and instead request to accept 5 minutes storage capacity for coarse ash slurry pumps. MOC of coarse ash tank is mentioned as 10 mm thk Mild steel to IS:2062. Please confirm whther any liner inside coarse ash tank is required to be considered by bidder.	Each pump discharge is routed to ash slurry sump. One coarse ash tank to be considered. Capacity of the coarse ash tank shall be as per specification. For coarse ash tank, 10 mm thick impingement liners shall be considered
44	Vol-III	21	Fly ash storage silo	17 of 21	18		MOC of access ladder/rung ladder inside silo shall be MS. Please confirm.	It shall be of MS galvanized.
45	Vol-III	21	Fly ash storage silo	17 of 21	18		SLFD for fly ash handling system indicates one no. level probe above the fly ash silo top and no silo ash level transmitter is shown. Please clarify the contradiction.	Ash level transmitter (type as specified) shall be provided for each silo as per details in chapter no. 21 Vol-III.
46	Vol-III	21	Ash Disposal Pump, BA Overflow & Coarse Ash Pump	18 of 21	20		SLFD indicates vertical BA overflow pump whereas spec says horizontal centrifugal BA overflow pump. Please clarify the contradiction. Request to keep provison of both the options and shall be finalized during detailed engineering.	Agreed, shall be fianlized during detailed engineering.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
47	Vol-III	21	Ash Disposal Pump, BA Overflow & Coarse Ash Pump System capacities	18 of 21 7 of 21	20 21.9.4		Please clarify which design criteria shall be considered for sizing of ash slurry disposal pump. Also request to furnish existing ash slurry piping layout,GA of existing ash dyke and slurry pipe garlanding over the dyke for interface check and inputs.	For head and flow, 10% margin shall be considered for fixing the capacity and head of the pump. For selecting no. of pumps in series for Ash disposal pumps, total length of 7KM including garlanding shall be considered and 15M static rise also to be considered. Existing GA drawings handed over to bidder.
48	Vol-III	21	Ash Disposal Pump, BA Overflow & Coarse Ash Pump	18 of 21	20.4	Type of coupling: Variable speed Hydraulic coupling with speed reduction by means of speed reduction gear box in first stage. Speed variation +10%/ - 45% with respect to rated design point in case of ash slurry disposal pumps and + 20% in case of B.A. slurry transportation pumps and B.A. over flow water transfer pumps.	Please confirm BA slurry transportation pump is not applicable for this tender.	Confirmed.
49	Vol-III	21 27	Pipework LP piping, Valves and specialities	20 of 21 6 of 31	29 Sr.No. 4		AHP spec specifies SS 304 sch 10s for instrument air pipe below 50 NB whereas chap-27,clause 27.4.5 (Page 6 of 31) low pressure piping ,valves etc specifies as GI pipes for instrument air line. Please clarify the contradiction and confirm that which which clause shall be considered by bidders.	For Instrument air service, Stainless steel ASTM 312 Gr 304 Sch 20S pipes shall be considered for pipe sizes 50 NB and below. All valves and specialities for instrument air service for the entire project including main instrument air header of sizes 50 NB and below shall also be Stainless steel.
50	Vol-III	21	Ash vessel	21 of 21	31 (c)	The Ash transporter /Air locks/pump tanks shall be supported independently on steel columns or hanger support.	Please elaborate this requirement as generally, Ash vessel below FAE tower are located on the ground.	Ash Vessels shall be supported independently on ground.
51			Tender Plot Plan			AHP facilities shown in the Tender Plot Plan	Please confirm that AHP facilities can be optimized while relocating the system shown in the plot plan during detailed engineering.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
52	Vol-III	21	Ash water pump house	11 of 21	21.12.3.1		As per practice followed in NTPC projects, Please confirm whether ash water pumps can be kept in open without roof and side walls.	Bid specifications to be followed.
53	Vol-II	4	Provenness Ash handling system	16 of 42	4.4.15.3	The activity of design and engineering under 4.4.15.1 (a), (b) & (c) should have been carried out by the Bidder/ its Sub- vendor and not through any external design agency/agencies. The activity of design and engineering under 4.4.15.1 (d) should have been carried out by either the Bidder/ its Sub- vendor or through design agency/design agencies having experience for high concentration ash slurry disposal system.	Please confirm that high concentration ash slurry disposal system is not applicable for the project.	Confirmed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
54	Vol-II	4	Provenness Ash handling system	14 of 42	4.4.15.1 (c)	Pneumatic pressure conveying Fly Ash Transportation System for transporting fly ash through conveying air blowers from pulverised coal fired boiler having capacity of not less than 80 TPH for a conveying distance of not less than 200 M.	In the provenness criteria, transporting fly ash through conveying air blowers shall be deleted as generally transportation is through transport air compressors. Thuse request to modify the clause to have requirement as pneumatic pressure conveying fly ash transportation system for transporting fly ash through conveying air blowers from pulversised coal fired boiler..... Existing Clause with Through conveying air blowers will restrict vendors to qualify. Customer is requested to revisit the clause.	In subclause 4.4.15.1 (C) of Ch-4 at Sheet 14 of 42 in Vol-II, the words "through conveying air blowers" stand deleted.
55			Flow diagram for ash slurry & water system				Please confirm the MOC of seal water tank to be considered.	MOC of seal water tank shall be RCC.
56			Flow diagram for ash slurry & water system				Clarifier sludge is terminated to ash water tank in the SLFD. In our view it shall be sent to ash slurry sump. Customer is requested to check and confirm.	Bid specifications as per clause 21.13.4 of Chapter 21, Vol-III be followed.
57			Flow diagram for ash slurry & water system				Ash water tank shall be covered with RCC slab on the top. Please confirm.	Confirmed.
58			Flow diagram for fly ash handling system				As per SLFD for fly ash handling system, 1 no. IAC receiver is shown for catering to valves & instruments in ESP & buffer hoppers area. It is silent about requirement of instrument air in fly ash silo area for bag filters,valves and instruments . Please clarify. Further we would like to propose instrument air requirement of ash handling system shall be met with main plant compressed air system in line with pracice followed in recent NTPC projects instead of separate 1w+1s Instrument air compressors for Ash handling system. Please confirm.	For silo area, one additional air receiver shall be provided. Capacity shall be minimum 2 cu.m or as per the requirement, which ever is higher. Proposal to meet Instrument Air requirement of ash handling system with main plant compressed air system is not acceptable.
59			Flow diagram for fly ash handling system				SLFD indicates dump valves in all the four ash conveying lines on 2nd fly ash silo also. Instead,we propose to have terminal box over the 2nd fly ash silo as valves requirement is not there. Please confirm.	Bid specifications to be followed.
60	Vol-III	11	Flow diagram for ash slurry & water system	17 of 23	6.01.01		Wash water pumps and scheme is not shown in the SLFD furnished for various ash handling systems. Dust conditioning water pumps are shown in the SLFD for water system at ash water tank. Please note that both the pumps are catering to fly ash silo area only. Thus,we propose to consider ash conditioning water pumps and wash water pumps in ash silo area only with common water sump (30 m3) in silo area. These pumps will be located in open at grade slab in fly ash silo area. Please confirm. Also instead of was water pump of vertical turbine type, please accept horizontal centrifugal water pump.	As per Clause 6.01.01, Ash silo area wash water transfer pumps are drain pumps which will transfer the ash rich effluents to ash clarifier adjacent to ash water sump. The dust conditioner water pumps shall be located in the ash water sump as per drawing no. 111-13-5204-REV-1. A sump of capacity $30M^3$ with 2 nos. horizontal centrifugal pumps for wash water shall be provided for automatic water spraying arrangement for cleaning the ash from loaded vehicle body before going out of the plant and for floor washing in ash silo area.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
61	Vol-III	21	Fly ash storage silos			Grade slab in fly ash silo area for existing units 1&2	Please clarify,that dismantling (if any) of existing grade slab in the fly ash silo area is excluded from the bidder's scope of work for providing front to take up construction of 2 nos. RCC fly ash silo (for Unit#3).	Dismantling of existing grade slab in the fly ash silo area is included in the bidder's scope of work for construction of 2 nos. RCC fly ash silos, weigh bridge and control rooms etc.
62	Vol-III	21	Clarifier	11 of 21	21.13.1	One adequately sized clarifier shall be provided for treating ash laden water recovered from BA Overflow and drains from vacuum pump house. The specification of clarifier shall be same as specified in chapter 4.0 (Pre-treatment Plant).	Chapter 4.0 is for raw water system. Please furnish the details fof AHP clarifier (Design basis,type etc) to be considered.	The type of clarifier shall be as described in Chapter 5, Vol-III, Clause 5.2.1 (f) - Water Treatment Plant.
ELECTRICAL AND C&I								
1	VII		TENDER DRAWINGS	109 of 120		Individual & Overall screened cables instrument cables	As per standard practice Overall sreened cables are used for all Digital signals (DIs and DOs) and Individual & Overall screened cables are used for Analog signals. However in this page, Individual and Overall screened cables are shown for Digital signals. Bidder understands that Screened cables shall be selected as per bidder's standard practice ie. Overall screened for DIs and DOs and Overall and Individual screened for all Analog signals.	Noted.
2	IV	Ch 1	Electrical Scope of Work	5 of 58	1.02.20	LV Dry type transformer neutrals shall be connected to earth pit through 1Cx400 sq mm XLPE cable.	Bidder understands that LV Dry type transformer neutrals shall be connected to earth pit through a suitable size XLPE cable, however the size of the cable shall be decided during detailed engineer with supporting calculation	LV Dry type transformer neutrals shall be connected to earth pit through 1Cx400 sq mm XLPE cable.
3	IV	Ch 1	Electrical Scope of Work	7 of 58	1.02.43	Wherever LV VFD drives are provided, one spare VFD panel similar in all respect to other VFD panels to be provided and erected for each unit in case of coal feeders.	It is proposed to supply 1 VFD drive as Spare Component instead of complete panel. Additonal panel will add cost , occupy more space and it is not possible to shift all cablings from one panel to other. General practice is replacement of componenets which is to be repaired.	Bid specifications to be followed.
4	IV	Ch 1	Electrical Scope of Work	12 of 58	1.07.11	All 415V Switchgears (PCC/PMCC/MCC) shall preferably be of one make for the entire plant or at the most limited to 2 makes for the entire plant.	Bidder understands that this is applicable for the main plant and coal and ash handling, However MCC panel for Machines like Wagon trippler, Stacker cum reclaimer etc. shall be as per Machine OEM standards	Bid specifications to be followed.
5	IV	Ch 1	Electrical Scope of Work	12 of 58	1.07.11	All VFDs shall preferably be of one make for the entire plant or at the most limited to 2 makes for the entire plant.	Bidder understands that this is applicable for the main plant and coal and ash handling, However VFD panel for Machines like Wagon trippler, Stacker cum reclaimer etc. shall be as per Machine OEM standards	Bid specifications to be followed.
6	IV	Ch 1	Electrical Scope of Work	41 of 58	1.30.10 (iii)	Above 19 core two or more of above cables	As per bidder's standard practice 24C and 27C cables are also used as control cables, hence bidder proposes to accept these sizes also for control cables	Confirmed.
7	IV	Ch 1	Electrical Scope of Work	41 of 58	1.30.10 (vi)	For multicore HT cables, the drum length shall be 750 metres	Bidder proposes to use 1000 meters drum length also.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
8	IV	Ch 1	Electrical Scope of Work	42 of 58	1.30.10 (viii)	For multicore & single core LT power cables and 1.1KV Copper Fire Survival Power cables, the drum length shall be 750 metres..	Bidder proposes to use 1000 and 2000 meters drum length also.	In clause 1.30.10(viii) of Ch-1 at Sheet 42 of 58 in Vol-IV, drum length be read as 500 / 750 / 1000 / 2000 meter.
9	IV	Ch 1	Electrical Scope of Work	42 of 58	1.30.10 (ix)	For control cables and 1.1KV Copper Fire Survival Control cables, the drum length shall be 1000 metres.	Bidder proposes to use 2000 meters drum length also.	Noted.
10	IV	Ch 13	415V Switchgears & DC Boards	20 of 43	13.06.18 (xviii)(b)	A marshaling panel shall be provided on each bus of LV Switchgear (PCC, PMCC and MCC) for interfacing with DCS.	It is proposed to provide marshall panel for specific cases where the cabling gets reduced. Example for Anlaog signals and when distance between DCS/ PLC panel and MCC is large , . In other cases cabling is not reduded and leads to congested cabling if applied for all feeders.	Noted.
11	IV	Ch 13	415V Switchgears & DC Boards	21 of 43	13.06.19 (iv)	The controller shall have following inputs and outputs:- *Minimum 6 digital and 2 analog inputs (for increasing the number of I/O's extended module can be added). *One thermistor/RTD input shall also be available as per requirement. *Minimum 2 relay outputs (240 V AC, 10A) shall be provided. *One Analogue output. For increasing/achieving the desired no. of I/Os extended modules can be added.	Bidder understands that the number of DI/DO/AI/AO/RTD IO's mentioned is indicative only and nos shall be selected as per the requirement of the driven mechanism.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
12	IV	Ch 13	415V Switchgears & DC Boards	22 of 43	13.06.19 (ix)	Maximum 14 No. of devices shall be connected in each (MODBUS TCP/Profibus/Device net) communication network at device level. Accordingly, Bidder shall select no. of converters, Communication cables and other accessories. Main & standby device /drive/equipment shall be considered in separate/different group.	Bidder proposes to loop maximum 24 nodes as most of the protocols can handle upto 32 nodes in one loop and considering 20% spare capacity 24 numbers can be used.	Noted.
13	IV	Ch 11	11 KV & 6.6 KV Switchgears	41 of 41	NA	Current transducer in Y phase for communicating with ammeter in LPBS.	As per bidder's standard practice Ammeter is provided in HT MCC and transducer data is read in DDCMIS and the same can be visualised in HMI. However no remote display of current is envisaged in Field LPBS.	Bid specifications to be followed.
14	V	Part B/Ch 18	Control Philosophies for BOP Packages	20 of 34	18.02.34 (q)	Ammeters shall be provided in control desk for all the motors.	As per bidder's standard practice, Control desk is aesthetically designed with Joystics/Push buttons and indication lamps, all motor currents and other details shall be provided in the HMI screen	Noted.
15	V	Part B/Ch 2	Field & Measuring Instruments	51 of 64	2.19.09	The 3D Scanner should a complete scan of the Stockpile and communicate with hard wired 4-20 mA signals and redundant wireless system to the CHP control room and Stacker reclaimer control system to generate the output in terms of Volume, Mass and Real Time 3D Profile of the Stockpile.	Bidder proposes to consider all interface communication with 3D scanner on soft communication only. No 4-20ma is envisaged in 3D scanner system as per standard practice	Noted.
16	IV	Ch 22	Cabling System	3 of 22	22.04.01	Interplant cabling for main routes shall be laid along overhead trestles/ pipe racks.	Bidder understand that interplant cabling for lime handling and gypsum handling areas shall be allowed through conveyor galleries as per standard practice	Bid specification to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
CIVIL & STRUCTURAL								
1	Vol VI & Vol III	Vol VI Civil Works Ch 2 & Vol III Mechanical Works Ch 30	Ch 2 Scope of Works & Ch 30 Flue Gas Desulphurisation System	Sh 4 of 7 & Sh 12 of 93	Clause 2.6 57) & Clause 1.9	Civil Specification: 57. 7 days storage capacity fully covered gypsum storage shed and RCC approach road to gypsum storage shed. Mechanical Specification: Gypsum shed of 15 days storage shall be considered. Shed shall be provided with side protection. Adequate space inside shed for truck movement shall be provided.	There is discrepancy in clauses of Civil specification and Mechanical specification regarding storage capacity of Gypsum storage shed. Please clarify.	Gypsum storage capacity shall be minimum 15 days.
2	Vol VI	Chapter 6	Ch 06: General Requirement of Buildings & Structures	Sheet | 8 of 12	6.12 PAVING Area Paving in Main Plant Block	2.5 m wide paving around periphery of all sumps and underground tanks without metallic hardener shall be provided.	Please clarify whether this requirement is applicable for sumps & tanks in AHP/CHP not located in Main Plant Area.	Bid specifications to be followed.
3	Vol VI	Chapter 6	Ch 06: General Requirement of Buildings & Structures	Sheet | 11 of 12	6.18 MISCELLANEOUS REQUIREMENTS	In case of trestles, minimum 7.0 m head clearance shall be provided for road crossings. In other areas, the clear height shall be 3.0m minimum.	Everywhere else in Mechanical and Civil specifications, clearance at road/rail crossings for all trestles is specified as 8.0m. Please clarify.	Clearance at road/rail crossings for all trestles shall be minimum 8.0 M.
4	Vol VI	Chapter 8	Ch 08: Loading	Sheet | 3 of 5	8.2 IMPOSED LOADS	All buildings of the project shall be designed considering solar panel load at Roof.	Please clarify whether this clause is applicable for CHP, AHP, LHP, GHP structures. Example: Transfer points, Crusher House, Conveyor galleries etc.	Clause is applicable for all buildings except conveyor galleries.
5	Vol VI	Chapter 10	Ch 10: RCC Structures & Foundations	Sheet | 11 of 36	10.11 MINIMUM HEIGHT FOR PEDESTALS/ENCASEMENT OF STEEL COLUMNS/WALL BEAMS	All wall beams shall be provided with gunniting of 50 mm thick all-round with nominal reinforcement and chicken mesh.	Where and on which structures is this clause applicable? Please clarify.	Clause is applicable for wall beams of power house building only.
6	Vol VI	Chapter 11	Ch 11: Buildings Description	Sheet | 16 of 18	11.21.2 Gypsum Storage Shed	Requirement of RC wall	We understand that 4m high RC wall is also required in Gypsum storage shed as per Mechanical specifications Chapter 30, Sheet 75 of 93, Clause 1.2 Please confirm.	2 M high RC wall is required in gypsum storage shed.
7	Vol VI	Chapter 14	Ch 14: CHP	Sheet | 1 of 22	14.1 WAGON TIPPLER, RECLAIM HOPPER AND UNDERGROUND TUNNEL	Details of shotcreting have been given elsewhere in this specification. Guniting should be protected by provoding MS plate in similar pattern as provided in existing hoppers.	Clarity is sought regarding: Whether both Guniting and MS Liners are needed on surfaces of Hoppers?	MS liners shall only be provided.
8	Vol VI	Chapter 14	Ch 14: CHP	Sheet | 6 of 22	CRUSHER HOUSE AND TRANSFER HOUSES	Roof shall be provided with troughed profile permanently colour coated sheet on outside and plain permanently colour coated sheet on inside with 50mm thick mineral wool insulation in between the two sheets. A slope of 1 in 5 shall be provided for quick drainage of rain water.	Chapter 19 of Mechanical specifications mentions Flat RC slabs for Roof in Transfer Houses and Crusher House, whereas in Civil specifications Inclined roof with Double Cladding+Insulation is mentioned. Please clarify which system is to be followed.	Flat RCC roof over deck sheet shall be provided for all Transfer houses and Crusher houses. Deck sheet shall be considered as shuttering material only. Thickness of RCC excluding corrugations shall be 150 mm.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
9	Vol VI	Chapter 14	Ch 14: CHP	Sheet | 3 & 5 of 22	OVERHEAD / GROUND CONVEYOR GALLERIES AND TRESTLES & TRANSFER HOUSES	In addition to steel windows, panels of suitable size to suit the architectural treatment and made of translucent sheets of polycarbonate material shall also be provided on the side cladding for natural lighting.	Chapter 19 of Mechanical specifications mentions FRP panels for natural lighting in Transfer Houses & Conveyor Galleries, whereas in Civil specifications Polycarbonate sheets is mentioned. Please clarify which system is to be followed.	Polycarbonate sheets be provided. However, steel windows not required.
10	Vol VI	Chapter 14	Ch 14: CHP	Sheet | 7 of 22	14.6 COAL STOCK YARD	Ground Improvement works in Coal Stockyard	Please confirm if any separate Ground improvement works for Coal Stockyard area, like Geotextiles, Ground improvement columns etc. is envisaged under this project. Any separate ground improvement works for coal stockyard, if required, may please be mentioned at Bid stage, as this leads to Huge Cost implication on Bidder.	Bidder to visit site to collect relevant informaiton.
11	Vol VI	Chapter 14	Ch 14: CHP	Sheet | 1 of 22	14.1 WAGON TIPPLER, RECLAIM HOPPER AND UNDERGROUND TUNNEL	Complete inside surfaces of Wagon tippler & reclaim hopper shall also be provided with 50mm thick guniting.	Please clarify whether this means: Complete Walls, Beams, Counterforts and Slabs of Wagon Tippler & Reclaim Hopper to be provided with Guniting?	Complete inside surface of wagon tippler hopper and reclaim hopper only shall be provided with MS liners.
12	Vol VI	Chapter 14	Ch 14: CHP	Sheet | 12 of 22	14.14 Roof Details	Clause 6.10 Sheet 6 of 12 All upstands and parapet walls on roof shall be of RCC construction, minimum height of parapet walls shall be 750mm and thickness 125 mm. Clause 14.14 Roof Details 900 mm high and minimum 100 mm thick R. C. C. parapet wall shall be provided over roofs.	Please confirm which clause to be followed for Parapet walls in CHP & AHP structures.	Follow clause 6.10 at Sheet 6 of 12 of Chapter-14 in Vol-VI.
13	Vol VI	Chapter 14	Ch 14: CHP	Sheet | 16 of 22	14.18 DESIGN CRITERIA	For all other under ground structructers not in contact with liquid on inside face may be designed as cracked sections with crack width limited to 0.1mm for both faces.	We understand that this clause will be applicable for Wagon Tippler, Underground Tunnel & Reclaim Hopper. Please confirm.	Confirmed.
14	Vol VI	Chapter 14	Ch 14: CHP	Sheet | 3 of 22	OVERHEAD / GROUND CONVEYOR GALLERIES AND TRESTLES	The floor of conveyor gallery all along the gallery length, shall be provided with minimum 12 gauge thick seal plates.	Please clarify the minimum requirement of seal plate thickness as there is discrepancy in Civil and Mechanical specifications. Civil specifications mentions minimum 12 gauge thickness (approx 2.6mm), whereas Mech specifications Ch-19, Sh 9 of 120 mentions minimum 5mm thickness.	Follow civil specifications.
15	Vol VI	Chapter 15	Ch 15: AHP	Sheet | 1 of 2	15.2 Following facilities shall be provided near the silo as per Vol. III of specification.	i) Ash slurry sump with pump house. ii) Ash water sump with pump house. iii) Vaccum Pump house. iv) Complete Ash Water recirculation systems. v) Ash conveying Blower room. vi) MCC Room / Control room. Compressor House Silo Utility Building	Vol III does not specify the material of construction of these buildings. We understand that all these AHP buildings are to be designed/constructed as a RCC building, with brick walls and RC roofs. Please confirm.	Please refer civil spec (Vol VI) for building descriptions. All AHP buildings are to be designed/constructed as a RCC building, with brick walls and RC roofs.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
16	Vol VI	Chapter 17	Ch 17: Architectural Works	Sheet | 7 of 21	Metal Cladding for TPs, Galleries & Crusher House	Civil Specifications as per Clause 17.7.3 Permanent colour coated non-insulated metal cladding system: Troughed galvanized M.S sheets having 0.6 mm minimum thickness with minimum rate of galvanization of 275 gms/sqm (or High tensile steel sheet coated with zinc aluminium alloy @ 150 gms/sq.m. of 0.5 mm minimum thickness and having minimum yield strength of 350 MPa) shall be used for the cladding system. Mechanical specifications of metal cladding for TPs, Conveyor Galleries & Crusher House: Ch 19, Sh 9 of 120 Roof and side cladding of permanently color coated zincalume sheet minimum 0.55mm TCT (Total coated thickness), 550 MPa tensile strength IS: 277 & IS: 513 / equal approved.	There is discrepancy in clauses of Civil specification and Mechanical specification regarding thickness/type and coating of non-insulated metal cladding. Please clarify which is to be followed.	Follow civil specifications (Vol-VI)
17	Vol VI	Chapter 11	Ch 11: Buildings Description		Dozer Shed, Loco Shed	Description requirement	Please provide us with Civil and Structural specifications/descriptions for following: 1. Dozer Shed 2. Loco Shed	Steel structure shall be provided. Both the sheds shall be provided with store room for storage of spare parts.
18	Vol VI	Chapter 18	CHAPTER – 18 PILING		Ground Improvement Columns	Description requirement	Attached geotechnical investigation data of 2x300MW plant proposes ground improvement columns for improving safe bearing capacity of isolated foundations. Hence, please provide us with specifications/descriptions for Ground Improvement columns like Minimum spacing, proposed arrangement, depth etc.	Available report has been furnished. Further, bidder to submit the description for ground improvement/column details to HPGCL for approval based on final geo-technical report.
19	Vol VI	Chapter 18	Ch 09: Steel Structure	Sheet | 9 of 28	9.9 PAINTING	Finish paint requirement for Lime Handling and Gypsum Handling structures	We are considering Painting specifications for LHP and GHP structures in line with painting requirements of CHP & AHP structures, as mentioned in clause 9.9 b). Please confirm.	Refer revised table as Attachment-18.
20	Vol VI	Chapter 18	Ch 17: Architectural Works	Sheet | 6 of 21	17.7.1 Plastering	i) Outside plaster on masonary wall: Plastering is required on outside of masonary wall.	Please specify the thickness and cement sand ratio for External/Outside plastering.	20 mm thick plaster in mortar 1:4.
PROVENNESS								
1	Vol-II	4	Provenness - Coal & Ash handling system	14 of 42, 16 of 42, 25 of 42, 31 of 42	4.4.15, 4.4.16, 5.3, 6.0	Ash Handling Plant Coal Handling Plant AUXILIARY OIL FILLED/ DRY TYPE TRANSFORMERS Control & Instrumentation	Refer Annexure I for Provenness modifications required for the referred 4 chapters. Request customer to review & furnish confirmation.	Refer replies in Annexure-28 at S.Nos. 2, 3, 17, 18 & 21
Annexure-18								
CIVIL								

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 2 of 7	2.6 Point no. 18	A raw water pump house to be constructed in one compartment of existing Raw water reservoir to pump the make-up water through MS pipes to Water treatment plant.	Please furnish the Layout and section drawings of existing raw water reservoir.	Bidder to visit site and collect the data.
2	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS		2.6 Point no. 19	Complete desilting of both compartments of existing Raw water reservoir inside plant boundary is in the scope of bidder.	Please furnish the details of work like quantity of desilting , finished bed level of reservoir etc.	Desilting of existing raw water reservoir stands deleted from the scope of bidder.
3	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 4 of 7	2.6 Point no. 61	Complete Site grading and leveling is in the scope of bidder. Finish ground level of entire plant area shall be RL (+)270.00 M FFL of all buildings shall be 270.50 M.	Please furnish Topographical survey drawing including spot levels and contours for the proposed plant area in Auto Cad format.	Bidder to visit site and collect the data.
4	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 4 & 5 of 7	2.6 Point no. 63	Rain water harvesting pond. The Pond shall be located at the lowest contour of the plant as far as feasible so that it can effectively collect all the rain water by gravity. HDPE lining and side stream Boulder pitching is also in the scope of bidder.	By providing HDPE lining and boulder pitching, pond will become water tight and no ground water recharge/harvesting will take place. Please review.	Rain water harvesting pond stands deleted from the scope of bidder. However, suitable storm water drainage network of proposed plant shall be connected to existing drain system of the existing plant to dispose off rain water to existing rain water holding pond. Bidder to ensure that ash laden water from fly ash silo area is not led to storm water drain network. It shall be led to ash slurry sump as indicated in vol.-III of specification. Further, water from rain water holding pond shall be pumped to raw water reservoir with 2x100 percent pumps (1W+1S). Suitable shed for pump and pipe network is also in the scope of bidder. Material of construction (MoC) of pumps shall be similar to raw water pumps.
5	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 5 of 7	2.6 Point no. 66	Service building-3000m2.(G+3)	Bidder Understands that Total floor area of Service building including ground floor is 3000 Sqm. Please confirm.	The service building area shall be 3000 sqm with (G+4). Operating floor of TG building shall be interconnected with service building.
6	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 5 of 7	2.6 Point no. 72	Security cum main gate complex.	Bidder undestands that the security cum main gate complex is not in bidder's scope. Please confirm.	New main gate with new RCC security cabin of size 4m X 4m on both sides and toilet of suitable size is in the scope of bidder.
	VI	6	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 9 of 12	6.13	SECURITY GATE.		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
7	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 5 of 7	2.6 Point no. 76	Rain Water Harvesting should be implemented as per the scheme / design approved. Central ground water Authority / Board or State ground water authority or MoEF authorized agency shall be consulted for finalization of appropriate rain water harvesting technology. The necessary consultancy charges for the above agency for preparing rain water Harvesting method / scheme for the project to be borne by the Bidder.	Please provide the detailed specification, scheme and requirement of water storage pond/capacity for the rain water harvesting in main plant area and other build-ings/facilities/structures.	Rain water harvesting scheme stands deleted from the scope of bidder. However, suitable storm water drainage network of proposed plant shall be connected to existing drain system of the existing plant to dispose off rain water to existing rain water holding pond. Bidder to ensure that ash laden water from fly ash silo area is not led to storm water drain network. It shall be led to ash slurry sump as indicated in vol.-III of specification. Further, water from rain water holding pond shall be pumped to raw water reservoir with 2x100 percent pumps (1W+1S). Suitable shed for pump and pipe network is also in the scope of bidder. Material of construction (MoC) of pumps shall be similar to raw water pumps.
8	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 5 of 7	2.6 Point no. 77	Clearing and removing the buried items if any in the whole proposed plant area and the same is to be deposited to the Client. Any infrastructure buried underground shall be demented/relocated by bidder without any additional cost.	Please furnish the details and list of burried items which are to be dismantled or relocated seperately.	No details / list of buried infrastructre is available. Clearing and removing the burried items, if any, in the proposed 800MW plant area shall be in the bidder's scope and the same is to be deposited to the client.
9	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 6 of 7	2.6 Point no. 83	RCC sump for collecting boiler blow down and ESP area floor washing for existing Units # - 1 & 2 and ash silo area washing is also covered under the scope of bidder and shall be pumped to proposed Ash Handling clarifier.	Please furnish the capacity and location of RCC sump for collecting boiler blow down and ESP area floor washing for existing Units # - 1 & 2 and ash silo area washing.	Bidder to note that only floor wash from existing ESP area and Ash silo area shall be collected in 10 m3 sump and shall be pumped to Ash handling clarifier. Two pumps (1W+1S) of 15 m3/Hr is proposed for pumping collected floor wash in sump to Ash clarifier. Drains from the boiler blow down of the existing units shall be excluded from the bidder scope. Sump location will be decided at the time of detailed engineering.
10	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 6 of 7	2.6 Point no. 84	Permanent store of 6000 sqm area shall be provided by the bidder. Out of this 3000 sqm shall be covered building.	Please furnish the detailed specification and layout drawings of Permanent store.	Permanent Stores stands deleted from the scope of bidder.
11	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 6 of 7	2.6 Point no. 85 (x.)	Anti-termite and anti-weed treatment in all areas / buildings as per IS: 6313.	Please furnish list of vulnerable structures, buildings, where anti termite treatment is required.	Anti-termite treatement will be required for entire project building.
	VI	6	General Requirement of Buildings & Structures	Sheet 2 of 12	6.6	Pre-constructional anti termite treatment shall be given to all vulnerable areas and shall include column pits, wall trenches, foundations, filling below the floors etc. as per IS: 6313 and other relevant Indian Standards.		
12	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 7 of 12	2.6 Point no. 85 (xiv.)	Internal/External compound wall is in the scope of bidder.	Bidder understands that plant boundary wall alongwith patrol road and drain is excluded from bidder's scope. Please confirm.	Patrol road and drain is included in bidder’s scope while plant boundary wall is excluded from bidder’s scope.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
13	VI	5	GEO-TECHNICAL INVESTIGATION	Sheet 1 of 7	5.1	Soil investigation report of the existing 2 x 300 MW (Units 1 & 2) adjacent to the proposed site is attached as a reference for the bidders.	Please furnish the soil investigation report for proposed plant area including bore logs, lab test results, electrical resistivity test, chemical test results etc.	Soil investigation for proposed plant area is in the scope of bidder.
14	VI	5	GEO-TECHNICAL INVESTIGATION	Sheet 1 of 7	5.2	As per the attached geotechnical report, It is advised to provide Pile foundation for boiler foundation, chimney foundation, cooling tower, main plant building structures,TG foundation, mill building foundation, mill foundation, conveyor gallery trestle (of height more than 25m) foundation, junction tower foundation, crusher house foundation, fly ash silo foundation including all other major structures in FGD and other areas.	Suitable foundation system (pile or open) shall be as per the approved Geotechnical investigation report during detailed engineering. Please confirm.	Bid specifications to be followed.
15	VI	5	GEO-TECHNICAL INVESTIGATION	Sheet 1 of 7	5.2	For ESP and stacker reclaimer foundation if open foundation is feasible as per Approved Geotechnical report, bearing capacity corresponding to 25mm settlement of foundation shall be considered.	Both the clause are contradictory. Bidder understands that total settlement for open foundations in soil shall be restricted to the following : (i) Foundations (other than raft) for power house, TG, boiler, mill bunker , fans of main plant area - 25 mm (ii) Raft foundation - 100 mm (iii) Other footings of width upto 6m - 50 mm. Please confirm.	Bid specifications to be followed.
16	VI	10	ALLOWABLE SETTLEMENT	Sheet 12 of 36	10.14	The total permissible settlement and differential settlement of the foundations will be governed by IS: 1904, IS: 13063, IS: 3370 and from functional requirements whichever is more stringent.		Bid specifications to be followed.
17	VI	6	General Requirement of Buildings & Structures	Sheet 10 of 12	6.15	Watch Tower shall be constructed with RCC frame work. Floor of tower shall be at least 6m above graded level.	Bidder understands that watch towers are excluded from bidder's scope. Please confirm.	Watch towers are included in bidder's scope. Watch towers shall be provided at spacing not more than 300 m including at all corners and turnings.
18	VI	9	Vertical deflection	Sheet 4 of 28	9.3.1 e)	For gratings and chequered plates : Span / 200 subject to a maximum of 6 mm	The permissible deflection span/200 is conservative for gratings, chequered plates. Please consider span/150 subject to maximum 6 mm.	Bid specifications to be followed.
19	VI	9	Vertical deflection	Sheet 4 of 28	9.3.1 d)	For roofing and cladding components : Span / 325	The permissible deflection span/325 is too conservative for sheeting in roofing and Cladding. Please consider span/250.	Bid specifications to be followed.
20	VI	18	DESIGN CRITERIA	Sheet 1 of 10	18.3 d)	Diameters of pile shall be 450mm, 600 mm and 750mm. The uplift and lateral load capacities shall be restricted to 20% and 5% respectively of the allowable load capacity in vertical compression. However, the pile capacities to be adopted shall be the least of the estimated design values and that obtained from the pile load tests.	a) Different diamter of pile may be allowed other than 450mm, 600mm and 750mm. b) Uplift and lateral capacity is not at all related with the allowable load capacity of pile in vertical compression. This shall be as per approved Geotechnical investigation report during detailed engineering. Please confirm.	Piles diameter other than as mentioned will be decided during detailed engineering. However, for pile capacity, follow tender specification
21	VI	18	DESIGN CRITERIA	Sheet 2 of 10	18.3 f)	Piles shall be designed for a limiting settlement of a single pile under vertical design load of 8 mm at the head and lateral deflection as 5mm.	Settlement consideration in case of pile shall be as per IS2911 part-1 section-2. Please confirm.	Confirmed

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
22	VI	18	DESIGN CRITERIA	Sheet 2 of 10	18.3 k)	Wherever pile foundations are adopted, a minimum of two pile group shall be provided below every column /foundation	In case of pile foundation, two pile group below every column/foundation may not be required. This shall be provided as per design/analysis. Please confirm	Bid specifications to be followed.
23	VI	18	BORE CAST-IN-SITU PILES	Sheet 6 of 10	18.7 g)	The dynamic cone penetration tests shall be carried out for a depth of at least 2 meters from the termination depth. The number of such tests shall be as follows :	Dynamic cone penetration tests (DCPT) will be conducted during geotechnical investigation. Further, DCPT is not required during installation of pile. Please confirm.	Noted.
24	VI	20	BACK-FILLING	Sheet 3 of 7	20.6 b)	The backfilling shall be carried out at optimum moisture content to achieve density requirements as per standard proctor test as under:- i) Backfilling of foundations and under grade slabs-95% of proctor's maximum dry density.	Degree of compaction for backfilling around foundation and under grade slab shall be 90% of maximum dry density (standard proctor). Please confirm	Bid specifications to be followed.
25	VI	24	Pressure relief valves	Sheet 2 of 3	24.5	Pressure relief valves	Pressure relief valves (PRV) are not required for earthen raw water reservoir. Further, it is to note that there will be huge chances of leakage of water inside the reservoir if PRV is to be placed with HDPE liner. Hence, it is requested to delete the requirement of Pressure relief valves.	Bid specifications to be followed.
26	VI	24	REINFORCED CONCRETE STRUCTURES AND FOUNDATIONS	Sheet 3 of 36	10.7	TG foundation shall be supported on vibration isolation system.The vibration isolation system shall consist of steel helical spring units and viscous dampers supporting the RCC deck which would support the machine. The spring units shall conform to DIN 2089 and DIN 2096.	TG foundation shall be supported on block foundation without vibration isolattion system. Option for the same shall also be provided. Please confirm.	Noted.
27	VI	24	REINFORCED CONCRETE STRUCTURES AND FOUNDATIONS	Sheet 17 of 36	10.17 (f)	TAB L E - I MINIMUM CEMENT CONTENT & MAX. W / C RATIO SPECIFIED FOR DIFFERENT GRADES OF CONCRETE	The cement content shall be as per IS:456. Please confirm.	Bid specifications to be followed.
28	VI	23	Concrete Road & Rigid Pavement	Sheet 1 of 2	23.1	Type III roads shall be of R.C.C & 3.75m wide with 1.0m wide hard shoulders on either side. Type III roads shall be provided along the plant boundary for access for security and maintenance.	Being an existing power station, bidder understands that Boundary wall and patrol road are excluded from bidder's scope. Please confirm.	Patrol road is included in bidder's scope while plant boundary wall is excluded from bidder's scope.
29	VI	17	Architectural Works	Sheet 21 of 21	Table-1 Finishing schedule	Workshop Canteen :General Area Kitchen Fire station building …..	Bidder undestands that following buildings are excluded from bidder's scope: a) Administrative building b) Canteen c) Fire station d) Workshop e) Security cum main gate complex f) Boundary wall g) Patrol road Please confirm.	Security cum main gate complex and Patrol Road are included in the bidder's scope. New main gate with new RCC security cabin of size 4m X 4m on both sides and toilet of suitable size shall be provided by the bidder.
30	VI	17	Architectural Works	Sheet 7 of 21	17.7.2. g)	Wall cladding Inner sheet shall fixed directly to side runner and Z spacers made of at least 2 mm thick galvanized sheet of grade 375 as per IS:277. Inner sheet shall be fixed at the rate not more than 1.50m centre top centre to hold the insulation and external sheeting.	In order to have faster execution and better quality of the Insulated Sandwich Panels, it is proposed to use Pre-Fabricated Sandwich Insulated Panels (both side profiled sheeting) manufactured in factory with insulation specified as per cl. 17.7.2 (e) to be used wherever required. Please confirm.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
31	VI	12	RCC Chimney	Sheet 14 of 38	12.8.1	Alternatively the chimney flue liner cladding shall be made of 2 mm thick Titanium (Grade 2 as per ASME SB265) or C-276 (ASTM B575, UNS N10276) alloy over 8 mm thick (minimum) mild steel base metal of flue liner. Cladding shall be done by explosion bonding or hot rolling to achieve the required quality as per ASTM B 898-11. In case of Titanium as liner, the flue diameter shall be so sized to ensure that the flue gas exit velocity shall not exceed 16.8 meters/second at the normal continuous operating load.	Chimney Flue Can be made up of Super Duplex SS-32760 plate with PREN 42 (min.) as per ASTM-A 240/480 which is also available indeginously and are also technically suitable. Considering the make in India, Atma Nirbar Bharat, and other circulars etc. it is proposed that bidder can provide either borosilicate / Super Duplex SS-32760/ C276/alloy 59/Titanium Clad plate. Please confirm.	Bid specifications to be followed.
32	Volume VI	Ch 06	General Requirement of Buildings & Structures	Sheet | 3 of 12	6.7.3	All stairs shall have maximum riser of 180mm and a minimum tread of 250mm. However, for Public buildings riser shall be limited to 150mm and tread width of 300mm.Minimum width of stairs shall be 1200mm generally.All stairs normally shall have not more than 15 risers in one flight.	Bidder understands that as per NBC and other relevant building codes for Public buildings, Maximum 13 Nos. of riser are recommended for Staircase.	Maximum 12 nos. of riser are reccommended for staircase.
33	Volume VI	Ch 06	General Requirement of Buildings & Structures/MISCELLANEOUS REQUIREMENTS/FURNITURE	Sheet | 12 of 12	6.18	All rooms shall be furnished for their intended use. The Contractor shall provide the Owner with a choice of furniture range.	Bidder understands that suggestion w.r.t furniture are in the scope only.The supply of furniture is not in the scope of bidder.	Supply of furniture for all buildings in the project is in Bidder's scope. Furniture to be supplied shall be of Make-Godrej Interio, Durian, Wooden street or equivalent make as approved by HPGCL.
34	Volume VI	Ch 11:	Buildings Description/ TURBINE GENERATOR BUILDING	Sheet | 4 of 18	11.2	Windows shall be side-hung steel glazed using 6mm thick wired glass generally.	Manufacturing of Wired glass are very limited in the market and not readly available. Bidder suggested for the replacement of wired glass with other type of glass like laminated toughened glass, plain glass etc.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
35	Volume VI	Ch 11	Buildings Description/TURBINE GENERATOR BUILDING	Sheet | 4 of 18	11.2	Staircase protected on all sides with fireproof enclosure shall be provided to satisfy TAC regulations. All the doors leading to the inside of the power house from staircase shall be automatically closing fire proof door satisfying TAC regulations.	Bidder undesrtands that TAC regulations are obsolete and no more in use. The staircase shall be in accordance with NBC code and fire door shall comply with latest IS-3614 2021 code. please confirm.	Noted.
36	Volume VI	Ch 11	Buildings Description/TURBINE GENERATOR BUILDING	Sheet | 4 of 18	11.2	A roof shall be provided with roof water proofing treatment using high solid content liquid applied elastomeric water proofing membrane with separate wearing course as per ASTM-C-836 & 898. Thickness of the membrane shall be 1.5mm (min.).	Kindly confirm the high solid content percentage in the elastomeric membrane used for water proofing along with details about two component or single component. Also, Provide thickness of polyscrim cloth /non-woven geotextile also.	Solid content 90% ± 2%, single component and Geo-textile 200 GSM
37	Volume VI	Ch 12	Buildings Description/TURBINE GENERATOR BUILDING	Sheet | 5 of 18	11.2	In control room false ceiling level shall be kept 3500 mm above floor level.	The false ceiling height mention is 3500 and 3600mm in different clause for the same area. Kindly confirm the requirement.	Minimum clear height be kept as per Clause 6.20.02 (iii) at Sheet 16 of 26, Part-B, Ch-6, Vol-V.
38	Volume V-Instrumentation & Control Works	Part B/Ch 6	Supervisory Control Panels, Supervisory control Desks, Equipment Panels	Sheet | 16 of 26	6.20.02	Minimum clear height between finished floor Level & False ceiling shall be 3600 mm for aesthetical purpose.		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
39	Volume VI	Ch 12	Buildings Description/TURBINE GENERATOR BUILDING	Sheet | 5 of 18	11.2	Main entrance to control room shall be provided with air locked lobby with automatic closing sliding glass doors. Lobby shall be formed of anodized aluminum framing with toughened sheet glass 6 mm thick..... Partition between control room and adjoining rooms shall be of glazed aluminum partition with 300 mm high brick wall at bottom for toe protection.	The specification for control room mentioned in volume VI and Volume -V are not silimar. Kindly confirm which specification needs to be follow.	Specifications as per Chapter-12 of Vol-VI. be followed
40	Volume V- Instrumentation & Control Works	Part B/Ch 6	Supervisory Control Panels, Supervisory control Desks, Equipment Panels	Sheet | 15 of 26	6.20.01	The Central Control Room shall be provided with combination of perforated and non perforated metal panels False Ceiling, modular pre-fabricated sliding 3D metal Lampre type Panel cladding wall cladding with acoustic property on the overall interior and exterior walls, Non-skid, fully vitrified flooring and skirting, Full Toughened glass wall partitions round bent glass with frameless structure, Special frameless Glass doors, Flush doors and Automatic Sliding doors, Air Lock Room, Illumination with modern LED based modular round ceiling lights, Strip Lighting to match the aesthetic look of CCR and Emergency Lighting.		
41	Volume V- Instrumentation & Control Works	Part B/Ch 6	Supervisory Control Panels, Supervisory control Desks, Equipment Panels	Sheet | 15 of 26	6.20.01	The Central Control Room shall be provided with combination ....., modular pre fabricated sliding 3D metal Lampre type Panel cladding wall cladding with acoustic property on the overall interior and exterior walls, Non-skid, fully vitrified flooring and skirting, Full Toughened glass wall partitions round bent glass with frameless structure, Special frameless Glass doors, Flush doors and Automatic Sliding doors, Air Lock Room, Illumination with modern LED based modular round ceiling lights, Strip Lighting to match the aesthetic look of CCR and Emergency Lighting.	Bidder noticed that " Lampare panel are not avilable in the market. Kindly provide some alternate material for the same either share the manufacturer details.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
42	Volume VI	Ch 17	Architectural Works/TABLE 1 : FINISHING SCHEDULE	Sheet | 19 of 21	17.7.15 Finishing Schedule	Central ControlRoom-Acrylic emulsion paint-Glazed Vitrified tiles Double Charge	For wall finish- emulsion paint is mentioned and for flooring - Non-skid, fully vitrified flooring and skirting is mentioned. The same is not matching with clause 6.20.01,Part B/Ch 6,Volume V- Instrumentation & Control Works. Please confirm the requirements to be furnished.	Bid Specifications as per Vol-VI, Chapter 17 be followed.
43	Volume V- Instrumentation & Control Works	Part B/Ch 6	Part B/Ch 6: Supervisory Control Panels, Supervisory control Desks, Equipment Panels	Sheet | 18 of 26	6.20.03	FLOORING & SKIRTING Bidder shall provide entire flooring of CCR with High Graded Vitrified Flooring. The colour of the flooring shall be aesthetically match with the ceiling and wall cladding colors. Also 100 mm Skirting shall be provided at the bottom of the walls and the colour of the skirting shall match with the Flooring. The test certificates to be provided before commencement of the work at site.	As per clause 17.7.15 Finishing Schedule/Architectural Works/TABLE 1 : FINISHING SCHEDULE/Ch 17/Volume VI. The finishing requirement for Control room flooring are not matching with the mention clause. Please confirm the specification to be followed. Also the test certificate requirement needs to be clarified in details for flooring materials.	Bid Specifications as per Vol-VI, Chapter 17 be followed. Test certificates to be provided as per bidder's standard practice
44	Volume V- Instrumentation & Control Works	Part B/Ch 6	Part B/Ch 6: Supervisory Control Panels, Supervisory control Desks, Equipment Panels	Sheet | 18 of 26	6.20.03.1	Granite Flooring:-The floor of the control room and other rooms shall be done with Granite Stone. The stone shall be of approved make and shall be machine cut, machine polished (pre polished), 18mm thick which will be laid over 20mm thick bedding of cement mortar 1:4, jointed with Laticrete including rubbing, curing etc. The colour of the granite shall aesthetically match with the control desk, CCR walls & Ceiling	As per clause 17.7.15 Finishing Schedule/Architectural Works/TABLE 1 : FINISHING SCHEDULE/Ch 17/Volume VI. The finishing requirement for Control room flooring are not matching with the mentioned clause. Please confirm the specifications to be followed.	Bid Specifications as per Vol-VI, Chapter 17 be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
45	Volume V-Instrumentation & Control Works	Part B/Ch 6	Part B/Ch 6: Supervisory Control Panels, Supervisory control Desks, Equipment Panels	Sheet | 18 of 26	6.20.04	CLADDING The overall Interiors and exteriors of CCR walls shall be provided with metal Lampre cladding and ……..Formed ACP cladding depending upon the requirement to match aesthetically.	Bidder noticed that " Lampare panel are not avilable in the market." Kindly provide some alternate material for the same or share the manufacturer details.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
46	Volume V-Instrumentation & Control Works	Part B/Ch 6	Part B/Ch 6: Supervisory Control Panels, Supervisory control Desks, Equipment Panels	Sheet | 21 of 26	6.20.04.3	Pebbles Lattice Concept PanelingDesigner 600X600mm composite tiles of ASS with 5mm thick laminated toughened glass encased by extruded aluminum sections for fitment. Structure should be made from heavy duty powder coated modular steel frame (minimum wall thickness 1.6mm to 2.0mm). The frame should be securely grouted from roof and floor with flexible joints to absorb seismic vibration. The tiles will be having cut-outs in such a way that when the tiles are rotated by 90 degrees the design pattern of the entire wall shall be changed. Using the same tiles and different orientations shall have multiple design possibilities. Options for corporate logos on this paneling shall be provided.	1. Kindly furnish the design details and manufacturer details for such kind of work. 2. Also were this can be installed needs to be clarified.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
47					6.20.06.2	35mm thick consisting of solid core block bonded with phenol formaldehyde synthetic resin confirming to IS: 848. The shutters shall be faced on both sides with 3mm thick water proof plywood finishe..... With door spring and locking arrangements and both way handle. -Width of double glass door : 2000 mm -Width of single glass door : 1000 mm -Height of the Door : 2500 mm	The description give is for wooden flush door but sizes mention are for glass door. Also the height of the door mention is 2500 but in 6.20.06.1 for glass door height mention 2400. kindly specifiy which to be followed.	For doors specifications of various buildings, refer Vol VI of specifications.
LAYOUT								
1	III	33	Layout Requirements	7 of 11	33.4, point no. 25	Steam turbine and Generator and other equipment located in the turbine hall shall be accessible by the EOT crane for handling during erection and maintenance. Wherever special handling procedures are to be followed such as for the generator stator, rotor withdrawal of Generator etc, the same shall be described in written out document and attached with the bid. The offered layout of TG Hall shall be such that it shall be feasible to remove the Generator Stator and send it for repair without removal of any equipment located in TG Hall. Further the complete set up including all tools required for removal, assembly & handling of Generator stator shall be provided by the bidder. A separate EOT crane with proper maintenance area shall be provided along with all tools required for removal, assembly & handling of Boiler Feed Pumps.	Bidder understands that Generator Stator can be handled by using EOTs in tandem or by using special handling arrangement such as portal crane or strand jack.	Bid specifications to be followed. However, Bidder's understanding is correct.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	III	33	Layout Requirements	7 of 11	33.4, point no. 25	Steam turbine and Generator and other equipment located in the turbine hall shall be accessible by the EOT crane for handling during erection and maintenance. Wherever special handling procedures are to be followed such as for the generator stator, rotor withdrawal of Generator etc, the same shall be described in written out document and attached with the bid. The offered layout of TG Hall shall be such that it shall be feasible to remove the Generator Stator and send it for repair without removal of any equipment located in TG Hall. Further the complete set up including all tools required for removal, assembly & handling of Generator stator shall be provided by the bidder. A separate EOT crane with proper maintenance area shall be provided along with all tools required for removal, assembly & handling of Boiler Feed Pumps.	If erection of generator stator is done via portal crane or strand jack method, portal crane or strand jack will not be supplied and shall be taken back by bidder after erection of generator stator. Kindly confirm.	Confirmed.
3	III	2	Turbine Generator & Auxiliaries	71 of 87	7.11	TDBFPs will be located on operating floor.	Bidder requests HPGCL to leave it open for bidder to keep TDBFPs on ground floor/intermediate floor/operating floor as per bidder's standard arrangement.	Noted.
Misc. Tanks								
1	III	DM Plant	Mechanical Works	14 of 15	5.4	The tanks shall be provided with 3 layers of floating polypropylene balls to avoid contact with CO2 atmospheric oxygen along with breather and water seal	NaOH breather has been provided to shield the DM water from atmosphere and are working properly in all previously executed projects. Floating PP balls are not required. Please confirm. In case same is required bidder shall provide 3 layers of floating (hollow type) polypropylene balls. Please confim.	Bid specifications to be followed.
2	III	DM Plant	Mechanical Works	14 of 15	7	The tanks shall be provided with 3 layers of floating polypropylene balls to avoid contact with CO2 atmospheric oxygen along with breather and water seal		
3	III	DM Plant	Mechanical Works	14 of 15	5.4(iii),7(iii)	MS epoxy painted inside (DFT 500 microns)	DFT 500micron is on higher side .Customer is requested to review the same.	Bid specifications to be followed.
POWER CYCLE								
1	III	Chapter 1	Steam Generator & Auxiliaries	7/186	1.10	A high temperature unit header with parameters 16 Kg/cm² (a) and 310°C and a low temperature unit header with parameters 16 Kg/cm² (a) and 210°C shall be provided.	1. A single unit header with parameters 16 Kg/cm² (a) and 290-310°C shall be provided for meeting all consumers' requirements shall be offered. 2. One number of control valve pneumatically operated on the desuperheating spray water line shall be provided with a bypass arrangement of equal capacity with motor operated inching type valve. Manual isolation for the spray control valve shall be provided at both upstream and downstream. Customer/consultant is requested to accept bidder's proposal.	Noted.
	III	Chapter 1	Steam Generator & Auxiliaries	7/186	1.10.2	One (1) desuperheater in between the interconnection of high and low temperature unit headers.		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
	VII		Tender Drawings	111-11-0300		P&ID Auxiliary Steam System		
2	III	Chapter 2	Turbine Generator & Auxiliaries (MAINTENANCE REQUIREMENTS)	16/87	1.3	Each turbine shall be suitable for Wet Steam washing if applicable as per Bidder's design. In such case, necessary stubs/ connections on turbine / piping shall be provided for the same. Recommended washing procedures may also be furnished.	The wet steam washing shall not be applicable for supercritical turbines as per standard practice of Turbine manufacturer. Customer/consultant is requested to accept bidder's proposal	Noted.
3	III	Chapter 2	Turbine Generator & Auxiliaries (DESIGN REQUIREMENT)	40/87	2.2	1. Condenser Design Parameters (b) Design cold water temp. : 32.5^0C	We understand the design cooling water temp shall be 33 deg C for condeser design and cooling tower design and guranateed heat rate shall be for the same condition. Please confirm.	CW Cold water temperature shall be 33 Deg C.
	III	Chapter 2	Turbine Generator & Auxiliaries (DESIGN REQUIREMENT)	12/87	1.14	TMCR (Turbine Maximum Continuous Rating) 2. This means 800 MW electric power output at generator terminal under 0% cycle make up at 33°C design cooling water inlet temperature.		
4	III	Chapter 1	Steam Generator & Auxiliaries	34/87	1.23	Heat Balance Diagram 1.23.1 (a) , 1.23.1(b) ,1.23.1(i) &1.23.1(j)	Bidder understands that VWO output is 105% of TMCR i.e 840 MW. Please Confirm.	Confirmed.
5	VII	Book 2 of 3	Attachment 6(P)	Declaration on Guaranteed value of parameters as per format in this Attachment for bid evaluation		e) Turbine Generator Output of 800MW (100% rated load) under rated steam conditions, 70mmHg (abs) condenser pressure with 0% makeup.	Bidder understands that the output guarantee shall be at Optimised condenser back pressure. Please confirm.	Bidder to follow Chapter 8 , Sheet 5 of 57, Voume II
6	III	Chapter 1	Steam Generator & Auxiliaries	34/87	1.23	Heat Balance Diagram 1.23.1 (a) & (b)	As per guaranteed schedule TG output and heat rate is guaranteed at 800 MW, 0% MU, optimized condenser pressure. Hence, these HBD are not considered for guarantee and may be deleted.	shall be read as: "a) 840 MW VWO output (i.e. 105% TMCR) under rated steam condition at design condenser pressure with zero make up. b) 840 MW VWO output (i.e. 105% TMCR) under rated steam condition at design condenser pressure with zero make up."
7	III	Chapter 1	Steam Generator & Auxiliaries	34/87	1.23	Heat Balance Diagram 1.23.1 (y)	we understand that condenser back pressure is not guaranteed hence, this HBD shall not be applicable. Please confirm. However, HBD requirement is already covered in sl no (i).	shall be read as: " y) 840 MW output at 1% make-up design CW temperature and CW flow. (condenser pressure condition)"

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
8	III	Chapter 2	Turbine Generator & Auxiliaries	48/87	5(l)	(l) Minimum Recirculation Flow Individual recirculation line for each CEP shall be provided. Minimum recirculation flow requirements of the pump shall be not less than 25% of design flow or on set recirculation (discharge/suction) whichever is higher.	Individual recirculation lines for each CEP are not required as the minimum recirculation requirement of CEP can be met through GSC min recirculation line. (As per bidder's experience individual recirculation line for each CEP is not recommended). Customer may review and clarify.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
9	III	Chapter 2	Turbine Generator & Auxiliaries	47/87	5(h)	CONDENSATE EXTRACTION PUMP SIZING: Design Capacity :Combined flow of 2x50% CEP to be based on 10% marginover highest condensate flow envisaged during unit operation (excluding HP/LP bypass operation). Design Head : Corresponding to above considering 10% margin over maximum deaerator pressure.	CEP combined Flow shall be based on 10% margin over VWO 1% make up for the efficient and optimized pump selection. However, CEP shall be sized to cater all operating conditions.To calculate the total dynamic head of the pump, frictional drop shall be calculated as per actual flow from the system as per corresponding HBDs. Please confirm.	Clause 5.0 (h) (i) of Chapter 2 at Sheet 47 of 87 in Vol-III be read as: "Combined flow of 2x50% CEP to be based on 10% margin over highest condensate flow envisaged during unit operation (excluding HP/LP bypass operation, house load operation, HP heater out").
10	III	Chapter 26	Power Cycle Piping, Valves, Fitting & Thermal Insulation	8/59	26.6.1.1	However bidder may consider 20% higher stress as per the provision of ASME B 31.1 (for the piping upto downstream valve at feed regulating station only) for which the requirement of special provision as per stipulation of clause no. 520 of IBR shall be met as a must by the bidder	As per our understanding, IBR does not restrict usage of 20% higher stress permitted by ASME. Hence, bidder may be allowed to use 20% higher stress as per the provisions of ASME. Please confirm.	Bid specifications to be followed.
11	III	Chapter 27	Low Pressure Piping, Valves & Specialities	2/31	27.1.3	Pump discharge and recirculation : Water Velocity 200 mm & above : 2.1 - 2.5 m/s	In DM/ condensate transfer piping (stainless steel pipe handling clean DM water), higher velocity 4 to 6 m/s) shall be considered, as in CEP/BFP discharge piping handling similar quality of water. Please confirm.	Bid specifications to be followed.
12	III	Chapter 26	Power Cycle Piping, Valves, Fitting & Thermal Insulation	2/59	26.2.1	Velocity limits for Auxiliary Steam System : 50 m/s	As proposed aux. steam parameters are 16 Kg/cm² (a) and 310-290°C which is adequately superheated, higher velocity upto 76 m/s may be allowed.	Bid specifications to be followed.
13			Tender Drawings	Flow Diagram MS,CRH & HRH		DPT across CRH & HRH line	As the pressure measurement is already considered for CRH and HRH line, DPT across reheater are not required. This is inline with the bidder's standard design. Please accept.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
			Tender Drawings	Flow Diagram MS,CRH & HRH		Strainer	Stop and Control Valve arrangement along with strainer for Turbine shall be as per OEM's recommendation. Please confirm.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
			Tender Drawings	Flow Diagram MS,CRH & HRH		Strainer	HPT exhaust piping (single / double lead), Valves and instrumentation requirement shall be as per OEM's recommendation. Please confirm.	
			Tender Drawings	Flow Diagram MS,CRH & HRH		Motorised Vent valves	As per bidder's design, piping vents shall be provided with manual isolation valves. Please confirm.	

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
			Tender Drawings	Flow Diagram MS,CRH & HRH		Reg Y piece instrument.	Requirement of Y piece (with metal temperature measurement) shall be considered during detailed engineering, if applicable.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
14			Tender Drawings	Flow Diagram MS,CRH & HRH		Attemperation and LPBP warm up line	Please note that these system shall be provided as per bidder standard offering which is acceptable every where.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
15		General	Tender Drawings	All P&IDs		Technical Specification & Tender Drawings: Excessive instrumentation & motorisation is specified.	Excessive instrumentation & motorized valves have been asked which are neither required for system O&M nor required for any control. This shall increase the Project cost as well as maintenance work during actual plant operation without any tangible benefit. As per bidder's past experience, we do not recommend such excessive instrumentation & motorized valves for safe & trouble free operation of the Plant. Hence, the requirement extra instrumentation and motorised valve requirement may please be reviewed.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
16			Tender Drawings	Flow Diagram HP AND LP BYPASS SYSTEM		Flow diagram of HP & LP Bypass System: HP bypass spray lines.	For HP Bypass spary line, bidder shall offer one Electro-hydraulic isolation valve (in common spray line) and two Electro-hydraulic spray control valves (one for each HP Bypass valve). Manual / motorised valve in the spray line shall not be considered due to criticality & response time required for the system. Please accept bidder's proposal.	For HP Bypass spary line, bidder shall offer one Electro-hydraulic isolation valve (in common spray line) and two Electro-hydraulic spray control valves (one for each HP Bypass valve). Manual valve instead of motor operated valve for spray line.
17	II	Ch 8: FG & LD	General & Schedules	21/57	3.9	Auxiliary Power Consumption	Please note that Guaranteed Unit Auxiliary Power Consumption(Pau) is defined as Pu+TL. In guarantee schedule sl no.(i) Unit auxiliary power consumption (including transformer losses) is to be guaranteed. However, transformer losses are also required to be guaranteed separately. As there is evaluation loading for Guaranteed Unit Auxiliary Power as well as for Transformer losses, it is leading to double loading of transformer losses which is not correct. Customer/consultant is requested to modify the guarantee related clauses suitably..	Bid specifications to be followed.
18	VII	Book 2 of 3	attachment 6(P)	Declaration on Guaranteed value of parameters as per format in this Attachment for bid evaluation	SL no. (i) & (p)	Guaranteed Figures		
19			Tender Drawings	Flow Diagram EXTRACTION STEAM FOR BFPT TURBINES		BFPT INLET STEAM	Bidder shall offer single/double admission turbine as per bidder's standard design. Number of Electro - Hydraulic valve shall also be as per bidder's standard design. Please accept.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
20			Tender Drawings	Flow Diagram HEATER DRAIN & VENT SYSTEM		General	LP Heater Drain to cascading heater or flash tank may be through control valve or through syphon as per the system requirement. Please confirm.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
21			Tender Drawings	Flow Diagram HEATER DRAIN & VENT SYSTEM		General	Start Up vent valves of deaerator shall be manual, however common vent valve shall be motorised as per bidder standard design. Please accept.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
22			Tender Drawings	Flow Diagram CONDENSATE SYSTEM			Please note that with reference to deaerator level control station, bidder proposes 2x100% capacity control valves with u/s manual isolation valve and d/s motorised isolation valve with 1x100% capacity motorised inching duty valve. Please accept.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
23			Tender Drawings	Flow Diagram FEED WATER SYSTEM			For optimised layout, bidder proposes 1x100% capacity SLBV and 1x50% capacity motorised bypass valve across HP Heater strings. Please accept.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
24			Tender Drawings	Flow Diagram FEED WATER SYSTEM			For optimised layout, bidder proposes that the option of 1x100% capacity motorised valve across Feed control station may also be considered. Please accept.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
AGITATORS								
1	III	Chapter 30	Flue Gas Desulpharisation Systems.	Sheet 20 of 93	Section 2,Clause 1.3,(Sub clause 6)	The FGD auxiliaries (like. agitator(s) in absorber and limestone slurry tanks,flue gas dampers, agitator(s) in absorber, process water (as applicable), mist eliminator wash pump(s) (if applicable), lube oil system of mills etc.) which may impact serious damage to the FGD System shall be connected to the emergency power supply system for total power failure condition. Bidder shall furnish a list of all such Auxiliaries in their bid proposal.	Agitators are not required to be connected to Emergency power supply as per proven practice being followed by collaborator. Equipment needing emergency power connection shall be decided based on process requirement and the recommendations of the collaborator & OEM for different equipment.	Bid specification to be followed. However, the issue may be discussed during detailed engineering.
2	III	Chapter 30	Flue Gas Desulpharisation Systems.	Sheet 63 of 93	Section 7,clause 4 ,sub clause 5	The material for the shaft (which is continuously in contact with slurry) and agitator blades of the Absorber Agitators shall be made with Alloy 926 or better material. For Agitators in other tanks, agitator blades shall be made with Alloy 926 or better material & shaft can be rubber lined with separate rubber layer for corrosion & erosion protection. This does not release the Bidder of the responsibility for selecting the correct materials.	Please also accept that for agitators in other tanks, agitator blades shall be made with carbon steel rubber lined as per proven collaborator experience.	Bid specification to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	III	Chapter 30	Flue Gas Desulpharisation Systems.	Sheet 68 of 93	Section 8,Clause no.8(sub clause 4)	Agitations shall be provided to prevent settlement of slurry by side entry agitators with emergency flush start system. Sufficient numbers of agitators shall be provided in the tank by the bidder to prevent the solid from settling down.	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 separate flushing system is not envisaged.	Bid specification to be followed. However, the issue may be discussed during detailed engineering.
FUEL OIL HANDLING SYSTEM								
1	Vol-VII	Drwg no. 111-29-0200	Plot Plan			Necessary booster pumps shall be installed in the existing Unit # 2 day farm area to transfer the LDO from the existing LDO forwarding header to the proposed 800 MW LDO Day tank.	As the LDO is to be transferred from Existing Unit#2 Day tank area to Proposed 800MW Daytank area , customer to pls confirm whether there is provision / space in existing Pipe Rack from " Existing Unit #2 to proposed 800MW Unit" for " One no LDO 100 NB Pipe & necessary Cabling " .	Bid specifications to be followed. However, bidder may visit site for space clarifications.
2	Vol-III	Chapter-22	Fuel oil handling System	2 of 8	22.1.2	It is proposed to tap the LDO required for the proposed 800 MW unit at Unit # 2 day LDO tank inlet header. Necessary booster pumps shall be installed in the existing Unit # 2 day farm area to transfer the LDO from the existing LDO forwarding header to the proposed 800 MW LDO Day tank.	As the LDO(for proposed 800MW unit) is to be tapped from Unit#2 day LDO tank inlet header, customer is requested to provide the pressure, Temperature and flow in this line near tank.	Bid specification to be followed. However, bidder may visit site for the required inputs.
3	Vol-III	Chapter-22	Fuel oil handling System	2 of 8	22.1.2	It is proposed to tap the LDO required for the proposed 800 MW unit at Unit # 2 day LDO tank inlet header. Necessary booster pumps shall be installed in the existing Unit # 2 day farm area to transfer the LDO from the existing LDO forwarding header to the proposed 800 MW LDO Day tank.	Customer to please provide the GA drwg of existing Unit#2 LDO Day tank (kept in 6.06 facility as per Plot Plan). Also, Provide the GA drwg of " Pressurizing & heating unit room (facility 6.05 as per plot plan)" , so that the possibiity of locating the new LDO pumps for 800 MW unit may be explored at our end.	LDO required for the proposed 800 MW unit shall be tapped from Unit # 2 day LDO tank spare outlet nozzle. The size is 100 NB. Bidder may visit site for the required inputs.
4	Vol-III	Chapter-22	Fuel oil handling System	2 of 8	22.2.1	One (1) 250 M3 capacity LDO day tank. The tank shall be located in the proposed boiler area.	250 m3 capacity LDO day tank will cater to approx 3 hrs LDO consumption of Boiler. In view of this customer to review and confirm the capacity of LDO Day Tank.	Bid specification to be followed. However, capacity of LDO transfer pump be kept same as that of LDO pressuring pump.
5	Vol-III	Chapter-22	Fuel oil handling System	2 of 8	22.2.1	One (1) 250 M3 capacity LDO day tank. The tank shall be located in the proposed boiler area.	There may be cases of emergency Oil drain from LDO Day tank along with minor spillages from valves etc inside tank Dyke area.Hence, it is necessary to route this Oil drain(with other particles) to a sump outside Tank dyke and further pump the same to ETP. Customer to pls confirm this requirement.	Bid specifications to be followed. Refer chapter 11, Clause 11.2.1, Vol-III.
CPU & CWTP								
1	III	17	CW TREATMENT SYSTEM	6-9 OF 20	2	As per tender specification and P&ID for CW Treatment System, Acid Storage & Dosing System, Corrosion and Scale Inhibitor Dosing System are to be provided.	Tender specification and P&ID for CW Tretament system do not stipulate or specify any requirement to provide Biocide & Bio-dispersant Dosing System as a part of CW Treatment System. It is requested to please review the specification and confirm the scope of these dosing systems. Kindly provide the technical specification, if are to be supplied.	Bid specifications to be followed.
2	III	9	CONDENSATE POLISHING UNIT	2 OF 15	9.1.1	There shall be two (2) vessels, each polishing vessel of 50% capacity of Condensate flow corresponding to maximum:	Both the referred clauses are contradictory. Kindly confirm the no. of service vessels and designing capacity (3 x 50% or 2 x 50% or 3 x 33%), to be provided.	Specifications as per clause 9.1.1, Chapter 9 of Volume III shall prevail.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	III	9	DATASHEET - CONDENSATE POLISHING UNIT	10 OF 15	2.0 (i)	No. of condensate polisher service vessel: Three (3 x 50% Full flow condensate polishing		
3	III	9	DATASHEET - CONDENSATE POLISHING UNIT	10 OF 15	1.0 (iii)	Total flow in all the service vessels: 2500 Tonnes per hour (Minimum)	The total condensate flow for designing CPU shall be considered as per HBD during detail engineeirng, max. of VWO (Valve Wide Open) condition at 1% make-up and designed condenser pressure OR HP / LP bypass charge condition OR all HP heaters out of service condition. Please review and confirm.	Calculate as per guidelines in clause 9.1.1, Chapter 9 of Volume III.
	III	9	CONDENSATE POLISHING UNIT	2 OF 15	9.1.1	There shall be two (2) vessels, each polishing vessel of 50% capacity of Condensate flow corresponding to maximum: - VWO (Valve Wide Open) condition at 1% make-up and designed condenser pressure OR - HP / LP bypass charge condition OR - All HP heaters out of service		
C&I								
1	Vol. V	Part A	StandAlone System	5 of 96	CL. 2.03.01(f), CL. 7.00.00	CPU-Regeneration considered in Stand-alone System	There is mismatch in the type of System specified at different places. We understand CPU(Regeneraion) to be considered as StandAlone system. Please confirm.	Confirmed.
2	Vol. V	Part A	Water System DDCMIS	74 of 96	cl. 4.00.00	CPU-Regeneration considered in Water system DDCMIS		
3	Vol. V	Part A	Human - Machine Interface & Plant Information System (HMIPIS)	7 of 96	2.04.09	Minimum amount of conventional mosaic compatible hardwired devices mounted on draw out portion of Control Desks.. Hardwired back up panel for offsite packages	All Operations can be done from OWS . Hence, H/W back up panel is not reqired. Requirement please be deleted.	Minimum amount of hardwired backup shall be provided for emergency operation only. Hardwired backup panels for offsite packages are not required.
4	Vol. V	Part A	Notes	14 OF 96	S.No. 10	DPG, DPT & DPS across the filters/strainers shall be provided.	DPT across the filters/strainers shall be provided. Please confirm.	Confirmed.
5	Vol. V	Part A	Notes	14 OF 96	S.No. 12	Thermocouples shall be provided for Mill outlet temperature and for Services with Temperature > 200 deg C.	Thermocouples shall be preffered for Mill outlet temperature and for services with design Temperature > 300 Deg C	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
6	Vol. V	Part A	PANELS CONTROL DESKS AND PANELS	33 of 96	Note-5 (A) : 1.00.00	One no. draw out section for process side - 16(h) X10(w) mosaic tiles, each of size 48 mm x 24 mm or 50 mm x 25 mm.	We understand that 16(h) X10(w) represents 16 no. of tiles Height wise and 10 no. of tiles width wise. Please confirm.	Confirmed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
7	Vol. V	Part A	Annexure-II to contract quantities for DDCMIS	53 / 54 of 96	Standalone System HMI	UCD in Unit Control Room between both units UCD.	We understand that There is only 1 unit under consideration. Accordingly, UCD, OWS and LVS as specified are applicable for unit only.	Bidder's understanding is correct.
8	Vol. V	Part B/ chapter 2	MEASURING INSTRUMENTS (PRIMARY AND SECONDARY) - Limit switches	46 of 64	2.18.00	For offsite plant application Limit switches shall be gold plated with high conductivity and non corrosive type.	Limit switches shall be provided as per Manufacturer's / Industry practise. Please confirm.	Bid specifications to be followed.
9	Vol. V	Part B/ chapter 2	Flow Nozzle	25 of 64	2.12.02	Flow nozzle material as A182F91 wherever main pipe pipe material is A335P91	SS316 nozzle is suitable for all services in power plant application and has been supplied for all projects including projects with supercritical parameters without adverse feedback. Please confirm.	Bid specifications to be followed.
10	Vol. V	Part B/ chapter 9	INSTRUMENTATION AND CONTROL CABLES	3 of 36	9.01.03.15	Two (2) pair (individual & overall shielded) cables shall be provided for terminating the thermocouples, transmitters & switches i.e Analog & Binary signals to local JBs.	Two (2) pair (overall shielded) cables shall be used for terminating the single Analog signal.	Bid specifications to be followed.
11	Vol. V	Part B/ chapter 11	CONTROL VALVE SIZING & CONSTRUCTION	2 of 10	11.02.05	The noise abatement shall be achieved by valve body and trim design and not by use of silencers.	Usage of silencers shall be as per ISA. Please confirm.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
12	Vol. V	Part B/ chapter 11	CONTROL VALVE SIZING & CONSTRUCTION	2 of 10	11.02.06	The Liquid pressure recovery factor (FL) shall be 0.995 or better for severe flashing/cavitation services	For Flashing services, Liquid pressure recovery factor (FL) is not applicable. Please confirm.	Noted.
13	Vol. V	Part B/ chapter 11	CONTROL VALVE SIZING & CONSTRUCTION	2 of 10	11.02.07	The Liquid pressure recovery factor (FL) shall be 0.985 or better for low flashing/cavitation services	For Flashing services, Liquid pressure recovery factor (FL) is not applicable. Please confirm.	Noted.
14	Vol. V	Part B/ chapter 14	Annexure-A	11 of 12	s. no. 15	Bidder shall provide local panel for local start/ stop monitoring of auxiliaries and equipment as per requirement .	No Local Panel is considered for the packages which are having DCS/PLC/Microprocessor based Control system. Further, Local start is not recommended as drive related parameters are availble in control room. Only local emergency stop is considered. Please confirm.	Noted.
15	Vol. V	Part B/ chapter 14	Effluent Treatment Plant Plant Misc Sumps with Pumps	8 of 12	ANNEXURE-A (s. no. 23)	Effluent Treatment Plant - PLC based. - PLC based		
16	Vol. V	Part A	Notes	14 OF 96	S.No. 2	For various auxiliary systems like DM/CPU/PT/CW chemical treatment/AWRS/ ETP /LWTP/PT plant/Chlorination /CW/ACW/ / Cooling Tower/ Ash Handling etc systems, ….to facilitate the remote operation of these plants through DDCMIS based control system.		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
17	Vol. V	Part B/ chapter 14	Air Conditioning system and Ventilation System	2 of 12	ANNEXURE-A (s. no. 4)	Air Conditioning System & Ventilation System - PLC based	There is mismatch in the type of Control specified at different places. We recommend the following philosophy: 1. H2 GENERATION: PLC Based 2. Sewage Treatment Plant - Relay Based 3. Effluent Treatment Plant - Central Control as DCS based while outside area including Sumps as Relay based/ Starter Panel. 4. Other Offsite packages i.e. CPU/DMP/PTP/HVAC/CWT/ CSSP/ Chlorination/ Fuel Oil System will be DCS based. OWS is envisaged Wherever DCS is applicable. Please confirm.	For CW treatment plant , Cl.18.04.10 , Vol.V, Part B/ chapter 18, sheet 29 of 34 to be followed. For Air conditioning and ventilation system, DDCMIS based controls shall be provided for HVAC (except split ACs and dry ventilation) in respective DDCMIS inline with the referred clauses of Volume-V, part-A. For service building, HVAC (except split ACs and dry ventilation) controls shall be PLC based inline with Volume-III, Chapter-25. For other non-plant buildings, HVAC (except split ACs and dry ventilation) control system shall be provided as per respective package OEM standard. For Effluent Treatment Plant sheet 8 of 12, ANNEXURE-A (s. no. 23),Part B/ chapter 14 to be followed. For all other plant/ offsite packages, follow bid specifications.
18	Vol. V	Part B/ chapter 18	Control Philosophy for Air Conditioning system and Ventilation System	33 of 34	18.08.00	The control & Instrumentation for Air Conditioning and Ventilation System of main plant TG Building & ESP bulding shall through hot redundant standby processor based plant DDCMIS system ..		
19	Vol. V	Part B/ chapter 14	CW Treatment Plant	7 of 12	ANNEXURE-A (s. no. 17)	CW Treatment plant - Relay Based Control System		
20	Vol. V	Part A	Notes	14 OF 96	S.No. 2	For various auxiliary systems like DM/CPU/PT/CW chemical treatment/AWRS/ETP/LWTP/PT plant/Chlorination /CW/ACW/ / Cooling Tower/ Ash Handling etc systems, ….to facilitate the remote operation of these plants through DDCMIS based control system.		
21	Vol. V	Part B/ chapter 18	CW Treatment Plant Control	29 of 34	18.04.10	The operation and control philosophy of circulating water/cooling water treatment plant shall through plant water system DDCMIS		
22	Vol. V	Part B/ chapter 11	CONTROL VALVE ACCESSORY DEVICES	5 of 10	11.07.02	Separate moisture separator unit for ensuring dryness of air entering I/P as well as the power cylinder is to be supplied with each control valve and control damper.	Control valves are fed from centarlised instrument air system having drier and hence separate mositure separator is not required.	Bid specifications to be followed.
23	Vol. II	CHAPTER-9	Mandatory Spares	81 of 103	1.00.01.12	List of C&I Mandatory spare - Ultrasonic Type LT - 50% of each type and length, including sensors	50% of Ultrasonic Type LT as mandatory spares seems to be quite high. 10% mandatory Spares are recommended for Ultrasonic Tpe LT. Please confirm.	Last column against 1.00.01.12 at sheet 81 of 103 of Chapter-9, Vol-II be read as:- "10% of each type & length including sensors"
24	Vol. II	CHAPTER-9	Mandatory Spares	82 of 103	1.00.01.15	Complete Electronic cards, PCB assembly and Power supply card assembly- 10% of Electronic card/PCB assembly for each type, model & rating or a minimum of one number for each model, rating and type , whichever is more for each type of Transmitter, switch & Flow Meters.	Complete Electronic cards, PCB assembly and Power supply card assembly- 10% of Electronic card/PCB assembly are not applicable for Transmitter, switch & Flow Meters. Please confirm.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
25	Vol. V	Part B/ chapter 20	DOCUMENTATION MANAGEMENT SYSTEM			Document management system for C&I	Bidder's has their own DMS called as PEDM with the same facility as specified in tender specification, which shall be available to HPGCL and consultant perpetually. Extra DMS for particular project is not required, which shall have licence fee and maintenance fee as extra cost.	Document Management System stands deleted. Soft copies of all Drawings and documents including all revisions shall be uploaded in the bidder's Document Management System by giving access to the owner. Bidder shall handover the entire documentation including all revisions before FTO in 6 HARD DRIVES; five (5) to HPGCL and one (1) to DESEIN. Hard copies shall be submitted during the engineering stage as per the distribution schedule attached in Chapter 2 of Volume II. Minimum 30 nos users are required to access bidders software.
CHLORINE DI-OXIDE								
1	III	17	Chlorine Di-Oxide Generation System & CW Treatment System	3 OF 20	1.3 (iii)	Common Bulk storage tanks for NaClO2 & HCl and associated unloading pumps for Sodium chlorite, Hydrochloric acid shall be provided.	There is ambiguity in the requirements for bulk acid storage tanks, acid unloading pumps, acid measuring tanks, indicated/ mentioned in technical specifciaiton, P&ID and Data Sheet. Customer is requested to kindly check and clarify the same.	Common HCl bulk storage tank and unloading pump for use at different places in the plant shall be provided, however acid measuring tank shall be individual for each place.
	III	17	Chlorine Di-Oxide Generation System & CW Treatment System	15 OF 20	1	Datasheet for Acid Measuring Tanks		
	VII	TENDER DRAWINGS	DRG NO. 111-12-3505 DRG NO. 111-12-3506 DRG NO. 111-12-3507			Tender drawing for chlorine di-oxide dosing system		
Gypsum Dewatering Equipment (GDWE)								
3	Volume II General & Schedules	Ch 9 :	Mandatory Spares	53 of 103	E (ii)	LIST OF MANDATORY SPARE-Belt (If Applicable)	Bidder has considered only the belt applicable for wear/ sealing of the Vacuum Belt Filter as mandatory spares. Customer may specify if any other belt is to be considered in the mandatory sapres.	Bid specifications to be followed.
4	Volume II General & Schedules	Ch11 :	QAP (Mechanical)	98 of 103	8.0	VACUUM BELT FILTER SYSTEM - Quality Assurance Plan	The Quality Plan shall be submitted by the bidder indicating the applicable details of tests and inspections during contract stage providing necessary technical justifications as per previous experience with similar application. Please accept.	Bid specifications to be followed.
5		Ch 30	FGD	9 of 93	1.4 (5)	2X100% vacuum pump for each vacuum belt filter.	Bidder understand that Customer desire to have single (1x100%) independent vacuum pump for each Belt filter. Accordingly, bidder does not envisage redundancy in Vacuum Pump for each belt filter as the entire system itself is having redundancy (2x100%) as per the specification. Please accept.	

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
6	III	Ch 30	FGD	66 of 93	4.0 (10)	Each belt filter shall have independent vacuum pump.		Bid specifications to be followed. It is clarified that redundancy of vacuum pump shall be 2x100%.
7		Ch 30	FGD	67 of 93	5.0 (1)	Two (2) number vacuum pumps dedicated to individual receiver tank.		
8	III	Ch 30	FGD	9 of 93	1.4 (10)	2 x 100 % (1W + 1S) Belt/ Wash Cloth Water pumps shall also be provided in the filtrate water tank for cleaning & washing of belt cloth in vacuum filter.	Noted. However, bidder shall be allowed to propose it's proven practice for the belt/cloth washing system.	Bid specification to be followed. However, the issue may be discussed during detailed engineering.
9	III	Ch 30	FGD	66 of 93	4.0 (4)	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 8000 hrs.	No GDS supplier provides guarantee for operational life as it depends upon the usage conditions. Please accept.	Bidder shall supply filter cloth as per standard guarantee of the filter cloth suppliers and supply balance quantity as loose supply to meet the specified guarantee of 8000 hours.
9	III	Ch 30	FGD	66 of 93	4.0 (6)	The belts shrouds and sealing belts shall provide a leak arrangement to prevent overflow of gypsum slurry. The sealing shall have minimum life of not less than 8000 hrs.	No GDS supplier provides guarantee for operational life as it depends upon the usage conditions. Please accept.	Bid specifications to be followed.
10	III	Ch 30	FGD	67 of 93	4.0 (11)	Gypsum cake from each belt filter shall be discharged through belt conveyors to gypsum storage yard. The elevation of discharge point of Belt conveyor shall be atleast 10.0 Mtr. above GL.	Gypsum cake from each belt filter shall be discharged through respective belt conveyor. The elevation of discharge point of Belt conveyor shall be decided based on the system requirement during detail engineering.	Bid specification to be followed. The issue may be discussed during detailed engineering.
11	III	Ch 30	FGD	67 of 93	4.0 (12)	A 2 m (min.) wide platform shall be provided around each belt filter for easy approach & maintenance	Bidder shall provide a common platform between the belt filters of adequate width between the belt filters as per industry practice. Please accept.	Bid specification to be followed. The issue may be discussed during detailed engineering.
12	III	Ch 30	FGD	67 of 93	5.0 (7)	Each vacuum receiver tank(s) shall be provided with slide plate type pneumatic vacuum breaker. The plate shall be stainless steel with a min. thickness of 3 mm.	Bidder shall provide as per the proven design of the OEM meeting the system requirement. Please accept.	Bid specification to be followed. The issue may be discussed during detailed engineering.
ELECTRICAL								

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1	Volume IV	Ch1/ Electrical Scope of Work	Electrical System Study/Short Circuit Calculation for all the systems.	10 OF 58	1.05.02	All above calculations shall be done manually. Back up ETAP results shall also be submitted for above and load flow study.	Please note that owing to the volume of calculations involved , system design, earthing, lighting system designs shall be done on E-Tap / other applicable softwares. HPGCL is requested to accept the same.	Bidder shall provide calculation on E-TAP software for the following: 1) Transformer sizing 2) Sizing of HV/MV/LV switchboard. 3) Electrical system study/short circuit calculation for all the system. For remaining points mentioned at page 9 & 10 of 58 in Clause 1.05.02 of Chapter-1, Vol-IV, bidder shall submit manual calculations or through other applicable softwares.
2	Volume IV	Ch1/ Electrical Scope of Work	Electrical System Study/Short Circuit Calculation for all the systems.	11 OF 58	1.05.03	Bidder shall supply 1 No. ETAP software along with license for Owner's use.	ETAP software supply may be excluded from scope of bidder. Please confirm	Bid specifications to be followed.
3	Volume IV	Ch1/ Electrical Scope of Work	Distribution Board	6 OF 43	13.03.04	Valve DBs shall be provided area wise of turbine side only to cater valve load and will be wall mounted fed from Turbine PMCC/Emergency Services PMCC. These valve DBs shall have single incomer only	Please note that wall mounted DBs for catering valve loads are not advisable, hence to cater valve loads of turbine, Turbine Valve DB/MCC (floor mounted) of suitable rating shall be provided with 2 incomers, 1 no. incomer from Turbine PMCC & 1 no incomer from Emergency MCC with "1 out of 2 on at a time interlock" between them. HPGCL is requested to accept the same.	Noted.
4	-----	-----	Emergency DG Sets & MAIN SINGLE LINE DIAGRAM	32.05.10 sh 11 of 30 & Sh 2 OF 2	-----	Power factor of Main plant DG & FGD DG shall be 0.80 Power factor of Main plant DG & FGD DG shall be 0.85	We understand that power factor of generator shall be 0.80 in line with clause no 32.05.10 iii) of Technical specification for Emergency Diesel Generator Set. Kindly confirm.	Confirmed.
5	Volume IV	Ch1/ Electrical Scope of Work	EMERGENCY POWER SYSTEM	50 of 58	1.43.03	The emergency diesel generator shall be adequately sized to cater to the following emergency loads of the unit during black out conditions: a) The instrumentation and the control system load which shall be supplied from UPS. ..... f) Emergency loads of BOP package like ETP loads etc.	It is to clarify thet ETP loads are non emergency type & are not being considered in DG sizing.However, emergency loads for BOP packages shall be considered in DG sizing as per system requirement.	Noted.
6	Volume IV	Ch1/ Electrical Scope of Work	SYSTEM PARTICULARS & DATA SHEET	14 of 60 & 22 of 22	1.08.00 & 16.51.01 1.4	DC system fault level shall be 15 KA for 1 Sec. DC system fault level shall be 25 KA for 1 Sec.	We understand fault level of DC system shall be 25 KA for 1 sec, kindly confirm.	Confirmed.
7	Volume IV	Ch1/ Electrical Scope of Work	Motor	4 of 58	1.02.16	Star Delta starters are not allowed for the complete power plant (including compressors and chillers).	Please note that for Chillers & Compressors of HVAC system we request HPGCL to accept Star Delta starters as the same is standard design for most of the vendors. Further star delta starter shall optimize the upstream Service transformer design at PMCC end.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
8	Volume IV	Ch1/ Electrical Scope of Work	SERVICE TRANSFORMER	30 of 58	1.22.04	An appropriate diversity factor with a minimum of 0.9 for continuously running loads and 0.4 for intermittent loads like cranes, plug points, sump pumps, elevator etc., shall be considered. The rating established shall take into account, load variations during the course of engineering.	We understand that diversity factor for continuous & intermittent loads as defined in the specification shall be 0.9 & 0.4 respectively, however diversity factor for actuators are not defined, hence shall be considered as 0.05 as per standard practice. Kindly confirm.	Bid specifications to be followed.
9	Volume IV	Ch1/ Electrical Scope of Work	SERVICE TRANSFORMER	30 of 58	1.22.05	15% spare margin shall be considered while calculating the total load on the L.T. board	10% spare margin shall be considered while calculating the total load on the L.T. board. Please confirm.	Clause 1.22.05 of Chapter-1 at Sheet 30 of 58 in Vol-IV be read as : "10% spare margin shall be considered while calculating the total load on the L.T. board."
10	Volume IV	Ch1/ Electrical & Ch 16: AC & DC Motors Scope of Work	MOTORS	37 of 58 & Sh 7 of 22	1.27.04 & clause no: 16.13.05	Locked rotor current of the LV motor shall not exceed 600% of full load current subject to 20% IS tolerance & LT motors, locked rotor current shall be as per IS: 12615	We understand that as mentioned in specification clause no: 16.13.05 for "AC & DC motor", the starting current of motors (IE3 for this project) shall be as per IS: 12615.	Locked rotor current of the LV motor shall be as per latest IS:12615.
11	Volume IV	Ch 13 : 415V Switchgears & DC Boards	Power Control Center (PCC)	5 OF 43	13.03.01	All PCCs except for ESP shall have duplicate incomers (only at the ends) with a bus-coupler at the centre. Distribution of outgoing feeders shall be arranged such as to ensure uniform loading on each section of the PCC	Please note that placing of incomer only at the end shall restrict the placing of Dry type transformer which shall effect the optimisation of layout drawing. Hence, HPGCL is requested to accept placing the incomer near buscoupler or other positions also.	Bid specifications to be followed.
12	Volume IV	Ch 13 : 415V Switchgears & DC Boards	Distribution Board	6 OF 43	13.03.04	ACDBs shall have isolation transformer for each incomer	Please note that for feeding loads from ACDB's isolation transformer is not required, for single phase loads being fed from ACDB's shall be through Essential supply modules which shall constitute 1 no 415/240 V transformer of suitable rating (Usually 2KVA or 5KVA), one no 3 phase MCB & no of SPN MCBs. In view of the same HPGCL is requested to accept the same.	Bid specifications to be followed.
13	Volume IV	Ch1/ Electrical Scope of Work	LOCAL PUSH BUTTON STATIONS	3 OF 4	15.03.07	All LPBs shall be of Di-cast aluminium/ FRP. LPB shall be of following types: ☐ Type-A: With Stop Push Button in FRP enclosure ☐ Type-B: With Start & Stop Push Buttons in FRP enclosure ☐ Type-C: With Forward, Reverse & Stop Push Buttons in FRP enclosure ☐ Type-D: With Stop Push Button in flame-proof enclosure ☐ Type-E: With Start & Stop Push Buttons in flame-proof enclosure ☐ Type-F: With Forward, Reverse & Stop Push Buttons in flame-proof	We understand that Die Cast aluminium is also acceptable for all type of LPBS. Please confirm.	Confirmed.
14	-----	-----	MAIN SINGLE LINE DIAGRAM	2 OF 2	-----	Raw water MCC incomer shall be from Existing PMCC.	Kindly furnish details of Existing PMCC. Also confirm , if any modification work if reqd in existing PMCC is in bidder's scope.	Following spare feeders are available at site in the existing Raw Water MCC Room (near Reservior): Existing 415V RW PMCC:- 1. 125A- 02 Nos. 2. 1000A - 1 No. 3. 630A- 1 No. EXISTING 220V DCDB:- 1. 32A- 05 No. In case any other rating is required in PMCC/DCDB, then suitable modification will be done by the bidder. Bidder shall furnish the details of modifications required.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
15	Volume IV	Ch1/ Electrical Scope of Work	LV Switchgear (415V)	2 of 58	1.02.11	Dummy panels shall be integral part of the LV Switchgear and of same size.	We understand that dummy panel shall be of same depth & height in line with PCC/PMCC/MCC/DB panel, however length of dummy panel shall be as per requirement, kindly confirm.	Confirmed.
16	Volume IV	Ch1/ Electrical Scope of Work	Electrical scope of work	35 OF 58	1.25.09	Lighting distribution board shall have 4 pole MCCB incomer & bus coupler and 4 pole MCCB with ELCB outgoing feeder.Lighting panel shall have MCB with ELCB incomer and SPN outgoing feeders.	i) 3 pole MCCB incomer and bus coupler shall be provided. ii) ELCB in outgoing of LDB and incomer of LP shall lead to spurious tripping in lighting circuit. ELCB shall not be provided.	Lighting Distribution Board shall have 4 pole MCCB incomer & bus coupler and 4 pole MCCB outgoing feeder. Lighting panel shall have TPN MCB with ELCB incomer and SPN outgoing feeders. Further, there will be no fuses in Illumination System.
17	Volume IV	Ch1/ Electrical Scope of Work	Electrical scope of work	49 of 58	1.38.08	All outdoor fixtures shall be----------Lighting mast shall be used for general area lighting. All outdoor lighting ----------in the panel.	Lighting mast shall be provided for general area lighting, however, area lighting for offsite areas like water system, tank area, unloading area, pump area (in open) shall be done through lighting poles with flood lights.	Bid specifications to be followed.
18	Volume IV	Ch1/ Electrical Scope of Work	Electrical scope of work	48 of 58	1.38.06	Necessary lighting distribution boards--------. Each MLDB shall have two incomer and one bus coupler. ---------- 415V switchgear.	MLDB in main plant area (TG hall, Boiler swgr room & ESP control room) shall have one incomer due to space constraints in these switchgear rooms. MLDB in offsite areas shall have two incomers and one bus coupler.	Bid specifications to be followed.
19	Volume IV	Ch25/ Illumination system	ILLUMINATION SYSTEM	2 of 34	25.02.01 (ii)	BEE 5 start rated LED lights (minimum 120 lumens per watt)	Chip efficacy shall be minimum 120 lumen / watt. Luminaire efficacy shall not be less than 80 lumen / watt.	Chip efficacy shall be minimum 120 lumen / watt. Luminaire efficacy shall not be less than 100 lumen / watt in line with clause 25.09.04 of Chapter 25, Vol-IV.
20	Volume IV	Ch25/ Illumination system	ILLUMINATION SYSTEM	2 of 34	25.02.01 (iii)	Lighting panels / boards : Main---------panels etc. All panels shall be provided with Energy Saving System	Energy saving system needed for Lighting panel is not clear. Details needed.	Energy saving system is not required for lighting panels.
21	Volume IV	Ch25/ Illumination system	ILLUMINATION SYSTEM	2 of 34	25.03.01	Carrying out of all detail------also consider Energy Saving System.	Energy saving system requirements are not clear. Details of Energy saving system are needed.	Energy saving system is not required.
22	Volume IV	Ch25/ Illumination system	ILLUMINATION SYSTEM	6 OF 34	25.08.08	Sub circuit loading --------- whichever is lower.	Sub circuit loading of each lighting panel shall be restricted to 2000 W or 18 (approx) number of fixtures, whichever is lower. Since fixtures used are LED wattage of fixtures is low, 10 no of fixtures per sub-circuit shall lead to non optimisation of circuits.	Noted.
23	Volume IV	Ch25/ Illumination system	ILLUMINATION SYSTEM	13 of 34		Flood light tower	We understand flood light tower is a watch tower meant for a guard siting for surveillance purpose. Please clarify.Otherwise flood lighting shall be provided along with lighting poles.	Lighting mast to be provided instead of flood light tower.
24	Volume IV	Ch25/ Illumination system	ILLUMINATION SYSTEM	15 of 34	25.09.17 (iii)	Wire size : For point beyond LP i.e from LP to JB (main run) : 10 sq.mm Aluminium stranded conductor	From LP to JB main run 2.5 sq.mm Copper wire shall be provided.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
25	Volume IV	Ch25/ Illumination system	ILLUMINATION SYSTEM	22 of 34	25.12.27 (v)	Each street lighting pole-----earthing terminal by 16 SWG GS WIRE ------grounding point.	Grounding shall be done using 14 SWG GI wire.	In Clause 25.12.27 (v), Sheet 22 of 34 in Vol-IV, '16 SWG G.S' be read as '14 SWG G.S'.
26	Volume IV	Ch25/ Illumination system	ILLUMINATION SYSTEM				Lighitng fixture DOP : Recess mounting : IP20; Indoor : IP 54 & Outdoor : IP 55. Please confirm.	Lighting Fixture DOP: Recess Mounting: IP 20; Indoor: IP 55 & Outdoor: IP 65
27	Volume IV	Ch25/ Illumination system	ILLUMINATION SYSTEM	15 of 34	25.09.16	Junction box shall be ------ IP-66.	JB shall be IP-55 for thermal power plants. Please confirm.	In Clause 25.09.16 (i), Sheet 15 of 34 in Vol-IV, 'IP-66' be read as 'IP-55'.
28	Volume V	PART-B/ CH 22	General Requirements	Sheet | 16 of 26	22.11.02.01 (2)	Central exchange shall be able to cater all the specified zones along with the ability to interconnect at least ten (10) more zones for future expansion	Please inform the numbers of additional handsets for 10 more zones to be envisaged for future expansion. As the same no. of licences to be taken care in central exchange.	60 nos additional handsets are required for future expansion.
29	Volume V	PART-B/ CH 22	General Requirements	Sheet | 18 of 26	22.13.01.02	The call stations and standalone amplifiers shall be individually IP addressable.	The call stations and standalone amplifiers shall be individually IP addressable. However, Load speakers (Horn Type, Ceiling, type) shall be analog. Please confirm.	Noted.
30	Volume V	Part B/Ch. 9–	Instrumentation & Control Cables	Sheet | 3 of 36	9.01.03.11	All type of the cables used for emergency trip push buttons, Fire alarm, detection & protection system, safety critical circuit, trip protection circuit and for other services specified elsewhere in the specification shall be fire survival cable	Please note as per CEA Guidelines cables for Bush Buttons, Fire Alarm Detection shall not be required to be fire survival. Kindly allow the same to be non- fire survival cable. However, safety critical circuits like 220V DC System cable, trip protection circuits for GRP & STRP shall be fire survival. Please accept.	In clause 9.01.03.11 of Ch-9 at Sheet 3 of 36 in Vol-V, the words "emergency trip push buttons" be read as "emergency turbine trip push buttons".
31	Volume V	Part B/Ch. 9–	Instrumentation & Control Cables	Sheet | 4 of 36	9.01.03.16 c)	Cables for binary signals used in relay based control system and Fire Protection & detection system shall be instrumentation paired cable of 1.5 Sq.mm conductor size as per cl. No. 9.02.01 mentioned below with over all shielding only	Please note cables for binary signals for relay based control system and Fire Protection & detection system shall be instrumentation paired cable of 0.5 Sq.mm conductor size as per cl. No. 9.02.02 mentioned with over all shielding only.	Bid specifications to be followed.
32	Volume V	Part B/Ch. 9–	Instrumentation & Control Cables	Sheet | 24 of 36	9.05.08	Current (4-20 mA) : 0.75 sq.mm Low voltage signals (AI/AO & DI signals)	Please note all metering (4-20 mA) LV signals (AI/AO & DI signals) shall be instrumentation paired cable of 0.5 Sq.mm conductor size as per cl. No. 9.02.02 mentioned below with individual pair shielding and over all shielding only. Cables for binary signals shall be instrumentation paired cable of 0.5 sq. mm copper conductor size as per cl. No. 9.02.02 mentioned with over all shielding only.	Bid specifications to be followed.
33	Volume IV	Ch 26:	Earthing & Lightning Protection	Sheet | 8 of 14	26.05.00	Neutral of Service transformers shall be earthed through minimum of 400 sq mm single core cable through two numbers treated earth pit and in turn shall be connected to station earth grid.	Neutral of Service transformers shall be earthed through cable for power house service transfomers & through minimum of 400 sq mm GS FLAT in other areas through two numbers treated earth pit and in turn shall be connected to station earth grid . The same is generally followed in bidder's all executed projects. Please accept the same.	Bid specifications to be followed.
HVAC								

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1	Volume II GENERAL and SCHEDULES	Chapter 5	General Technical Requirement	Sheet 11 of 86	8.6.5 (e)	All piping layouts, equipment layouts, floor plans, ducting layout (Air/flue gas, A/C, Ventilation etc.), General Arrangement drawings and RCC layout of major buildings and structural arrangement drawings shall necessarily be extracted from the aforesaid 3D model.	All effort shall be made to comply the specification. However, Auto-cad format of drg may please be accept.	Bid specifications to be followed.
2	Volume II General & Schedules	Chapter 8	FG & LD	Sheet 23 of 57	3.9.1	Unit Auxiliary Power Consumption (xli) Air conditioning and ventilation system	Since, it ia single unit of 1x800 MW, Kindly clarify the equipment and building to be considered for unit auxiliary power consumption for Air conditioning and ventialtion system. Also clarify the duty factor to be considered for Unit Auxiliary Power Consumption for Air conditioning and ventialtion system.	Clarified that HVAC shall have duty factor of one. Since it is a single unit there will be only one auxiliary power consumption covering all consumptive areas.
3	Volume II General & Schedules	Chapter 9	Mandatory Spares	Sheet 36 of 103	AIR CONDITIONING SYSTEM	Sr. No. 1: Reciprocating Chilling Machine	It is being clarified that reciprocating chiller is not used in Air conditioning system. Mandatory spares shall be provided for the items that shall be installed under scope of Airconditinoning system during detailed engineeing stage. Please review and confirm.	Please refer Chapter 9 , Clause 1.1 f) of Volume II (Sheet 1 of 103).
4	Volume II General & Schedules	Chapter 11	QAP (Mechanical)	Sheet 60 of 103	1.1.5 (b)	b) No load air run (free run) test of all types of compressors / chilling units to check FAD (Free air delivery), Noise, and Vibration & Temp. rise of bearing & body.	We understand that for Air conditioning system, FAD (Free air delivery) is not applicable for Chiller.	Noted
5	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 3 of 36	25.3.5	Lighting load shall be minimum 2 Watts per Ft^2 or actual whichever is higher	Lighting load of 2 Watts per Sq. Ft was applicable earlier days when incandesent light / tube lights were supplied for lighting. Now a days, these lights are replaced with CFL / LED and accordingly lighting load has drastically come down to 0.2 W / Sq. Thus, Lighting load of 0.2 Watts per Ft^2 or actual which ever is higher shall be considered for heat load calculations.	Bid specifications to be followed.
6	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 3 of 36	25.3.7	In air conditioning system, the return air shall be through ducts and use of plenum space for return air shall be avoided, further, for service building where various floors are air conditioned and no intermediate or intervening floor are left non air conditioned, the space above false ceiling shall be used as return air plenum	Due to ceiling height constraint, non-ducted return air to AHU/PAC room shall be provided for 8.5M UPS room PH, ESP control room, FGD control room in addition to service building. Ducted return air to AHU room shall only be provided for main CCR/CER of power house. Kindly review and accept.	Bid specifications to be followed. The issue may be discussed during detailed engineering.
7	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 4 of 36	25.3.16	Smaller areas which are away from the D-X type condensing unit/ central chilling units which may require air conditioning < 8 TR rating shall be served with Hi–Wall split/Cassette air conditioner units (5 star rating) as per requirement. For static excitation control room (if applicable) precision air conditioners of required capacity shall be provided.	Multiple non ductable Split A.C./ cassette AC may please be allowed for buildings /Control rooms having total heat load up to 10 TR for easy Operation, maintenance, fast pace of erection and less interface issues. Since static excitation panel room(if applicable) is located towards A row side of power house, customer is requested to accept dedicated Split AC/ Ductable split AC/ Air cooled Precision Package AC based on actual cooling requirement for static excitation control rooms (if applicable).	Bid specifications to be followed.
8	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 4 of 36	25.3.18	Air conditioning system for service building & administration building shall be designed with ECBC code to make it "Green Building". Mandatory requirements of ECBC to be followed for A/C equipments of service building & administration building:	We understand that administrative bldg is not in bidder scope and Service building is not a green building. kindly clarify. Accordingly all the mandatory requirement for ECBC for green bldg is not applicable like VVFD drive motor, COP of chiller, CFC/HFC free refrigerant, thermal insulation, primary and secondary chilled water system, Controls and sensors like occupancy sensors, CO2 sensors, day light sensor etc.	Confirmed.
9	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 5 of 36	25.3.20 (a)	a) For main plant areas (control room, control equipment room, UPS room and SWAS room)	SWAS room: Due to layout constraint for routing the AC duct to SWAS room, it is proposed to cater AC required for SWAS room through Chilled water type fan coil unit (FCU) with N+1 configuration, where N is nos. of working unit.	Bid specifications to be followed. The issue may be discussed during detailed engineering.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
10	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 5 of 36	25.3.20 (a)	Condensing Unit - 2 x 100%	We understand that for main plant areas of Power house, only vapor compression type Chilling Units shall be provided and no separate condensing unit is not applicable.	Noted
11	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 5 of 36	25.3.20 (a)	Air handling units (DX type) - 2 x 100%	Since, vapor compression type Chilling Units shall be provided for main plant area, Air handling units (DX type) is not applicable. only chilled water type AHU is applicable	Noted
12	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 5 of 36	25.3.20 (a)	Air handling units 2 x 100% Multiple AHUs of similar (Chilled water type) capacities per AHU room. AHU shall be variable voltage frequency driven (VVVFD).	Due to space constraint, AHU configuration shall be of N+1 configuration where N is nos. of working AHU. This AHU is applicable for main control room area which is not part of green bldg and having fixed cooling requirement. Thus, AHU shall be provided without VVFD.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
13	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 5 of 36	25.3.20 (b)	ESP Control Building . FRP cooling towers (with VVFD Fan)- 2 x 100% (if applicable) . Secondary Chilled Water Pumps (with VVFD)- 2 x 100% . Air handling units- 2 x 100% AHU shall be variable voltage frequency driven (VVVFD).	FRP cooling tower, Secondary chilled water pump, AHU: These drives are not part of green bldg and having fixed cooling requirement. Thus, these drives shall be provided without VVFD. Further no secondary chilled water pump will be applicable for ESP control room. Kindly review and confirm.	Bid specifications to be followed. Applicability of chilled water pumps shall be reviewed during detailed engineering. The drives shall be without VVFD.
14	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 5 of 36	25.3.20 (c)	c) Service Building . Screw/ Centrifugal Type Water Chilling units 2 x 100% . Condenser water pumps (with VVFD) - 2 x 100% . Primary Chilled water pumps - 2 x 100% . FRP cooling towers (with VVFD Fan)- 2 x 100% . Air handling units – No Standby - AHU shall be variable voltage frequency driven (VVVFD) . Secondary Chilled Water Pumps (with VVFD)- 2 x 100%	Since, service bldg is not a green bldg, VFD drives, primary and secondary chilled water system shall not be applicable. Moreover, Service bldg is not critical for 24x7 operation. We propose to provide 2x50% configuration system instead of 2x100%. kindly review and accept.	Bid specifications to be followed. Chilled water pumps with 100% standby as applicable to be provided. All associated instrumentations for operation of HVAC with VVFD to be provided.
15	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 6 of 36	25.3.20 (d)	d) FGD Control room . Screw/ Centrifugal Type Water Chilling units 2 x 100% . Condenser water pumps (with VVFD) - 2 x 100% . Chilled water pumps - 2 x 100% . FRP cooling towers (with VVFD Fan) - 2 x 100% . Air handling units - 2 x 100% (with VVVFD)	Cooling load requirement for FGD control room is similar to ESP control room and generally ESP control room is clubbed with FGD control room to optimize the system. Thus, type of AC system for FGD control room shall be similar to ESP control room listed under clause no. 25.3.20 (b). kindly review and accept.	Bid specifications to be followed. The issue may be discussed during detailed engineering. The drive shall be without VVFD.
16	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 6 of 36	25.3.20 (e)	e) Water Treatment Control Building . Water Cooled / Air Cooled Condensing units/ Precision Air Conditioners - 2 x 100% . Condenser water pumps - 2 x 100% (if applicable) . FRP cooling towers (with VVFD Fans)- 2 x 100% (if applicable) . Air handling units- 2 x 100% AHU shall be variable voltage frequency driven (VVVFD).	FRP cooling tower and AHU: These drives are not part of green bldg and having fixed cooling requirement. Thus, these drives shall be provided without VVFD. kindly review and confirm.	Bid specifications to be followed. However, the drive shall be without VVFD.
17	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 6 of 36	25.3.20 (f)	(f) 100% standby shall be provided for areas served by precision/ cassette/ Hi wall split type AC for all other offsite control rooms	Due to layout/space constraint wrt installation of machine, We proposed to provide configuration of N+1 where N is nos. of working machines.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
18	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 6 of 36	25.3.20 (g)	(g) Fresh air fans shall be 2 x 100% for each AHU room	As per standard practice followed in HVAC industry, 1x100% fresh air fan shall be provided. kindly review and confirm.	Bid specifications to be followed.
19	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 6 of 36	25.3.21	AHU rooms shall be provided on each floor for service building & administration building. AC Plant Room shall be located in TG building and ground floor of service building & administration building	Administration building is not applicable, kindly review and confirm.	Confirmed.
20	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 7 of 36	25.4.2	Inside Temperature shall be maximum 3 deg C below the design ambient temperature during summer for mechanically ventilated areas.	Inside Temperature shall be maximum 5 deg C above the design ambient temperature during summer for mechanically ventilated areas. kindly review and confirm.	In second bullet point of clause 25.4.2 of Ch-25 at Sheet 7 of 36 in Vol-III, the word "below" be read as "above".
21	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 7 of 36	25.4.3	Supply air fan catering for electrical areas (MCC & switchgear rooms) shall be provided with pre filters and fine filters and for other areas shall be provided with pre-filter only.	We understand that filters are not applicable for exhaust fans. Please confirm.	Bid specifications to be followed.
22	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 8 of 36	25.4.10	Air Washer Units and Unitary Air Filtration Systems shall be multiple units without any standby. . Pumps for each Air Washer Unit shall be 2 x 100% . Pumps for each Unitary air filtration system shall be 2 x 100%. . Fans for each air washer unit shall be 2x50% capacity while for unitary air filtration unit shall be 1x100% capacity.	1. Configuration of UAF shall be 1x100% or 2x50% as per capacity requirement during detailed engineering. 2. As per clause no, 32 of Volume III Mechanical Works, Ch 33: Layout Requirements Sheet 9 of 11, Ventilation requirement from A-row side of TG building, space for installation of Air washer units along with pumps shall be considered in AB bay at suitable elevation. No separate room outside A-row for locating Air Washer equipment and no trestle outside A-row for routing Ventilation duct shall be considered. 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 confirm.	Bid specifications to be followed. However, in case air washer units cannot be accomodated in TG building during detailed engineering, then separate building for air washers outside A-row shall be provided.
23	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 10 of 36	25.6.1.2	The air washer chamber casing shall be fabricated from 10 SWG black MS sheet with adequate stiffeners etc and various sections shall be bolted through gaskets to avoid leakage of water. The inside & outside of casing shall be protected by spray galvanization	The housing/casing of the Air Washer Unit shall be double skin construction. (25±2) mm thick Double Skin Panels shall be made of 0.80 mm pre-painted sheet on outer side and 0.8 mm Galvanized sheet (275 GSM) inside with 40kgs/cub mtr density, fire retardant P.U. insulation injected in between. This panel shall be screwed on to the aluminum frame work with soft rubber Gasket in between to make the joints air tight. kindly review and confirm.	Bid specifications to be followed.
24	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 12 of 36	25.6.4.6	Fans of capacity 1000 cum/hr & lower shall be propeller exhaust type	As a stand practice, fans of capacity 1200 cum/hr & lower shall be propeller exhaust type. kindly review and confirm.	Bid specifications to be followed. The issue can be discussed during detailed Engineering.
25	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 13 of 36	25.6.6 (viii)	viii. Online non- chemical type scale preventer shall be used to avoid formation of scale in the Air washer /UAF water circuit to reduce the blockage in nozzles	Since clarified water is used for makeup water. Online non- chemical type scale preventer is not required for ventilation system.	Bid specifications to be followed

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
26	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 13 of 36	25.7.1	Vapour Compression Type Machines: Type: Water cooled type (Chillers for main plant shall be with multiple compressors)	Please note that most of chiller manufacturers are not manufacturing chillers with multiple compressors for capacity less than 200TR. Thus, in case the final actual capacity of single chiller works out to be less than 200TR during detail engineering, single compressor machine may please be accepted. Please confirm.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
27	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 13&14 of 36	25.7.1	Compressor Type & Refrigerant: Compressor shall be open/ semi hermetic/ multiple hermetics in case of Screw or centrifugal type operating on R407 refrigerant complete with accessories and automatic control facilities	Refrigerant shall be environment friendly manufacturer standard. kindly review and confirm.	Noted.
28	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 15 of 36	25.7.3	Condensing Unit (Water cooled D-X Type) Refrigerant: R 407	Refrigerant shall be environment friendly manufacturer standard. kindly review and confirm.	Noted.
29	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 15 of 36	25.7.4 (a)	Air Handling Unit (AHU) Pre-filter at the suction and fine (micro-vee type) and absolute (HEPA type) filters (wherever applicable) at the discharge of each individual AHU, and heater section in the common discharge of AHUs.	Since all the AHU are connected to common plenum, fine filter and hepa filter shall be provided in common plenum for easy operation and maintenance for filters.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
30	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 15 of 36	25.7.4 (c)	Face and bypass dampers (motor operated for DX type plant) of opposed blade type shall be provided. Dampers shall be made of 16 gauge G.S sheet metal (class 275 of IS: 277). The area of the bypass	Since, cooling capacity is controlled through part load operation of compressor with slider valve/thermostatic expansion valve, Face and bypass dampers is not required in D-x type AHU.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
31	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 16 of 36	25.7.4 (f)	Air handling units/centrifugal fans shall be provided with Variable frequency drive (VFD) and velocity sensor/static pressure sensor in supply air path to adjust air flow automatically. The minimum efficiency of VFD at full load shall not be less then 96%.	Since, green building is not applicable and cooling requirement of applicable area where AHUs are being provided are fixed cooling load requirement, Hence VFD and velocity sensor/static pressure sensor is not applicable. Any variation in cooling requirement shall be controlled through 3-way mixing valve and part load operation of compressor (D-x type AHU)	AHU / Centrifugal Fans shall be provided with VFD and velocity sensor/static pressure sensor, wherever applicable.
32	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 20 of 36	25.7.9	Centrifugal Pumps Type: Horizontal Centrifugal, Axially split type casing pump	To accommodate the pump inside air washer casing and AC plant room, End suction, top discharge horizontal centrifugal pump may be accepted.	Noted.
33	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 23 of 36	25.7.13.1	Duct Fabrication & Supports	In addition to conventional duct support, wire rope support may also be accepted for supporting duct on account of speedy erection, flexibility in adjustment and good aesthetic view. Please confirm.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
34	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 25 of 36	25.7.13.3	Diffusers, Grills & Dampers The diffusers/ grills shall be extruded Aluminium of minimum 2mm thk with powder coating	Diffusers/ grills of minimum 2mm thk extruded Aluminium is not readily available in market with all the OEM. kindly accept diffusers/ grills with 1.2mm extruded Aluminium as standard thickness available in market. Kindly review and accept.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.

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35	Volume III Mechanical Works	Chapter 25	Air Conditioning & Ventilation System	Sheet 34 of 36	25.8 (d)	(d) Air Handling Unit Control of the inside room temperature and humidity shall be by controlling the chilled water flow by means of motor operated three way modulating valve and by varying the flow by means of VFD driven AHU's which shall get signal from the control system for main plant A/C system. For service building & Administrative building inside room temperature & humidity shall be controlled by varying the chilled water flow of chilled water pumps through VFD driven motor and by varying the air flow of AHU through VFD driven motor	Since, green building is not applicable and cooling requirement of applicable area where AHUs are being provided are fixed cooling load requirement. Hence VFD and velocity sensor/static pressure sensor is not applicable. Any variation in cooling requirement shall be controlled through 3-way mixing valve and part load operation of compressor (D-x type AHU)	Noted, however VFD and velocity sensor/ static pressure sensor is applicable for AHU of Service Building.
36	Volume III Mechanical Works	Chapter 33	Layout Requirements	Sheet 9 of 11	33.4	Equipment layout 32. For Ventilation requirement from A-row side of TG building, space for installation of Air washer units along with pumps shall be considered in AB bay at suitable elevation. No separate room outside A-row for locating Air Washer equipment and no trestle outside A-row for routing Ventilation duct shall be considered.	The type of Air washer unit as per specification with 2x100% pump and 2x50% fan is not suitable to meet this layout requirement. 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 confirm.	Bid specifications to be followed. However, in case air washer units cannot be accomodated in TG building during detailed engineering, then separate building for air washers outside A-row shall be provided.
37	Volume VII Tender Drawings	Tender Drawings	Flow Diagram - Chilled Water Type Air Conditioning	Sheet 54 of 120	44	Flow Diagram - Chilled Water Type Air Conditioning (Drg. No. 111-15-6201)	we understand that configuration shown in P&ID is typical, configuration of equipment shall be as per specification.	Noted.
38	Volume VII Tender Drawings	Tender Drawings	Flow Diagram - Chilled Water Type Air Conditioning	Sheet 56 of 120	46	Flow Diagram - Air Washer Unit (Drg. No. 111-15-6203)	This P&ID is not suitable for placing air washer inside TG hall. Modular type Air washer with 1x100% fan and 1x100% pump shall be provided. Pump and fan shall be placed inside the Air washer casing. kindly review and accept.	Noted, however, redundancy of fans & pumps shall be as per specifications.
COMPRESSED AIR SYSTEM								
1	Volume III Mechanical Works	Ch 23	Compressed Air System	5 of 24	23.4.6	Noise level shall not exceed 85 dBA when measured at a distance of 1.0 meter from the compressor.	Noise level of compressor shall not exceed 85 dBA plus tolerances as per applicable standards when measured at a distance of 1.0 meter from the compressor.	Bid specifications to be followed.
2	Volume III Mechanical Works	Ch 23	Compressed Air System	5 of 24	23.4.8	Compressors shall be identical oil free, rotary, dry screw type, water cooled, horizontal and multistage.	Since, the compressors are of higher capacity i.e. 53 NM3/min. minimum & there are limited suppliers for such high range capacity compressors, as most of 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. We request to accept Centrifugal compressors also as an option considering the availability and machine efficiency in this range.	Confirmed.
3	Volume III Mechanical Works	Ch 23	Compressed Air System	5 of 24	23.4.10	Total Instrument Air requirements shall be assessed by the following guidelines: Z = {(A+B)+C+D} x [1+ (mw+ml)/100]	Diversity factor for converting intermittent requriement of Instrument air into continious requriement is not specified in the specifciation. Bidder have considered dicersity factor of 0.6 inline with the diversity factor defined for Service air system.	Diversity factor for intermittent instrument air consumption shall not be less than 0.60.

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4	Volume III Mechanical Works	Ch 23	Compressed Air System	6 of 24	23.4.14	After cooler outlet air temperature shall not exceed 8ºC above the cooling water inlet temperature.	The temperature rise in cooling water circuit shall be limited to 10 deg.C as per reputed OEM design practice for Compressors. However, Bidder confirms that the Compressed Air outlet temperature shall be limited to 45 Deg. C only. Please accept.	Noted.
5	Volume III Mechanical Works	Ch 23	Compressed Air System	6 of 24	23.4.16	Each Air Receiver shall be so sized that even in the event of total stoppage of air inflow to the same, the pressure in the Air Receiver shall not fall below 5.5 kg/cm2 (g) within two minutes of such stoppage, while maintaining an out flow of air at a rate equal to the rated capacity of a single compressor, during the aforesaid period. In no case, the size of each Air Receiver shall be less than that arrived from IS: 7938.	Based on the given formula, considering minimum compressor cap. of 50 Nm3/min. as specified in specification. Air receivers capacity comes out to be approx. 45M3, which is very huge. Please note that time required by standby compressor to come into 100% full load capacity is approx. 45 seconds. Further there are Air Receviers for Standby Compressors, additional Unit air receivers & Air Receivers for DM Plant, which will add to the storage of compressed air. Hence, Bidder request to 1.) Reduce the holding time to 45 seconds 2.) The air receiver capacity shall be calculated based on the total storage, each for Instrument air and Service air, provided for the plant instead of individaul air receiver meeting the storage period. Accordingly, Bidder request to accept the air receiver capacity of 15 M3 as minimum capacity specified in the specification, for air receivers located outside Compressor House. Please accept. Also, locating of higher capacity air receivers inside TG hall is not feasible.Please confirm.	Noted, however Three (3) Air Receivers, each of 15 cu.m capacity shall be provided in line with specification.
6			Flow Diagram - Compressed Air System		111-14-6100	Unit Air Receivers for Instrument Air System located inside TG Hall	The capacity of Unit air receivers for Instrument air system is not defined in the specification. Bidder shall provide 10M3 capacity Unit air receivers for Instrument air, located inside TG Bldg. Placing higher capacity air receivers inside TG hall is not feasible. Please accept.	Noted.
7	Volume III Mechanical Works	Ch 23	Compressed Air System	7 of 24	23.4.20	The capacity of each air drying plant shall be provided to match the corresponding 1.10 times capacity of each Instrument air compressor.	There is contradiction in the mentioned two clauses. Please confirm whtther 10% margin needs to be considered in Air Dryer capacity or not.	10% margin be considered in air drier capacity.
	Volume III Mechanical Works	Ch 23	Compressed Air System	13 of 24	23.6.7.2	The capacity of air drying plant shall be equal to the capacity of the individual air compressors.		
8	Volume III Mechanical Works	Ch 23	Compressed Air System	8 of 24	23.5.1 (e)	All instruments as required including pressure switches, temperature switches, pressure gauges, temperature gauges, mass flow meters, control panels etc.	Please note that the Instruments within the Compressor Skid shall be as per reputed OEM practice. The instruments outside compressor skid shall be as per specification. Further, flow meters shall be provided as per Flow Diagram - Compressed Air System: 111-14-6100. Flow meter against individual instrument air compressor is not applicable. Please confirm.	Noted, however flow meter against each IA compressor shall be provided.
	Volume III Mechanical Works	Ch 23	Compressed Air System	9 of 24	23.5.2 (d)	All instruments as required including pressure switches, temperature switches, pressure gauges, temperature gauges, control panels		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
9	Volume III Mechanical Works	Ch 23	Compressed Air System	8 of 24	23.5.1 (g)	PLC based control panel for control and monitoring of the Compressed air system, field instruments, control cables, etc.	Bidder understands that dedicated microprocessor based, compressor skid mounted control system is to be provided for overall control & monitoring of each compressor. Further, Start / Stop control and monitoring of compressors from Plant DDCMIS shall also be provided. Common PLC panel for CAS is not applicable. Please confirm.	Bid specifications be followed as per Chapter 18, Clause 18.06.00, Part B, Volume V.
	Volume III Mechanical Works	Ch 23	Compressed Air System	9 of 24	23.5.2 (f)	PLC based control panel for control and monitoring of the Compressed air system, field instruments, control cables, etc.		
10	Volume III Mechanical Works	Ch 23	Compressed Air System	12 of 24	23.6.7	Air Drying Plants	Specification calls for HOC type air dryer, however specification for Twin tower type air dryer is provided. Bidder understands that HOC – Rotary drum type air dryer is also acceptable. Please confirm.	Noted.
11	Volume III Mechanical Works	Ch 23	Compressed Air System	17 of 24	2.8	Number of starts per hour : 8 (equally spreaded)	Since the motors are HT motors for Compressed air system, the no. starts shall be limited to 2 hot start per hour & 3 cold start per hour. Please confirm.	Bid specifications be followed as per Chapter 7, Clause 16.13.00, Volume IV.
12	Volume III Mechanical Works	Ch 23	Compressed Air System	18 of 24	3.0	Material of Construction for Compressor	Please note that Material of Construction (MOC) with in the compressor skid shall be as per OEM practice. However the MOC outside Compressor skid shall be as per specification. We request you to accept the same.	Noted.
13	Volume III Mechanical Works	Ch 23	Compressed Air System	11 of 24	23.6.5	The design pressure and temperature shall be minimum 10 kg/cm2 (g) and 500 C respectively.	There is an ambiguity in the two clauses specified. Bidder have considered Air Receiver Design pressure as 1.2 times of Working pressure and Hydro test pressure as 1.5 times of Working pressure. Please confirm.	Specifications be followed as per Clause 7.2.4 Sheet 20 of Volume III.
	Volume III Mechanical Works	Ch 23	Compressed Air System	20 of 24	3.0	AIR RECEIVER Design pressure / Temperature: Minimum 1.5 times compressor discharge pressure (or 12.75 kg/cm2(g) minimum) / 80 Deg C (minimum)		
14	Volume III Mechanical Works	Ch 23	Compressed Air System	22 of 24	7.3.5	Piping, Valves and Fittings for Compressed Air System	The MOC of pipes for Service air application is not specified in the main Compressed Air System specification. Bidder have considered IS 1239 heavy galvanized/IS 3589 Gr 410 Galvanized pipes for Service air inline with Clause no. 27.4.5 (4) of Chapter 27. Please confirm.	Clarified that plant air is service air.
	Volume III Mechanical Works	Ch 27	Low Pressure Piping, Valves & Specialities	6 of 31	27.4.5 (4)	Instrument air & plant air. ASTM A-53 type E Gr. B galvanized /IS 1239 heavy galvanized/IS 3589 Gr 410 Galvanized to SI-4736 or equivalent.		
15	Volume III Mechanical Works	Ch 23	Compressed Air System	22 of 24	7.3.5 (b)	Pipes for Instrument air line & interconnecting air line: ASTM A 312 Gr 304 thickness as per Schedule 20S as per ANSI B16.9	There is an ambiguity in the two clauses specified for MOC of Instrument air pipes. Bidder have considered IS 1239 heavy galvanized/IS 3589 Gr 410 Galvanized pipes for Instrument air inline with Clause no. 27.4.5 (4) of Chapter 27. Please confirm.	Follow Chapter 27, Clause 27.4.5, of Volume III.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
13	Volume III Mechanical Works	Ch 27	Low Pressure Piping, Valves & Specialities	6 of 31	27.4.5 (4)	Instrument air & plant air. ASTM A-53 type E Gr. B galvanized /IS 1239 heavy galvanized/IS 3589 Gr 410 Galvanized to SI-4736 or equivalent.		
14	Volume III Mechanical Works	Ch 23	Compressed Air System	22 of 24	7.3.5	Piping, Valves and Fittings for Compressed Air System :	The MOC of Valves for Instrument air and Service air application is not specified in the main Compressed Air System specification. Bidder have considered 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, both for Instrument air and Service air application, inline with Clause no.27.15.2 of Chapter 27. Pl. confirm.	Follow Chapter 27, Clause 27.15.2, Volume III.
	Volume III Mechanical Works	Ch 27	Low Pressure Piping, Valves & Specialities	17 of 31	27.15.2	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.		
15	Volume V Instrumentation & Control Works	-	Part B/Ch 18: Control Philosophies for BOP Packages	31 of 34	18.06.00	Main plant DDCMIS shall have redundant interfacing (not in daisy serial link) with each individual compressor's microprocessor based control system, and HW signals required for command, status, local/remote operation, interlock & protection of complete compressor package.	Redundant interface with OEM specific Microprocessor panel within the compressor skid is not available with all the leading compressor suppliers. Bidder shall provide non-redundant interface with DCS panel. Please confirm.	Bid specifications to be followed.
16	Volume V Instrumentation & Control Works	-	Part B/Ch 18: Control Philosophies for BOP Packages	31 of 34	18.06.00	Each Compressor's Winding temp RTD signals, Bearing temp RTD signals and VMS signals shall be hardwired to Microprocessor based control System and main plant DDCMIS directly from field/VMS panel.	VMS signal shall be hardwired to DCS panel and not to Microprocessor based Compressor panel, as the compressor microprocessor panels are OEM standard. Please confirm.	Noted.
FIRE TENDER								
1	Volume I Conditions of Contract : Commercial & General	Section – III	BDS	44 of 60	6.0 C(4)	Milestone Schedule for Balance of Plant (BOP) Systems Fire Detection & Protection System, Fire tender and Fire Station Equipment	Specification of Fire Tender is not available in the Tender documents. Please confirm the bidder's scope for Fire tender package.	Fire Tender is not envisaged.
2	Volume I Conditions of Contract : Commercial & General	Section – III	BDS	45 of 60	6.0 C(4)	Milestone Schedule for Balance of Plant (BOP) Systems Fire Detection & Protection System, Fire tender and Fire Station Equipment	If supply of fire tender is in bidder's scope, please confirm the requirement of registration of fire tenders. In that case, bidder shall provide temporary registration while permanent registration of the fire tenders shall be in customer's scope. Please confirm.	
3	Volume I Conditions of Contract : Commercial & General	Section – III	BDS	46 of 60	6.0 C(4)	Milestone Schedule for Balance of Plant (BOP) Systems Fire Detection & Protection System, Fire tender and Fire Station Equipment	If supply of fire tender is in bidder's scope, Please confirm the scope of insurance for the fire tenders. Further, bidder understands insurance of fire tenders (except transit insurance while on way from manufacturer's works to project site and first year insurance) shall be in customer's scope. Please confirm.	
4	Volume I Conditions of Contract : Commercial & General	Section – III	BDS	47 of 60	6.0 C(4)	Milestone Schedule for Balance of Plant (BOP) Systems Fire Detection & Protection System, Fire tender and Fire Station Equipment	If supply of fire tender is in bidder's scope, Customer to inform the schedule of supply & handover of fire tenders at Site.	

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
5	Volume VI Civil, Structural & Architectural Works	Ch 17	Architectural Works	21 of 21		TABLE 1 : FINISHING SCHEDULE Fire Station Building	1. Please confirm whether the Fire Station Building is in bidder scope. 2. If yes, please confirm the provision for the number of fire tender is to be considered for designing fire station buiing.	
D/G EOT CRANES								
1	III	28	CRANES AND HOISTS	2 of 13	28.1.3	Air compressor room (Double girder Overhead EOT crane).	The capacity of crane in compressor room is in the range of 5 to 8 T for which single girder crane is sufficient and adequate. Also as per general practice in industry (including NTPC) single girder EOT crane is employed in compressor house.	Noted.
2	III	28	CRANES AND HOISTS	2 of 13	28.2.1	The crane shall be capable of lifting at least 125% of the weight of single heaviest component/ equipment to be handled in TG hall for erection as well as maintenance of the equipment provided in AB bay.	Each crane shall be capable of lifting at least 105% of the weight of single heaviest component / equipment, including lifting beam and slings etc. to be handled in turbine hall for erection as well as maintenance of the equipment provided in AB bay excluding generator stator. Since handling of heaviest equipment in TG hall is a one time activitiy only, it is not desirable to build in extra margins in whole civil structure of TG hall for this one time activity.	Two (2) electrically operated overhead travelling (EOT) crane with associated auxiliaries, along with electrical equipment, control & instrumentation as required and specified shall be provided in the turbine hall for erection and maintenance of turbo generators and their auxiliaries. The crane shall be capable of lifting at least 125% of the weight of single heaviest component / equipment to be handled in TG hall (except for generator stator) for erection as well as maintenance of the equipment provided in AB bay. Generator stator during erection and maintenance shall be handled with the help of Strand Jack arrangement by the bidder. Each crane shall also be provided with associated lugs, slings and lifting beam. The capacity of the Auxillary hook shall be minimum 25% of the Main Hook capacity.
3	III	28	CRANES AND HOISTS	2 of 13	28.2.2	Auxiliary Hook of 5 T shall be provided in the crane for handling BFP.	The auxiliary hook requirement for BFP/CWPH handling is redundant as the main hook can cater the handling requirement of all component of BFP/CWPH. Hence this requirement may please be deleted	Clarification noted for BFP EOT only.
4	III	28	CRANES AND HOISTS	2 of 13	28.2.3	The CW pumphouse EOT crane shall be provided with an auxiliary hook of 5T capacity		Bid specifications to be followed for CW pump house EOT.
5	III	28	CRANES AND HOISTS	2 of 13	28.2.12	The EOT cranes shall be designed to operate with 125% of rated load without any permanent deformation.	The EOT cranes shall be designed to operate at 100% of rated load. However overload test shall be carried out at 125% of rated load as per procedure mentioned in IS:3177 without any permanent deformation.Please confirm the same	Noted.
6	III	28	CRANES AND HOISTS	2 of 13	28.4.13	The factor of safety for the rope shall not be less than six (6)	EOT crane and its component like rope etc. shall be designed as per IS 3177:2020, accordingly factor of safety shall be 4.5 for M5 mechanism class of crane in line with code. Please confirm the same	Noted, however latest version of IS 3177 be followed for design.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
7	III	28	CRANES AND HOISTS	2 of 13	28.6.2.3	Motor ratings shall be 25% (at least) over the maximum power requirement. The hoist motors shall be rated to lift 125% of the design load at rated speed.	Motor ratings shall be 10% over the maximum power requirement. Please accept the same. Additional margin is not required as for crane motor sizing additonal factors viz. cyclic duty factor, service factor etc. are already considered for arriving at BKW of the motor. 10% margin over and above that is adequate to take care of any wear losses.	Continuous motor rating shall be arrived at considering 15% margin over the duty point input or 10% over the maximum demand of the driven equipment, whichever is higher, considering highest system frequency and voltage variation.
S/G CRANES & HOISTS								
1	Volume III	Ch 1	Steam Generator & Auxiliaries	27 of 186	1.26 (C)	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.	For items weighing 500 kg and above, hoists and trolleys along with monorails shall be provided throughout the plant where crane cannot be utilized. For items weighing less than 2000 kg, manual hoists can be provided. For items weighing 2000 kg and more, electric hoists (lift & travel) shall be provided. In case the lifting height is more than 10m, electric hoist (lift & travel) shall be provided irrespective of the weight. All hoists shall be provided with trolleys. For handling requirement of items below 500 kg, min. eight(8) nos. loose type manual hoist (i.e. chain pulley blocks without trolley) of 1 T capacity shall be supplied in addition to the dedicated hoists with trolley/runway beam etc. required in the respective areas and /or as mentioned in specification.	
2	Volume III	Ch 28	Cranes & Hoists	3 of 13	28.2.13	For items weighing 300 kg and above, hoists and trolleys along with monorails shall be provided throughout the plant where crane cannot be utilized. For items weighing less than 1000 kg, manual hoists can be provided. For items weighing 1000 kg and more, electric hoists (lift & travel) shall be provided. In case the lifting height is more than 10m, electric hoist (lift & travel) shall be provided irrespective of the weight. All hoists shall be provided with trolleys. For handling requirement of items below 300 kg, min. eight (8) nos. loose type manual hoist (i.e. chain pulley blocks without trolley) of 1 T capacity shall be supplied in addition to the dedicated hoists with trolley/runway beam etc. required in the respective areas and /or as mentioned in specification.		Noted. For hoists follow Chapter 28, Clause 28.2.13 of Volume III.
3	Volume III	Ch 28	Cranes & Hoists	3 of 13	28.2.12	The EOT cranes shall be designed to operate with 125% of rated load without any permanent deformation.	The EOT cranes shall be designed to operate at 100% of rated load. However overload test shall be carried out at 125% of rated load as per procedure mentioned in IS:3177 without any permanent deformation.	Noted.
4	Volume III	Ch 28	Cranes & Hoists	3 of 13	28.2.3	The rated capacity of all the other cranes shall be 25% over and above the heaviest component/ equipment to be handled including slings.	The rated capacity of all single girder cranes shall be 10% over and above the heaviest component/ equipment to be handled including slings.	Bid specifications to be followed.
5	Volume III	Ch 28	Cranes & Hoists	9 of 13	28.6.2.3	Motor ratings shall be 25% (at least) over the maximum power requirement. The hoist motors shall be rated to lift 125% of the design load at rated speed.	Motor ratings shall be 15% (at least) over the maximum power requirement as per prevalent practice of crane industry.	Continuous motor rating shall be arrived at considering 15% margin over the duty point input or 10% over the maximum demand of the driven equipment, whichever is higher, considering highest system frequency and voltage variation.
6	Volume III	Ch 28	Cranes & Hoists	9 of 13	28.6.2.4	Motors shall suit the duty class S4, cyclic duration factor 60% and 300 starts per hour	Motors shall suit the duty class S4, cyclic duration factor 40% and 150 starts per hour as per IS:3177.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
7	Volume III	Ch 28	Cranes & Hoists	10 of 13	28.6.3 (iv)	VVVF system shall be capable of generating suitable starting torque (upto 400% typical)	VVVF system capable of generating suitable starting torque (upto 200% typical) should be allowed as per prevalent practice of crane industry.	Noted.
8	Volume III	Ch 28	Cranes & Hoists	9 of 13	28.6.2.8	The rating of VVF shall be decided considering 250% of full load current of respective drive motor based on in panel rating with derated at 50 Deg C ambient temperature.	The rating of VVF shall be decided considering 150% of full load current of respective drive motor based on in panel rating with derated at 50 Deg C ambient temperature as per prevalent practice of crane industry.	Noted.
9	Volume III	Ch 28	Cranes & Hoists	4 of 13	28.2.13	All hoists shall be provided with trolleys.	Due to layout and headroom constraint it is not feasible to provide trolleys, access ladder along with suitable platform for the maintenance of all hoist and trolleys.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
10	Volume III	Ch 1	Steam Generator & Auxiliaries	27 of 186	1.26 (C)	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.	Due to layout and headroom constraint it is not feasible to provide trolleys, access ladder along with suitable platform for the maintenance of all hoist and trolleys.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
ELEVATORS								
1	Volume III	Ch 29	Elevators	6 of 15	29.10	Emergency safety devices: The lift shall be provided with safety devices attached to the lift car frame and placed beneath the car. The safety device shall be capable of stopping and sustaining the lift car up at the governor tripping speed with full rated load in car.	Please note that safety governor are installed on sides of car which come in operation during free fall of elevator or during speeds are higher than tripping speeds. During above mentioned situations safety governor gradually hold the guiderail and bring the elevator in complete rest. However, there is no safety arrangement placed beneath the car. Customer may please review the requirement and confirm.	Noted.
2	Volume III	Ch 29	Elevators	7 of 15	29.11.1	Bidder shall provide emergency indicator to indicate the location of elevator in case of elevator being stuck up between the floors through automatic flashers (both audio and visual).	There are two condition which are envisaged for stuck up of elevator: 1) If the elevator is stuck between floors in power condition, the floor indicator will be visible with a message –"Out of Service" 2) If the elevator is stuck between floors in Power-off condition, the floor indicator will not be available. Once power is restored the lift moves to the nearest landing & the indicator will get updated. We have checked with reputed / regular elevator supplier that in said scenario i.e. in stuck-up condition positioning of elevator cannot be indicated in either of above condition. Kindly furnish acceptance.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	Volume II	Ch 9	Mandatory Spares	41 & 42 of 103	A & B	Mandatory Spares for Elevators for TG Building, Service Building, Gypsum dewatering building, ESP Control Room & Any other building/control room/ MCC room apart from the elevators listed above and having more than two floors (>G+2), if applicable	1. As per tender specification, for both TG building and Service Building, 1088 kg passenger elevators have to be considered. Accordingly we propose one (01) common set of applicable list of spares (as applicable) as per Sl. no. (B) mentioned at Page no-42 of 103, Ch 9 : Mandatory Spares, Vol-II, General & Schedules. 2. As per tender specification One (1) no. 1088 kg passenger cum goods elevator for Gypsum dewatering building has to be considered. Accordingly, we propose one (01) set of applicable list of spares (as applicable) as per Sl. no. (A) mentioned at Page no-41 of 103, Ch 9 : Mandatory Spares, Vol-II, General & Schedules. 3. As per tender specification One (1) no. 884 kg passenger elevator for ESP Control Room has to be considered. Accordingly, we propose one (01) set of applicable list of spares (as applicable) as per Sl. no. (B) mentioned at Page no-42 of 103, Ch 9 : Mandatory Spares, Vol-II, General & Schedules. 4. As per tender specification for any other building/control room/ MCC room apart from the elevators listed above and having more than two floors (>G+2) has to be provided with 680 kg passenger elevator (if applicable). Accordingly, in case any elevator is provided, we shall provide one (01) common set of applicable list of spares (as applicable) as per Sl. no. (B) mentioned at Page no-42 of 103, Ch 9 : Mandatory Spares, Vol-II, General & Schedules. Kindly furnish acceptance.	Bid specifications to be followed.
CHEMICAL DOSING SYSTEM								
1	Volume III Mechanical Works	Ch 2: Turbine Generator & Auxiliaries / SECTION – 3 LP CHEMICAL DOSING SYSTEM	ALL VOLATILE TREATMENT (AVT)	79 of 87	1.3.1	Under AVT, ammonia and hydrazine shall be dosed in the feed water at suction lines to the boiler feed pumps as well as at the condensate pumps discharge after the condensate polishing unit. Ammonia shall be used as pH control agent and hydrazine as oxygen scavenger for AVT, Bidder shall include in his scope all necessary hardware including storage tanks, measuring tanks, mixing arrangement, However, generally all the tanks, oxygen cylinders, dosing facilities shall have redundancy of 100%. However minimum details for AVT are given below:	Bidder understands that 1 no. Hydrazine and 1 no. Ammonia dosing skid required for station. Hydrazine and Ammonia dosing skid shall be common for both dosing locations i.e. in feed water at suction lines to the boiler & at the condensate pumps discharge after the condensate polishing unit. To meet this requirement, 2-separate dosing lines shall be provided from each (ammonia & hydrazine) dosing skid.	Noted.
ETP/ZLD								
1	III	CH11	Effluent Treatment Plant / Sources of waste	3 of 23	11.2.2	Four (4) (3W+1S) Trolley mounted screw pumps to transfer waste to Common Oily waste Sump.	There is contradiction in scope of both statements. Kindly clarify.	2 nos. turbine area oily waste transfer pumps shall be provided.
	III	CH11	Effluent Treatment Plant/Datasheets	9 of 23	1.02.01	i) Turbine Area Oily Waste Transfer Pumps Quantity required - 1 nos.		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	III	CH11	Effluent Treatment Plant / Sources of waste	3 of 23	11.2.3	Two (2) Common Oily waste transfer pumps each complete with electrical drive motors.	There is contradiction in scope of both statements. Kindly clarify.	2 nos. Switch Yard Area oily waste transfer pumps shall be provided.
	III	CH11	Effluent Treatment Plant/Datasheets	11 of 23	1.04.02	i) Switch Yard Area Oily Waste Transfer Pumps Quantity required - 1nos.		
3	III	CH11	Effluent Treatment Plant / Sources of waste	4 of 23	11.2.6	Two (2) Boiler waste transfer pumps complete with electrical drive motors.	There is contradiction in scope of both statements. Kindly clarify.	2 nos. Boiler Area oily waste transfer pumps shall be provided.
	III	CH11	Effluent Treatment Plant/Datasheets	10 of 23	1.03.01	i) Boiler Area Oily Waste Transfer Pumps Quantity required - 1nos.		
4	III	CH11	Effluent Treatment Plant / Datasheets	20 of 23	13.01.08	Average Life of UF Membrane: 5 years	Five (5) years Guarantee Life of Ultrafiltration membranes is on higher side. Bidder suggest that the guaranteed life of UF membranes shall be as per membrane supplier recommendations up to maximum possible.	Bid specifications to be followed.
5	III	CH11	Effluent Treatment Plant / Datasheets	22 of 23	20.01.04	RO Membrane life: 3 years	Three (3) years Guarantee Life of RO membranes is on higher side. Bidder suggest that the guaranteed life of R0 membranes shall be as per membrane supplier recommendations up to maximum possible.	Bid specifications to be followed.
6	III	CH11	Effluent Treatment Plant / Datasheets	22 of 23	19.01.08	High Pressure Pumps efflciency : 80% (min.)	80% efficiency of High Pressure Pumps is on higher side. Bidder suggest that the efficiency of High Pressure Pumps shall be as per pumps supplier recommendations up to maximum possible.	Bid specifications to be followed.
7	III	CH11	Effluent Treatment Plant / Datasheets	20 of 23	13.01.03	Permeate Flow rate : 160 m3/hr	Bidder suggest that Capacity of complete system of ETP RO system shall be selected based upon actual water balance diagram finalized during detailed engineering.	Noted, may be finalized during detailed engineering.
8	III	CH11	Effluent Treatment Plant / Datasheets	22 of 23	20.01.06	Permeate capacity/stream : 100m3/hr		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
9	III	CH11	Effluent Treatment Plant / Datasheets	4 of 23	11.2.7	Rainfall cum normal run off from coal piles shall be collected by a drainage system around the coal pile and led by gravity to a coal particle settling basin. The settling basin shall have two chambers one operating and one standby. Each chamber shall be sized to treat maximum rainfall water run off from the coal pile. The rain intensity for one (1) hour peak rainfall shall be considered. Decanted water shall be collected in decanted water sump and thereafter pumped to CMB.	Nature of Ash handling system, FGD waste water, CHP run off water is having ash/coal waste hence it is not recommended to mix these ash/coal laden waste with fresh/clarified water since fresh/clarified is being used as service water/FGD make/CT makeup/HVAC make up/ DG SET/Solar Panel Cleaning/ Power House & other plant building. Hence, customer to suggest the separate treatment and disposal philosophy for coal/ash laden waste water.	Ash laden water shall be pumped to ash clarifier in line with Clause 21.13, Chapter 21 of Volume III. Treated water shall be routed to ash water sump/tank. Clarifier sludge shall be pumped to ash slurry sump. For other services, follow respective chapters of Volume III.
	III	CH30	Flue Gas Desulphurisation System	5 of 93	1.1 (6)	The gypsum from absorber shall be pumped by dedicated gypsum bleed pumps to a Gypsum Dewatering system through primary hydro-cyclone feed water tank consisting of dual streams (in series) of primary and secondary dewatering equipments. The overflow water/slurry removed from the absorber to Absorber sump and other drains shall be recycled to the absorbers. The waste water from the system shall be discharged to effluent treatment plant as specified elsewhere in the specification.		
	III	CH21	Ash Handling System	8 of 21	21.10.6 Pollution Considerations	Liquid Effluent: For liquid effluent generated in the Ash Handling Plant, the provisions of MINAS (Minimum National Standard)-COINDS/21/ 1986 shall be followed before discharging water to the recipient environment. In case there is any specific requirement of the state pollution authorities over & above MINAS stipulations, the same shall be taken care of in the Effluent Treatment Plant.		
10	III	CH11	Effluent Treatment Plant / Datasheets	22 of 23	22.01.02	Dessaged Water Storage tank capacity: 300 m3	There is contradiction in capacity of Dessaged Water Storage tank as in the Tender P&ID of ETP capacity of same is mentioned 600m3. Kindly clarify.	Clarified that capacity of Dessaged Water Storage tank shall be 300 cu.m
CHIMNEY								
1	III-Mechanical	29	Elevators	2 of 15	29.2.1.1	Elevator shall be located inside the RCC stack and shall be capable of operating from the ground floor to the top interior platform with intermediate stops at all interior platforms.	Bidder understands that the elevator shall be capable of operating from ground floor to the last platform below roof platform. Kindly confirm	Confirmed
2	III-Mechanical	29	Elevators	3 of 15	29.2.1.4.1 vi.	Total vertical travel (M) : 275	The mentioned clauses are contractictory regarding the height of RCC chimney. Kindly confirm the height of chimney to be considered.	Chimney height shall be minimum 150 M or as per the formula specified, whichever is higher.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	VI- Civil, Structural & Architectural Works	2	Scope of Work	2 of 7	2.6	9. RCC chimney height shall be calculated as guidelines indicated below (Whichever is higher) with single flue including corrosion protective lining on steel flue, elevator, electrical works, aviation lights etc. H=14Q0.3 (where Q is SO2 emission rate in kg/hour) OR H=74Q0.27 (where Q is PM emission rate in Ton/hour) OR Minimum 150 M height.		
4	VI- Civil, Structural & Architectural Works	3	Instruction to BidderS	1 of 5	3.1.5	Size, concrete grade and other design parameters and construction details etc. for 275m high RCC chimney with steel single flue.		
5	VI- Civil, Structural & Architectural Works	1	Codes & Standards	9 of 12	1.14 a	IS-4998 : Criteria for design of R.C. Chimneys (all parts)	Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Confirmed
6	VI- Civil, Structural & Architectural Works	3	Instruction to BidderS	3 of 5	3.2.3	Proof checking of structural design of following structures shall be got from SERC Chennai or IIT Roorkee by the Contractor at his own cost.	Design of Chimney is a specialised work and the bidder has an expertise in the same and the design is already been verified through Wind tunnel test. Hence proof checking of structural design of chimney is not require. Kindly confirm. Incase proof checking is to be done, it shall be done from any reputed institute.	Proof checking of structural design of following structures shall be got from SERC Chennai/IIT Roorkee/IIT Kanpur by the Contractor at his own cost.
7	VI- Civil, Structural & Architectural Works	3	Instruction to BidderS	3 of 5	3.2.3(b)	Chimney profile laser testing and Non Destructive testing of Concrete Wind Shell.	As per bidder's standard practice, these tests for chimney are not required. Kindly confirm	Bid specifications to be followed.
8	VI- Civil, Structural & Architectural Works	3	Instruction to BidderS	3 of 5	3.2.3	All the cost of wind tunnel test including travelling expenses to be borne by contractor.	Bidder understands that the travelling expenses of customer/consulant are not under bidder's scope. Kindly confirm	Shall be in Bidder's scope
9	VI- Civil, Structural & Architectural Works	4	Submissions	2 of 4	23	All design and drawings for RCC single flue chimney. Contractor shall submit all design calculation in Excel/Editable format in addition to PDF copy. In case Chimney has been designed using In-House programme/Software, same shall also be submitted in editable format for review/verification purpose.	Chimney shall be designed using inhouse developed programme which are proprietary of the company and cannot be shared as per company policy. Design document in PDF format shall be provided for review/approval. Kindly confirm	Bid specifications to be followed.
10	VI- Civil, Structural & Architectural Works	5	Geo Technical Investigation	1 of 7	5.2	As per the attached geotechnical report, It is advised to provide Pile foundation for …… chimney foundation,……..	Bidder proposes to follow the foundation type of chimney based on the approved geotechnical report during detailed engineering. Kindly confirm	Bid specifications to be followed.
11	VI- Civil, Structural & Architectural Works	12	RCC Chimney	1 of 38	12.2	b) IS:4998 : Criteria for design of reinforced concrete chimneys – Part 1 Design Criteria -1975 c) IS:4998 : Criteria for design of reinforced concrete Part 1 Assessment of loads - 1992	The codes mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Noted.

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12	VI- Civil, Structural & Architectural Works	12	RCC Chimney	4 of 38	12.3.4	The temperature gradient ΔT across the shell thickness of windshield shall be calculated as per IS: 4998 (Part-I) – 1975 but subject to a minimum of 200C. Temperature stresses will be calculated according to the procedures given in ACI-307 and IS: 4998.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Follow Tender Specification with Latest Codes
13	VI- Civil, Structural & Architectural Works	12	RCC Chimney	4 of 38	12.3.6	Wind load calculation will be done as per IS:4998 (Part-1) and IS:875 (Part-3) Dynamic analysis will be carried out and stability ensured under such condition.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Follow Tender Specification with Latest Codes
14	VI- Civil, Structural & Architectural Works	12	RCC Chimney	5 of 38	12.3.7	The "gust factor" will be calculated according to the method given in IS:4998 (Part-I) – 1992. Dynamic modulus of Elasticity of concrete as recommended in IS:4998 (Part-1) – 1992 will be used for calculating the natural frequencies of the chimney.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Follow Tender Specification with Latest Codes
15	VI- Civil, Structural & Architectural Works	12	RCC Chimney	5 of 38	12.3.7	Along wind response of chimney shall be calculated both by gust factor method in A-5.1 and simplified method in A-4.1 of IS:4998 Part-1, 1992. For design, higher of the along wind loads shall be used.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Follow Tender Specification with Latest Codes
16	VI- Civil, Structural & Architectural Works	12	RCC Chimney	5 of 38	12.3.8	The across wind response of the Chimney will be evaluated as per IS:4998 (Part-1)/ACI307-98.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Follow Tender Specification with Latest Codes
17	VI- Civil, Structural & Architectural Works	12	RCC Chimney	5 of 38	12.3.9	The circumferential ring moment due to wind will be calculated in accordance with clause 5.4 of IS:4998 (Part-I) – 1992. The wind induced stresses in concrete and steel shall be calculated in accordance with Cl. No. D-2.2.7, D-2.2.8 and D-2.2.9 of IS:4998 (Part-I) – 1975.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Follow Tender Specification with Latest Codes
18	VI- Civil, Structural & Architectural Works	12	RCC Chimney	5 of 38	12.3.10	The concrete shell shall be designed as per working stress method as per following load combinations.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Confirmed.
19	VI- Civil, Structural & Architectural Works	12	RCC Chimney	6 of 38	12.3.10.5	The dynamic modulus or elasticity of concrete for various concrete grades shall be taken as lower values in the range of values specified in IS:4998 (Part-I) – 1992.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Follow IS 4998:2015
20	VI- Civil, Structural & Architectural Works	12	RCC Chimney	6 of 38	12.3.10.8	The clear cover to reinforcement shall be 50mm & 75mm for foundation/pile cap.	Bidder proposes to provide clear cover to reinforcement of 50mm for side and top face and 75mm for bottom of foundation. Kindly confirm.	Bid specifications to be followed.
21	VI- Civil, Structural & Architectural Works	12	RCC Chimney	7 of 38	12.3.10.9	The maximum width of opening shall be limited to an angle of not more than 30^0 subtended at the centre of the concrete shell.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
22	VI- Civil, Structural & Architectural Works	12	RCC Chimney	7 of 38	12.3.10.9	The total plan area of the openings at a particular section shall not be more than 15% of the plan area of concrete shell at that location.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Bid specifications to be followed.
23	VI- Civil, Structural & Architectural Works	12	RCC Chimney	7 of 38	12.3.10.9	The opening size for the purpose of stress calculations shall be taken as 1.1 times the actual width of the opening.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Bid specifications to be followed.
24	VI- Civil, Structural & Architectural Works	12	RCC Chimney	7 of 38	12.3.10.9	The extra reinforcement around opening shall satisfy the requirements given in the following documents and the highest shall be provided. a) IS:4998 (Part-I) …….. k) 25% extra reinforcement over and above the area of reinforcement around openings calculated as above shall be provided. Minimum half the number of extra horizontal bars in shell around the opening to continue for complete circle all-round for both faces and both sides.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Bid specifications to be followed.
25	VI- Civil, Structural & Architectural Works	12	RCC Chimney	8 of 38	12.3.10.10	If the circumferential tensile stress in concrete due to wind induced ring moment exceeds the value specified in clause 7.1.1 (g) of IS:4998-Part I, additional reinforcement shall be provided in two layers limiting the stress in reinforcement steel to value specified in clause 7.1.2(g) of IS 4998 Part I.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Bid specifications to be followed.
26	VI- Civil, Structural & Architectural Works	12	RCC Chimney	8 of 38	12.3.10.13	The number and size of the inlet openings in the shell shall have a total area of not less than two third of the area of the minimum air gap at top of chimney.	The criteria mentioned for inlet openings is not clear. Please clarify.	Bid specifications to be followed , however, the issue may be discussed during detailed engineering.
27	VI- Civil, Structural & Architectural Works	12	RCC Chimney	9 of 38	12.3.11	The stress in concrete and steel reinforcement shall not exceed the limits given CL-7.0 of IS:4998(Part-1)-1975 for various load combinations, excepting the stress in concrete for the case of dead load + wind load which shall not exceed 0.25Fck. The stress in concrete at the junction of shell and foundation will be limited to 0.28Fck where Fck is the characteristic compressive strength of the weaker concrete between shell and foundation.	The design criterias mentioned are obsolete and have been superseeded with the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm	Bid specifications to be followed.
28	VI- Civil, Structural & Architectural Works	12	RCC Chimney	10 of 38	12.4	Duly considering the need to support the main girder supporting the steel flue without causing eccentric loading to the wind shield the minimum thickness of wind shield, shall be kept as 400mm at top.	The mentioned clauses are contractictory regarding minimum thickness of shell. Bidder proposes to provide the thickness of the shell based on the design following the latest code IS-4998:2015. Kindly confirm	Minimum thickness of shell shall be 500mm.
29	VI- Civil, Structural & Architectural Works	12	RCC Chimney	6 of 38	12.3.10.2	Minimum thickness of the shell at top shall be 500mm & at junction of shell & pile cap shall be 950mm.		

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30	VI- Civil, Structural & Architectural Works	12	RCC Chimney	10 of 38	12.4	Minimum thickness of roof slab shall be 250mm laid to slope towards rain water outlets.	Bidder proposes to provide roof slab concrete thickness as per design following a minimum concrete thickness of 200mm and waterproofing above as per specification. Kindly confirm.	Bid specifications to be followed.
31	VI- Civil, Structural & Architectural Works	12	RCC Chimney	10 of 38	12.5.1	The liners shall be provided with externally wrapped thermal insulation.	If inside surface of flue is lined with borosilicate, additional insulation outside flue is not recommended from the point of view of the performance of borosilicate glass block system. Kindly confirm.	Noted.
32	VI- Civil, Structural & Architectural Works	12	RCC Chimney	10 of 38	12.5.1	The liner shall be of corrosion resistant steel type "COR-TEN B" of minimum 10 mm thick.	Please provide standard/code to be followed for "COR-TEN B" material.	Bid specifications to be followed , however, the issue may be discussed during detailed engineering.
33	VI- Civil, Structural & Architectural Works	12	RCC Chimney	10 of 38	12.5.1	Stainless steel liner shall commence immediately above the flue supporting platform but below the roof supporting structure.	Subject clause regarding use of material conforming to AISI:316L or BS:1449 is not clear. It requested to clarify that how much height of flue can material from top shall conform to AISI:316L or BS:1449. Bidder proposes top flue can of height equal to diameter of flue can material in line with EPRI guidelines and design considerations shall conform to AISI:316L or BS:1449. Kindly confirm.	To be discussed at the time of detailed engineering
34	VI- Civil, Structural & Architectural Works	12	RCC Chimney	10 of 38	12.5.1	Top 10m length or length equal to 2 times flue diameter whichever is larger shall be provided using material confirming to AISI:316L or BS:1449.		
35	VI- Civil, Structural & Architectural Works	12	RCC Chimney	10 of 38	12.5.1	The liner shall be supported atleast at three different levels, and restrained laterally at several levels, with a small length at the bottom near breach elevation supported from the bottom with a suitable expansion compensator in between.	Bidder proposes that the liner shall be supported and restrained laterally at internal platform levels at a spacing of approx 45m as a bidder's standard practice followed in all projects, with a small length at the bottom near breach elevation supported from the bottom with a suitable expansion compensator in between. Kindly confirm	Bid specifications to be followed.
36	VI- Civil, Structural & Architectural Works	12	RCC Chimney	10 of 38	12.5.1	Clean–out door shall be provided below the flue for removal of ash.	Bidder understands that clean out door shall not be required for subject wet chimney. Kindly confirm.	Noted.
37	VI- Civil, Structural & Architectural Works	12	RCC Chimney	11 of 38	12.5.1	Load Bearing and Side Restraints of Flues	Hanging type flue can arrangement shall be provided as a proven practice by bidder.	To be discussed at the time of detailed engineering
38	VI- Civil, Structural & Architectural Works	12	RCC Chimney	12 of 38	12.5.2	Minimum clearance between the liners and the liner and shell or other subsystem generally shall be not less than 1.2 metres.	Bidder understands that only one flue liner is to be provided. Minimum clearance between the liner and shell or other subsystem generally shall be not less than 1.0 metre. Kindly confirm	Bid specifications to be followed.
39	VI- Civil, Structural & Architectural Works	12	RCC Chimney	12 of 38	12.6	The flue shall be insulated externally. The insulation shall be semi-rigid, resin bonded type, in the form of slabs and shall conform to IS:8183.	If inside surface of flue is lined with borosilicate, additional insulation outside flue is not recommended from the point of view of the performance of borosilicate glass block system. Kindly confirm.	Noted.

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40	VI- Civil, Structural & Architectural Works	12	RCC Chimney	13 of 38	12.6	Insulation materials shall be added to walls where necessary to reduce cooling loads. Also, insulation shall be used for sound absorption on walls which enclose equipment that has been determined as generating excessive noise. This sound insulation shall be provided in interior concrete block, sound block, or insulated metal wall panel liners as appropriate. The liner panels shall be as described above, except they shall include perforations and insulation enclosed in plastic bags. The overall noise Reduction Coefficient shall be 0.80 or better.	If inside surface of flue is lined with borosilicate, additional insulation outside flue is not recommended from the point of view of the performance of borosilicate glass block system. Kindly confirm.	Noted.
41	VI- Civil, Structural & Architectural Works	12	RCC Chimney	13 of 38	12.7	The hood shall completely cover the annular area packed with insulation material between the stainless steel flue and cladding.	Bidder understands that inside surface of flue projecting above the roof has also to be lined with borosilicate. Hence, additional insulation packing outside flue is not required. Kindly confirm.	Inside surface of flue projecting above the roof has to be lined with borosilicate from inside and 3 mm thick titanium cladding outside.
42	VI- Civil, Structural & Architectural Works	12	RCC Chimney	13 of 38	12.8	The wet steel flues of existing chimney shall be suitably lined.	Bidder understands that a new wet steel flue RC chimney is to be constructed and no retrofitting of existing chimney is to be done. Kindly confirm.	Confirmed.
43	VI- Civil, Structural & Architectural Works	12	RCC Chimney	13 of 38	12.8.1	External surface of chimney flue liner projecting over the chimney roof shall be wrapped with 3 mm thick Titanium sheet over insulation.	If inside surface of flue is lined with borosilicate, additional insulation outside flue is not recommended from the point of view of the performance of borosilicate glass block system. Kindly confirm	Inside surface of flue projecting above the roof has to be lined with borosilicate from inside and 3 mm thick titanium cladding outside.
44	VI- Civil, Structural & Architectural Works	12	RCC Chimney	14 of 38	12.8.2 ii	Compressive strength of at least 1.38 Mpa / 1.1 N/Sq.mm as per ASTM C.165	Kindly clarify the different result values for the two units, MPa & N/Sq. mm, that should be calculated as the same result value. Also specify the lower limit of result value for the required compressive strength.	Bid specifications to be followed.
45	VI- Civil, Structural & Architectural Works	12	RCC Chimney	14 of 38	12.8.2 iii	Flexural strength of at least 0.62 Mpa / 0.8N/Sq.mm as per ASTM C.203/C.240	Kindly clarify the different result values for the two units, MPa & N/Sq. mm, that should be calculated as the same result value. Also specify the lower limit of result value for the required flexural strength.	Bid specifications to be followed.
46	VI- Civil, Structural & Architectural Works	12	RCC Chimney	14 of 38	12.8.2 iv	Thermal conductivity of 0.087 W/m°K at a mean temperature of 38 °C as per ASTM C177 and ASTM C518	Please note that thermal conductivity of maximum 0.087 W/mK at mean temperature of 40°C would be considered as per ASTM C177 and ASTM C518. Also, please note that the upper limit of result value for thermal conductivity is required.	Bid specifications to be followed.
47	VI- Civil, Structural & Architectural Works	12	RCC Chimney	14 of 38	12.8.2 i	Tensile strength at 23° C of 1.0 N/mm2 as per ASTM D.412	We request to revise the tensile strength at 23°C with minimum 1.0 N/mm2 as per ASTM D.412 as the lower limit of result value for tensile strength is required.	Bid specifications to be followed.

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48	VI- Civil, Structural & Architectural Works	12	RCC Chimney	15 of 38	12.8.2 iii	Moisture vapor transmission of 0.0048 Perm inches as per ASTM C.96 Method E	Please note that moisture vapour transmission of maximum 0.0048 Perm inches as per ASTM E96 would be considered as the upper limit of result value for moisture vapour transmission is required. Please note that ASTM C 96 is Test Method for Specific Gravity and Absorption of Fine Aggregate, which has been withdrawn in 1936.	Bid specifications to be followed.
49	VI- Civil, Structural & Architectural Works	12	RCC Chimney	15 of 38	12.8.2 iv	The adhesive shall show no slump after 5 hours conditioned at 60ºC with a film thickness of 3/32" as per ASTM 6511, standard test methods for solvent bearing bituminous compounds, section 12 behavior at 60ºC.	We request to revise the adhesive width itself showing no slump after 5 hours conditioned at 60°C with a film thickness of 3/32" as per ASTM 6511, standard test methods for solvent bearing bituminous compounds, section 12 behavior at 60ºC.	Noted.
50	VI- Civil, Structural & Architectural Works	12	RCC Chimney	15 of 38	12.8.2	Bidder shall provide a project specific "Wet Stack" study, performed by an independent approved institute, subject to acceptance by the Purchaser, ……	We request to revise the independent approved institute with the authorized agency, being acceptable by purchaser.	Bid specifications to be followed.
51	VI- Civil, Structural & Architectural Works	12	RCC Chimney	17 of 38	12.8.2	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.	We request to revise the clause as "The lining system shall, through documented testing, have been proven resistant to thermal shock, for numbers of cycles, where each cycle results in the lining surface temperature to rise from ambient temperature to more than 160°C, and back to ambient temperature."	Bid specifications to be followed.
52	VI- Civil, Structural & Architectural Works	12	RCC Chimney	18 of 38	12.8.2	The lining system (borosilicate glass block and adhesive) shall be tested and certified for fire risk by an approved institute subject to acceptance by the Purchaser, and thorough testing as per relevant ASTM standards.	The test certificate of the previously performed test is already available with us. Please inform if we can submit the same to meet the requirement.	Bid specifications to be followed.
53	VI- Civil, Structural & Architectural Works	12	RCC Chimney	18 of 38	12.8.2	The material of gutter including drain and base plates shall be made of suitable alloy steel to withstand design operating environment.	Please provide the material specification and properties.	Bid specifications to be followed , however, the issue may be discussed during detailed engineering.
54	VI- Civil, Structural & Architectural Works	12	RCC Chimney	19 of 38	12.9	Minimum 3 number of Internal platforms shall be provided, unless indicated otherwise elsewhere.	Bidder proposes to provide intermediate platforms at a spacing not exceeding 45m. Kindly confirm.	Bid specifications to be followed.
55	VI- Civil, Structural & Architectural Works	12	RCC Chimney	19 of 38	12.9	Top most grid work shall support RCC roof slab, where as other grid work shall support M.S. gratings as required from functional requirement. Corrosion	Bidder proposes to provide 6mm thick chequered plate instead of MS gratings as a general practice followed for all other customers like NTPC, Mahagenco etc. from safety point of view. Kindly confirm	Confirmed.
56	VI- Civil, Structural & Architectural Works	12	RCC Chimney	19 of 38	12.9	The gratings shall be fabricated from M.S. flats comprising of 40x5 thick bracing bars spaced at 40 c/c and 25x4 thick space bar. The grating shall be hot dip galvanized.	Bidder proposes to provide 6mm thick chequered plate instead of MS gratings as a general practice followed for all other customers like NTPC, Mahagenco etc. from safety point of view. Kindly confirm	Confirmed.
57	VI- Civil, Structural & Architectural Works	12	RCC Chimney	20 of 38	12.9	32mm dia G.I. drainage spouts shall be provided in the platform for drainage of water.	Bidder understands that drainage spouts are not required in internal platforms as they are not RCC platforms. Kindly confirm.	Noted.

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58	VI- Civil, Structural & Architectural Works	12	RCC Chimney	20 of 38	12. 10	External platform shall be provided as per directorate of air routes and aerodromes (DARA) circular for locating aviation warning lights.	External chimney platform is obsolete nowadays. Bidder proposes to provide openings in shell to accommodate AWL to meet the requirements of IS: 4998, I.C.A.O regulations and Instructions issued by the Director General of Civil Aviation. Kindly confirm.	Bid specifications to be followed.
59	VI- Civil, Structural & Architectural Works	12	RCC Chimney	20 of 38	12. 10	The platforms shall be equally spaced at a spacing of 40m (maximum)	Bidder proposes to provide external platforms at a spacing not exceeding 45m matching with internal platforms. Kindly confirm.	Bid specifications to be followed.
60	VI- Civil, Structural & Architectural Works	12	RCC Chimney	20 of 38	12. 10	Hand railing shall be provided all around external platforms including hood platforms using 32 NP GI pipes.	Bidder understands that 32 NB GI pipe hand railing is to be provided. Kindly confirm.	Confirmed.
61	VI- Civil, Structural & Architectural Works	12	RCC Chimney	21 of 38	12.12	The expansion compensator shall be made of flexible fabric and bolster.	Bidder understands that for wet stack operations, bolster is not required as the temperature of flue gas is approx 50oC and as per recommendation of bolster supplier, acid resistant the material for bolster is not available in the market. Kindly confirm.	Bid specifications to be followed , however, the issue may be discussed during detailed engineering.
62	VI- Civil, Structural & Architectural Works	12	RCC Chimney	22 of 38	12.12	Bolsters shall be manufactured of glass felt of density not less than 24kg/m3 confined in texturised glass fabric of weight not less than 400grams/sqm and thickness not less than 0.25mm to withstand a temperature of 300degC.	Bidder understands that for wet stack operations, bolster is not required as the temperature of flue gas is approx 50oC and as per recommendation of bolster supplier, acid resistant the material for bolster is not available in the market. Kindly confirm.	Bid specifications to be followed , however, the issue may be discussed during detailed engineering.
63	VI- Civil, Structural & Architectural Works	12	RCC Chimney	22 of 38	12.12	If the CONTRACTOR wishes to deviate from the above, he shall propose an alternative arrangement clearly spelling out its advantages/superiority over the one outlined herein for the ENGINEER's review during bid stage. The CONTRACTOR shall test the materials for chemical and physical properties, namely acid resistance, maximum and minimum temperatures, pressures and movements. The test procedures along with their acceptance standards shall be submitted by the CONTRACTOR to the ENGINEER for his review and approval well before the procurement of the units.	Bidder understands that for wet stack operations, bolster is not required as the temperature of flue gas is approx 50oC and as per recommendation of bolster supplier, acid resistant the material for bolster is not available in the market. The details shall be provided during detailed engineering post award of contract. Kindly confirm.	Bid specifications to be followed , however, the issue may be discussed during detailed engineering.
64	VI- Civil, Structural & Architectural Works	12	RCC Chimney	22 of 38	12.13	Two opacity measurement ports fabricated from stainless steel pipe shall also be provided in each liner at the same platform level of the gas sampling ports.	Bidder understands that only one flue liner is to be provided. Kindly confirm	Confirmed.
65	VI- Civil, Structural & Architectural Works	12	RCC Chimney	22 of 38	12.14	The staircase shall be supported by a structural steel framework supported from platform to platform independently of the wind shield. Connection of the structural support to the platform beam shall be so chosen as to permit unrestrained deflection of the platform supporting beam.	Bidder proposes that staircase and elevator shall be provided separately supported on chimney shell considering the stability criteria and width of staircase shall be 800mm. Kindly confirm.	Bid specifications to be followed.
66	VI- Civil, Structural & Architectural Works	12	RCC Chimney	22 of 38	12.14	Tread shall be of 25 mm thick M.S. gratings hot dip galvanized with anti-skid nosing.	Bidder proposes to provide tread of 6mm thick chequered plate instead of MS gratings as a general practice followed for all other customers like NTPC, WPDCL, NTPL etc.. Kindly confirm	Confirmed.

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67	VI- Civil, Structural & Architectural Works	12	RCC Chimney	23 of 38	12.14	Staircase and its connection shall be designed for a live load of 5 kN/sqm	Individual members of staircase shall be designed for a live load of 5kN/sqm. However, the staircase supporting members shall be designed for a staircase live load of 1.5kN/sqm as chimney is not a typical structure and such high manpower movement is not expected at any moment. Moreover, the supporting members shall be designed for a platform live load of 5kN/sqm. Kindly confirm	Bid specifications to be followed.
68	VI- Civil, Structural & Architectural Works	12	RCC Chimney	23 of 38	12.15	These stringers shall be supported from box column which in turn supported from top most support platform and roof beam so chosen as to permit unrestraint deflection of the roof beam. An open able hatch of stainless steel grade AISI 304 L shall be provided in the roof slab for above the cage ladder to prevent entry of rain water.	The mentioned clauses are contradictory. Please clarify the material of hatch/door to be provided. Also, painting over stainless steel is not recommended. Please clarify.	Follow Clause 12.19.
69	VI- Civil, Structural & Architectural Works	12	RCC Chimney	25 of 38	12.19	All the items of the door shall be of stainless steel of grade 316 L and then painted with heavy duty acid and heat resistant paint as per requirement of IS:158.		
70	VI- Civil, Structural & Architectural Works	12	RCC Chimney	29 of 38	12.28	A mild steel hatch shall be provided as an access to the hood of the chimney and one hatch shall be provided in the ash hopper platform for taking the equipments up to any level for maintenance and repairs.		
71	VI- Civil, Structural & Architectural Works	12	RCC Chimney	23 of 38	12.16	Landing at all locations of platforms shall be provided unless otherwise specified elsewhere.	Bidder understands that the landing shall be provided upto the last platform below the roof platform. Kindly confirm	Noted.
72	VI- Civil, Structural & Architectural Works	12	RCC Chimney	24 of 38	12.17	Reinforced concrete walls shall be provided at grade level around staircase & elevator to make the enclosed space air tight and free from ash & dust for the comfort & safety of personal, who are required to go into the chimney for maintenance and inspection purpose. Height of enclosure wall shall be 10m (minimum) or as per the requirement of client.	Bidder understands that the chimney is a wet flue liner and there shall be no ash. Hence, there is no requirement of enclosure wall. Kindly confirm.	Confirmed.
73	VI- Civil, Structural & Architectural Works	12	RCC Chimney	24 of 38	12.18 a	Clean Outdoors	Bidder understands that clean out door shall not be required for subject wet chimney. Kindly confirm.	Noted.
74	VI- Civil, Structural & Architectural Works	12	RCC Chimney	24 of 38	12.18 b	Opening provided near the base of the wind shield for the purposes of flue can erection shall be closed using a removable type of colour coated galvanized aluminium sheet min. 0.6 mm thick on structural steel framing which also can be dismantled if required.	Bidder proposes to provide a rolling shutter for truck movement for maintenance purpose in the opening provided in wind shield for flue can erection. Kindly confirm	Confirmed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
75	VI- Civil, Structural & Architectural Works	12	RCC Chimney	25 of 38	12.19	The roof slab and the inside surfaces of the wind shield shall be lined with 20 mm thick acid proof tiles conforming to IS: 4457.	Bidder understands that the roof slab and the inside surface of wind shiled above roof slab shall be lined with 20mm thick acid proof tiles. Kindly confirm	Confirmed.
76	VI- Civil, Structural & Architectural Works	12	RCC Chimney	25 of 38	12.19	The rain water down take pipe shall be led to a manhole chamber inside wind shield suitably lined with acid / alkali resistant brick lining. From the manhole the drainage water shall be led out of the chimney wind shield through CI pipe to a manhole chamber outside wind shield and from there to Effluent Treatment Plant.	Bidder proposes to connect the rain water down take pipe to drain outside the wind shield through CI pipe by providing pipe openings in the wind shield. Kindly confirm.	Noted
77	VI- Civil, Structural & Architectural Works	12	RCC Chimney	25 of 38	12. 20	In the event of flue gas condensation within the flues acids may be drained out at the base with the provision of stainless steel pipes connected to the soot hopper outlets in each flue located outside the wind shield.	Bidder understands that soot hopper shall not be required for subject wet chimney. In the event of flue gas condensation within the flues acids may be drained out to the absorber outlet with the provision of FRP pipes. Kindly confirm.	Noted.
78	VI- Civil, Structural & Architectural Works	12	RCC Chimney	26 of 38	12.22	Just above the ash hopper an inspection platform 1000mm wide with removable GI gratings and adequate toe protection shall be provided spanning two manholes.	Bidder understands that ash hopper shall not be required for subject wet chimney. Kindly confirm.	Noted.
79	VI- Civil, Structural & Architectural Works	12	RCC Chimney	28 of 38	12.25	A 300 mm wide R.C.C drain shall be provided all round the chimney, located at a distance of 1500 mm from the edge of chimney. This drain will take the roof drainage from the drain chamber to the nearest drain of the project storm water drainage system. All drain including sump shall be provided with A.R lining and shall be provided with 40 mm thick C.I & G.I grilles at top. The space between wind shield and the drain shall be provided with 100 mm thick plinth protection with nominal concrete of grade M20.	Bidder proposes to connect the rain water down take pipe to drain outside the wind shield through CI pipe by providing pipe openings in the wind shield. Kindly confirm.	Confirmed
80	VI- Civil, Structural & Architectural Works	12	RCC Chimney	29 of 38	12.27	Two steel leak proof doors of size 750 x 1000 mm and 750 x 600 mm shall be provided diametrically opposite in each brick liner at all those levels where external platforms are provided.	Bidder understands that the mentioned clause is not vaild for the project as brick liner is not to be provided. Kindly confirm	Noted.
81	VI- Civil, Structural & Architectural Works	12	RCC Chimney	29 of 38	12.28	A mild steel hatch shall be provided as an access to the hood of the chimney and one hatch shall be provided in the ash hopper platform for taking the equipments up to any level for maintenance and repairs.	Bidder understands that ash hopper shall not be required for subject wet chimney. Kindly confirm.	Noted.
82	VI- Civil, Structural & Architectural Works	12	RCC Chimney	30 of 38	12.27	The top 50m of the outside surface of the shell and paraphet above roof slab including embedments etc. shall be painted with 4-coats of acid and heat resistant paint (Polyurethane) over a coat of primer with total DFT 150 microns in alternate bands of signal red and white colour.	The clauses are contradictory regarding the waterproofing on the inside surface of shell above roof slab. Bidder proposes to provide 4-coats of acid and heat resistant paint (Polyurethane) over a coat of primer with total DFT 150 microns. Kindly confirm	Please follow clause 12.19
83	VI- Civil, Structural & Architectural Works	12	RCC Chimney	25 of 38	12.19	The roof slab and the inside surfaces of the wind shield shall be lined with 20 mm thick acid proof tiles conforming to IS: 4457.	Laser scanning of chimney has not been the requirement of any customer in the earlier projects.. It is requested to please clarify the requirement of laser scanning and the data to be provided in the results.	Bid specifications to be followed.

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84	VI- Civil, Structural & Architectural Works	12	RCC Chimney	30 of 38	12.27	The laser scanning of chimney shell after every 70 M height and on completion should be performed.		Bid specifications to be followed.
85	VI- Civil, Structural & Architectural Works	12	RCC Chimney	31 of 38	12.29	Wind and earthquake shall be treated as normal load and no enhancement of stress is permitted on this account in soil, concrete and steel. No tension will be allowed under the pile cap during earthquake and wind. Working stress method shall be adopted for design of foundation.	Chimney is generally a wind sensitive structure and no enhancement of stress shall be considered for wind load. For earthquake load, enhancement shall be considered as per codal provisions.The design criteria of working stress method is obsolete and have been superseeded with limit state method in the latest code.The Bidder proposes to follow the latest code IS-4998:2015 : Design of RC Chimneys-Criteria. Kindly confirm.	Pile cap to be designed during working stress method. However, shell may be designed with limit state method as guided by latest codes.
PT PLANT								
1	II	General & Schedules	RAW WATER ANALYSIS	4 OF 10	APPENDIX – I	Total Suspended Solids	The values of total suspended solids in Raw water has not been specified.	Total suspended solids (ppm) in Raw water of existing plant 2X300MW is as under: during March 23- April 23 : 11-21 during July 22 : 192-366
DM Plant								
1	II	Ch 2 : Project Information	APPENDIX – I,RAW WATER ANALYSIS	4 of 10	Point no. 7	Colloidal Silica -4.2 mg/l	Please note that as per tender Specification colloidal Silica is specified in raw water analysis but no Post MB -UF system has been envisaged or detailed out in tender specifications (write up & P&ID) . In view of above customer is requested to please clarify that whether Post MB , UF system is required or not for DM plant Package. Further if the same is required then revised specification of DM plant along with P&ID Shall be furnished.	DM UF system shall be provided as per Attachment-7.
2	III	Ch 8: DM Plant	Mechanical Works	3 of 15	8.1.2 s)	One (1) no. filter water tank along with 2 no. pumps for each filter.	We understand that only 1 no. overhead Filter water tank along with 2 no. pumps shall be required for DM plant . Please clarify the same.	Filter water tank indicated in Chapter 8, Sheet 3 of Volume III is not applicable. However the following shall be provided by bidder for filter water system: 1. One (1) spent RGF backwash tank of minimum 150 cum capacity or 1 hour backwash storage whichever is higher. Tank shall be of RCC construction. 2. 2 x 100% RGF backwash pumps shall be provided in the filtered water pumphouse and take suction from the filtered water storage tank. MOC of these pumps shall be similar to MOC specified for pumps in Chapter 6, Sheet 5 of Volumer III of specifications. These pumps shall be verical pumps. 3. 2 x 100% spent RGF backwash pumps to pump backwashed water to ETP. The capacity of pumps shall be fixed to empty the spent RGF backwash water tank within 30 minutes. MOC of these pumps shall be simialr to MOC specified for pumps in Chapter 6, Sheet 5 of Volumer III of specifications. These pumps shall be verical pumps. 4. 2 x 100% blowers for RGF (if required).
3	VII	Tender Drawings	Flow Diagram -DM Plant (3 Sheets) - 111-12-3501 Rev 1	1 of 3	-	Overhead Filter water tank capacity Mentioned in P&ID is 50 M3.	Please note that as per tender Specification overhead filter water tank capacity specified in P&ID as 50 m3 and in datasheet 5 m3. Please clarify the capacity of overhead filter water tank.	The requirement of service water and potable water for DM plant shall be supplied from the respective networks and the tanks shown in the service and potable water flow diagrams (111-12-3304 Rev 1 & 111-12-3307 Rev 1) shall be provided by the bidder.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
4	III	Ch 8: DM Plant	Mechanical Works	15 of 15	9.0 ii)	Filter Water Tanks : Capacity : 5 Cu.m.		
5	III	Ch 8: DM Plant	Mechanical Works	4 of 15	8.2 m)	The uniformity co-efficient of resins shall be less than 1.2.	Please note that conventionally for the DM plant there is as such no requirement of UC being practiced and technically also it is not required. Bidder's earlier executed projects also there was no mention of UC requirement for the DM plant resin. Further NTPC specification also does not call for the requirement of 'UC less than 1.2 for DM plant resin'. As per the information available , this requirement of UC as less than 1.2 will also result into restricting the supply of resins through Indigenous sources. Such requirement will also discourage the recent guidelines of Indian Government to encourage the Make in India products. In view of above, we request Customer to kindly review this requirement of UC for DM plant resins at their end and remove the same.	Noted.
6	II	General & Schedules/Ch 8 FG &LD	FG &LD	42 & 43 of 57	5.35	a) Activated Carbon Filters : 1. Each filter shall be guaranteed for the design capacity. A.C. filter shall be backwashed once in 24 hours. 2. Free chlorine content in effluent water shall not be detectable as per latest ASTM procedure. 3. Organic matter below detectable level. 4. Turbidity in the effluent water shall be less than 0.5 NTU. b) Ion Exchange Units : 3. Effluent from the mixed bed unit shall be guaranteed to meet the following requirements, at rated capacity, throughout the period between two successive regenerations: i.) Reactive Silica not to exceed - 0.01 ppm as SiO2 ii.) Iron as Fe - Not detectable as per ASTM-D-1068 iii.) Total Hardness - Not detectable iv.) pH Value - 6.8 - 7.3 v.) Conductivity - Not more than 0.1 micromhos/cm at 25°C. 4. Effluent from the anion exchanger shall be guaranteed as follows at rated capacity throughout the period between two regenerations: i.) Reactive silica not to exceed: 0.2 ppm as SiO2 ii.) Conductivity at 250C: Not more than 10 micro mhos/cm iii.) Sodium leakage through cation shall not exceed 2 ppm as CaCO3 throughout the period between two regenerations. 5. Effluent from degassifier should not have CO2 content more than 5 ppm.	Please note that guarantees of DM plant (i.e. outlet of ACF,SAC, DG ,SBA &MB) has been mentioned in Datasheet and under functional Gurantees & Liquidated damanges chapter differently. In view of the above Fuctional Gurantees of DM plant (i.e. outlet of ACF,SAC, DG ,SBA &MB) shall be as mentioed below : Activated Carbon Filters : xii) Guaranteed Effluent : a. Free Chlorine - Non-detectable b. Organic Matter - BDL (Below Detectable Limit) c. Turbidity - <1 NTU Guaranteed Effluent Quality from DM Plant : Sr.No. DM Plant Vessel Guranteee Description Outlet Parameters 1. SAC Outlet Sodium Leakage ppm as CaCO3 ≤ 2.0 2. Degasser Unit CO2 Content ppm as CaCO3 ≤ 5.0 3. SBA Outlet Reactive Silica ppm as SiO2 <0.2 Conductivity Mi-cromhos/cm ≤ 10.0 4. MB Outlet Reactive Silica ppm as SiO2 ≤ 0.01 Total Hardness BDL Conductivity Micromhos/ cm ≤ 0.1 at 25°C pH value at 25 Deg.C 6.8 – 7.2 BDL stands for (Below Detectable Limit). Customer to Kindly note & confirm the same.	The oultet parameters from DM plant shall be as per Chapter 8, Volume III of specification except for S.No.-4 (at Sheet 8 of 15). "Total Silica ppm as SiO2 < 0.01 " in 3rd & 4th Coulmn against S.No.-4 of Table at Sheet 8 of 15 be read as:- "MB Outlet Reactive Silica ppm as SiO2 < 0.01 MB Outlet Colloidal Silica ppm as SiO2 < 0.01".
7	III	Ch 8: DM Plant	Mechanical Works	6 of 15	1.0 XII)	Activated Carbon Filters : xii) Guaranteed Effluent : a. Free Chlorine - Non-detectable b. Organic Matter - Traces c. Turbidity - <1 NTU		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
8	III	Ch 8: DM Plant	Mechanical Works	8 of 15	2.0	Guaranteed Effluent Quality from DM Plant : Sr.No. DM Plant Vessel Guranteee Description Outlet Parameters 1.SAC Outlet Sodium Leakage ppm as Na <0.5 2. Degasser Unit CO2 Content ppm as CaCO3 <5.0 3. SBA Outlet Reactive Silica ppm as SiO2 <0.1 Conductivity Micromhos/cm < 5 Total Electrolyte ppm < 1 4. MB Outlet Reactive Silica ppm as SiO2 <0.01 Total Electrolyte ppm <0.05 Total Hardness Nil Conductivity Micromhos/cm ≤ 0.1 at 25°C pH value at 25 Deg.C 6.8 – 7.2		
Mill Reject Handling System								
1	Volume III	CHAPTER – 20	MILL REJECT HANDLING SYSTEM	Sheet | 2 of 7	20.1.1	From storage silo the mill rejects shall be disposed off in trucks.	Disposal of rejects from storage silo including trucks shall be in Owner's scope.	Noted.
2	Volume III	CHAPTER – 20	Mill Rejects Conveying Pipe	Sheet | 5 of 7	20.2.6	Pipes shall be joined by welding and all fittings……..be alloy cast iron (minimum 500 BHN hardness)	Hardness should be 350 to 400 BHN. High hardness will result in increase in brittleness which is not suitable for flow of material with high velocity and may lead to cracks/ punctures of bends/ fittings. This is standard followed by various system suppliers.	Noted.
3	Volume III	CHAPTER – 20	Rate of Rejects Generated per mill	Sheet | 6 of 7	1.0 (d)	3% of mill capacity or maximum actual whichever is higher	Mill Reject System shall be designed at 1% of mill capacity at 100% BMCR with worst coal firing. Oversize system design rate hugely affects layout and equipment selection which impacts working clearances and headroom required for operation.	Bid specifications to be followed.
4	Volume III	CHAPTER – 20	Air Compressors	Sheet | 4 of 7	20.2.4		Air compressor for mill reject system shall be house in main plant IA/SA compressor house.	Noted.
5	Volume III	CHAPTER – 20	DATA SHEET MILL REJECT HANDLIMG SYSTEM	Sheet | 6 of 7	2.0	MILL REJECT ISOLATION VALVE : SS 410 a Type Knife gate b Material of construction i) Body :Cast Iron FG 260 BHN ii) knife gate: 10 mm SS – 304 nitriding to 500 iii) Seat :Replaceable type alloy CI or SS smooth finished with 250 BHN hardness	Type and material of construction of valve shall be as per proven practice of MRS system supplier, as same is proprietary in nature.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
6	Volume II	CHAPTER – 9	Mandatory Spares - General & Schedules	Sheet | 14 of 103	27 (A) a to e	MILL REJECT HANDLING SYSTEM Pneumatic Conveying System	The spares listed at clause 27 A (a) to (e) are the only spares required by Owner for mill reject handling system. Kindly confirm.	Bid specifications to be followed.
Bunker								
1	Volume VI	CHAPTER – 7	MATERIAL	Sheet | 1 of 2	7.1	Complete hopper including vertical and conical portion of bunker in mill building shall be provided with lining of atleast 6mm thick SS plate grade SS 316L	Kindly clarify the thickness of liner to be used in raw coal bunker since both the clauses are contradictory.	5 mm thick SS-316 liners shall be provided for vertical and conical portions
	Volume VI	CHAPTER – 11	Civil, Structural & Architectural Works	Sheet | 6 of 18	11.3	Stainless steel liners of thickness 5.14mm shall be provided in bunkers for the conical / hyperbolic as well as vertical portion of Bunker. The grade of SS liner shall be SS316L.		
2	Volume VI	CHAPTER – 11	Civil, Structural & Architectural Works	Sheet | 6 of 18	11.3	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 canons	Air canons are not specified in Mechanical part of specification for Coal bunkers. Kindly confirm requirement.	Air Canons not envisaged
MSE-WATER SYSTEM								
1	III	4	RAW WATER INTAKE & PLANT RAW WATER SYSTEM	2 of 8	4.1.2. & 4.1.3	Bidder shall replace (supply and install) all the three (3) existing vertical turbine type Raw water Intake Pumps with new pumps of same capacity & head. Make : Flowmore Private Limited Capacity : 2550 M3/Hr Head : 4.5 MWC Motor rating : 75 KW Make of motor : Marathon Electric Voltage : 415 V	HPGCL may please note that procurement of pumps will be through competitive bidding. Therefore, make of Pump and drive motor may be different from the present make.Further, there may be slight changes/ modification required in the existing civil foundation or discharge piping. This modification shall not be in bidder's scope. HPGCL to confirm regarding different make of Pump and Drive motor.	Bidder's understanding is correct upto the extent that procurement of pumps will be through competitive bidding. Any modification required on the existing foundations shall be in bidder's scope.
2	III	4	RAW WATER INTAKE & PLANT RAW WATER SYSTEM	3 of 8	4.1.6	Raw water Intake and Plant Raw water System includes, but shall not be limited to the following: i. Three (3) (2W + 1S) Raw Water Intake Pumps		
3	III	4	RAW WATER INTAKE & PLANT RAW WATER SYSTEM	2 of 8	4.1.3	The raw water required for the proposed 800 MW Unit shall be drawn from one of the compartments of existing raw water reservoir (Location of raw water pump house shown in the Plot Plan). The pump house shall be constructed inside the raw water reservoir or adjacent to the raw water reservoir.	Different clausses are contradictory. Bidder understands that Raw water required for new 800 MW unit is to be tapped from existing Raw water reservoir only. Also new raw water pumphouse to be made inside or adjacent to existing Raw water reservoir to be finalised during detail engg.Pl. Confirm Please also confirm New Raw water reservoir is not in present scope of works.	No contradiction in clauses. Raw water is to be drawn from existing raw water reservoir. Reply of Sr. No. 6: Bid specifications to be followed. Reply of Sr. No.7: New raw water reservoir stands deleted from the scope of bidder. Accordingly, Chapter-24 of Vol-VI of specifications shall be treated as null and void.
4	III	4	RAW WATER INTAKE & PLANT RAW WATER SYSTEM	2 of 8	4.1.5	Raw water required for the proposed 800 MW Unit shall be drawn from existing raw water reservoir. Needed modifications in the existing reservoir shall be in bidder's scope of work.		
5	VII	Tender drg	Plot plan, drg no: 111-29-0200,	57 of 120	Building S. No. 41 & 45	Building no: 45: Area for Proposed New raw water reservoir and pump house Building no: 41: Proposed raw water pump house in existing raw water reservoir (compartment-2)		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
6	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	2 of 7	18	A raw water pump house to be constructed in one compartment of existing Raw water reservoir to pump the make-up water through MS pipes to Water treatment plant.		
7	VI	23	RAW WATER RESERVOIR (OPTIONAL)	1 of 3	24.1	A new Raw Water Reservoir shall be constructed having the storage capacity of minimum seven days of consumptive water requirement of 800 MW unit.		
8	III	4	RAW WATER INTAKE & PLANT RAW WATER SYSTEM	3 of 8	4.2.3	Each pump shall be located in individual sump, dimension of which shall be decided as per HIS.	Requirement of individual sump shall be decided as per HIS only. Please confirm.	Confirmed.
9	III	2	Turbine Generator & Auxiliaries	40 of 87	1. Condenser Design Parameters	b) Design cold water temperature: 32.5°C h) Temperature rise in circulation water across the condenser Not more than 8.5 Deg C m) Maximum circulating water temperature deg.C (min.): 38°C (max.)	Different clauses are contradictory. Bidder understands that Design cold water temperature (Guarantee) for Cooling tower and Condenser design shall be same i.e, 33 deg C. Please confirm. Further, the temperature range across condenser is to be optimised by bidder considering back pressure not exceeding 70 mmHG. Therefore, please confirm that temperature range across condenser can be from 9.5 to 11 degC.	Cold water temperature shall be considered as 33 deg C. Temperature difference across the condensor shall be limited to 10 deg. C.
10	III	18	NDCT	22 of 23	DATA SHEET	2.4 Cold water temperature (DegC): 33 (guaranteed) 2.5 Cooling range (Deg C): Temperature rise across condenser plus 1 deg. C, keeping hot water temperature at outlet of condenser as base. 2.7 Approach (DegC): 5 2.8. Design Relative Humidity (%): 45%		
11	II	8	FG & LD	8 of 57	3.1 xv)	Cooling Tower: The cold-water temperature of 33 Deg C shall be guaranteed for the design conditions of CW flow, range, ambient WBT and RH as per the performance test procedure of cooling tower elaborated elsewhere in the specification		
12	III	15	CW & ACW System	5 of 37	15.4.3	The temperature at outlet of the Cooling Tower for design purposes shall be 33 Deg C considering cooling tower approach of 50 C (max) at rated conditions and design inlet air Wet Bulb Temperature to be 28 Deg C.		
13	II	2	Project Information	3 of 10	3	Condenser cooling water inlet temperature of 33°C and 9°C temperature rise across the condenser.		
14	III	2	Turbine Generator & Auxiliaries	39 of 87	2.1 (o)	2X100% capacity, fully automatic debris filter shall be installed on each condenser inlet line of suitable mesh size for clarified water application shall be provided with covered shed above ground level at the outside of the TG building at the upstream of COLTS for each CW inlet line. Debris filter shall be supplied with automatic self wash system. The debris filter design has to be suitable for clarified water quality. Debris filter flushing line outlet shall be routed to ash dyke by suitable arrangement.	We understand that Debris filter is to be installed at each inlet supply line to condenser i.e. there shall be total 2 Nos. debris filters (1 for each inlet line to conderser). Please confirm.	Debris filter is deleted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
15	III	15	CW & ACW System	5 of 37	15.4.5	The design flow rate in the filtered water (acw) side of the operating PHEs for the unit shall be considered same as the design DMCW flow rate, with the average temperature rise of ACW limited to 5.5 Deg C under all circumstances.	Please note the ACW flow will unnecessarily increase by 30% to 50% more than required flow to limit the temperature rise to 5.5 degC. There is no technical merit for same. Bidder understands that temperature rise across PHE shall be same as temperature rise across condenser. Please Confirm.	Confirmed.
16	III	15	CW & ACW System	5 of 37	15.4.7	The velocity of water in the CW and ACW system shall not exceed 2.0 m/sec.	This system is low pressure system. Please allow velocity limitation up to 2.5 m/sec.	Bid specifications to be followed.
17	III	15	CW & ACW System	20 of 37	15.13.1 (i)	i.) One (1) set of stop log gate assembly for as many identical pump bays{comprising of identical and interchangeable units of adequate size (height x width)} properly	We understand that 1 No. gate shall be provided for CW pumps sumps and 1 No. gate shall be provided for ACW pump sump for isolation purpose. Please confirm.	Confirmed.
18	III	15	CW & ACW System	5 of 37	15.4.5	Capacity of ACW pump shall be fixed by taking 10% (minimum) margin on design ACW flow.	Contradictory clauses. Please confirm, ACW pump capacity design margin shall be 10 % of design flow or 5 % of design flow.	Confirmed that ACW pump capacity design margin shall be 10 % of design flow as per clause 15.4.5 of Chapter 15 at Sheet 5 of 37.
19	III	15	CW & ACW System	32 of 37	Data sheet for ACW pumps	Pump capacity: By bidder; shall be equal to 105% of the cooling water requirement of the unit		
20	III	15	CW & ACW System	35 of 37	Data sheet for automatic SCS	2.4 a) Normal (m3/hr): 105% of ACW pump rated flow	We understand that the normal flow to SCS shall be same as design capacity of ACW pump. Please confirm.	In 4th coulmn of Table against S.No. 2.4 (a) of Ch-15 at Sheet 35 of 37, the figure "105%" be read as "120%".
21	III	15	CW & ACW System	36 of 37	Data sheet for automatic SCS (4.9.1)	MOC of valves: Gun metal/SS-304	As per specification carbon steel piping & valves are applicable for ACW system. Self cleaing strainers are also envisaged in ACW system, hence we understand that MOC of various valves in SCS system shall be Carbon steel. Please Confirm.	Cast Carbon Steel is acceptable as MOC of various valves in SCS system.
22	III	16	DMCW System	2 of 12	16	For the primary cooling circuit, One (1) overhead tank of minimum (normal) capacity of 10 M3 for TG system and SG system shall be provided by the bidder.	We understand that there shall be 1 No. DMCW Overhead tank which is common for DMCW-TG Aux & BOP and DMCW-SG Aux. in line with tender drawing. Please confirm.	Confirmed.
23	VII	Tender drg	Flow Diagram - DWCW System (TG and SG Auxliaries) 111-12-3310	25 of 120		DMCW O/H tank		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
24	III	16	DMCW System	3 of 12	16.2.2	The required flow in this system shall…….. In computing the design heat load and design DMCW flow in individual DMCW system Bidder shall ensure that the average temperature rise of DMCW is limited to 5.5 deg.C under all circumstances.	Please note the DMCW flow will unnecessarily increase by 30% to 50% more than required flow to limit the temperature rise to 5.5 degC and same cannot be handled by the various Turbine, Turbo Generator, Boiler auxs coolers, BFP auxs and Compressor auxs, which are generally of standard and varying design temperature rise. Also there is no technical requirement to limit the temperature rise. therefore, Bidder understands that temperature rise across PHE on ACW side shall be same as temperature rise across condenser. Please Confirm.	Confirmed.
25	III	16	DMCW System	4 of 12	16.2.3	All piping and equipment coming in contact……..All DMCW piping in the discharge of DMCW pumps shall be sized for a velocity not exceeding 2 m/sec under all circumstances.	This system is low pressure system. Please allow velocity limitation up to 2.5 m/sec.	Noted.
26	III	16	DMCW System	5 of 12	16.3.3.2 a)	Suitable cleaning system complete with all equipment and accessories (viz. pumps, piping, valves etc.) for inside cleaning of the PHE's.	Pressure of Service water provided in TG hall shall be sufficient to clean the PHEs. Hence there is no requirement of separate equipments (viz. pumps, piping, valves etc.) Please confirm.	Noted.
27	VI	11	Buildings Description	8 of 18	11.8	The circulating water system envisaged for the plant is by using clarified water. RCC cooling water channel shall be of rectangular in shape and….	CW channel from cooling tower to CW forebay shall be Open channel or Closed duct? Please Confirm.	CW channel from cooling tower to CW forebay shall be Open channel.
28	III	15	CW & ACW System	5 of 37	15.4.8	Underground CW and ACW piping shall be provided with suitable protective coating/wrapping and shall be suitably stiffened to withstand soil loads and loads due to heavy vehicles at road crossings.	We understand that, underground CW and ACW piping shall be provided with suitable protective coating/wrapping and Buried CW piping under rail/road crossing only shall be encased in 500 mm thk RCC. Please confirm our understanding.	The thickness of pipe shall be selected accordingly. Buried CW piping under rail / road crossing only shall be encased in 500 mm thick RCC/Culverts. The painting / protection of pipes (buried & overground) shall be in line with Clause 27.13, Chapter 27, Volume III of specification. However RCC encasing mentioned in this clause is not applicable.
29	III	27	Low Pressure Piping, Valves & Specialities	7 of 31	27.4.13	Buried CW Pipes shall be encased in 500 mm thick RCC. However this thickness shall be reviewed for live loads at road crossings according to AWWA M11 and adequately revised.		
30	III	27	Low Pressure Piping, Valves & Specialities	11 of 31	27.11	Specific technical requirement of laying buried pipe with anti corrosive treatment		
31	III	27	Low Pressure Piping, Valves & Specialities	14 of 31	27.13.1 (NOTE)	NOTE: CW piping shall be encased in 500 mm thk RCC. Pipes external surface shall be applied with one coatsof coal tar primer before placing the pipes in position for RCC encasing. Thickness of paint shall be minimum 35 microns.		

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32	III	27	Low Pressure Piping, Valves & Specialities	17 of 31	27.15.2	Valve Body Material: Valve body material for various services shall be as follows: Valve body material for water application like circulating water, Secondary circuit auxiliary cooling water of ECW system, Raw water, Ash water make-up, service water, clarified water, DM cooling water (pH corrected) & drinking water shall be cast iron for sizes 65 NB and above; gun-metal for sizes 50 NB and below.	Inline with the MOC of piping specified in technical specification and standard practice followed in all 600 MW/660 MW/800 MW projects, the MOC of valves greater than 65 NB may be of cast carbon steel or cast iron for these services. Please confirm.	Confirmed.
33	III	27	Low Pressure Piping, Valves & Specialities	23 of 31	27.21	Material of Construction (Gate/Globe/Check Valve) (a) The materials shall generally comply with the following: (1) Cast Steel Valves Body & bonnet ASTM A 216 Gr. WCB/ ASTM A 105		
34	III	15	CW & ACW System	10 of 37	15.6 B e)	The pump shall be provided with an approved mechanical device to prevent reverse rotation on loss of drive motor power and failure of discharge valve to close. Bidder shall furnish full details of his previous experience on such non-reverse ratchets in similar installations....	Reverse Rotation Indicator with alarm is provided to detect reverse rotation. Thrust bearing is capable of taking load in case of reverse flow also. Hence, Non-reversible ratchet is not applicable.	Bid specification to be followed.
Hydrogen Generation Plant								
1	Volume III	Ch 3:	Hydrogen Generation Plant	2 of 19	3.3.5	The scheme & construction details of equipment shall be based on manufacturer's standard for Bipolar Proton Exchange Membrane (PEM) Solid polymer electrolyte type- of the Hydrogen plant.	As scheme & construction details of equipment are OEM specific. Hence, all the details of control and instrumentation shall also be as per the OEM standard practice. Please accept.	Hydrogen Generation Plant indicated in Chapter-3, Vol-III stands deleted. Associated activities like H_2 Generation plant building, Air-conditioning for H_2 Generation control room etc. also stands deleted. However the Room for storage of cylinders shall be in bidder's scope as mentioned else where
							-	-
1	III	33	Layout Requirements	6 of 11	18	Coal Mills shall be located on the side of the boiler.	Option for Locating Mills on Front or rear of the boiler shall also be provided. Please accept.	Locating mills on Front side of the Boiler is also acceptable.
2	III	33	Layout Requirements	8 of 11	28	The headroom for all pipe/cable racks in outlying areas shall be 5 M except at rail/road crossing where the headroom shall be 8 M.	In the outlying area, pipe and cables can be routed on trestle with headroom of 2m or on pedestals. At road crossings pipe/cable to be routed through either trestle or underground (RCC /PCC or hume pipe) . In case road crossing through trestle, height of trestle shall be minimum 8m. Please confirm.	Noted.
3	III	1	Steam Generator & Auxiliaries	77 of 186	XXIII(d)	The entire mill reject system including accessories for conveyance will be located above ground.	For pneumatic type conveying system for mill reject handling, pipe trenches/ pits are required for routing of conveying pipes from conveying vessel outlet to silo. We understand that pipe trenches/ pits are allowed for pneumatic type mill reject conveying.	Layout and locations indicated in plot plan are tentative. Bidder shall develop and optimize the layout based on the requirements spelt out in the specification.

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4	VII	Drawings	111-29-0200 (Plot Plan)	57 of 120		Plot Plan	Though TG Building AB & BC bay widths are mentioned in the Tender Plot Plan, However bidder understands that bidder is free to optimise the size of TG building within compliance limits of the specification.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
5	III	33	Layout Requirements	3 of 11	33.2	Control Room For Offsite Areas	To optimise usage of area available for Plant, Clubbing of buidings like ESP cum FGD Control room, Regeneration Facilities for CPU & DM Plant etc. may please be allowed.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
6	III	15	CW & ACW System	3 of 37	15.3	Two (2) (1W+1S) – Vertical wet pit turbine pumps Auxilary Cooling Water (ACW) Pumps each with associated motor drives and complete with all accessories such as base plate, sole plate, foundation bolts and nuts, anchor, sleeves, stuffing boxes (if applicable), thrust pads etc as required.	Option for Providing Horizontal ACW pump shall be given to optimise the overall ACW System. Water for the secondary circuit for cooling the primary circuit DM water shall be tapped offf from CW system. It is inline with the practice being followed in NTPC & other tenders like Lara, Singreni,Talcher etc. Please accept.	Bid specifications to be followed.
7	VI	16	Raw Water , PT & DM	1 of 2	16.1	Raw water pre-treatment for CW and DM plant generally consist of the following facilities/buildings. However, the bidder may add/delete/club facilities as per approved system: - Chlorination buildings - Aerator - Stilling chamber and inlet channels and measuring flumes - Clarifiers - Chemical house - Sludge pit Rapid gravity filters - Filtered water reservoir and pump house - Raw water pump house - DM Plant - Sludge thickener - CPU regeneration area	Shed shall be provided for Misc. Pump Houses such as Service Water Pump Houses, Filtered Water Pump House, ACW Pump House etc. It is inline with the practice being followed in NTPC & other tenders like Lara, Singreni,Talcher etc. Please accept.	Bid specifications to be followed.
8	VI	17	Raw Water , PT & DM	1 of 2	16.6	The filter water pump house structure shall be of RCC framed construction with RCC flat roof.		
Annexure-19								
1	II	9	Mandatory Spares	17 of 103	2.1 (M)	All type of internals like stem, disc, seal, bushings, pilot valves, seat of HP bypass valves and its spray valves with one set of fasteners, one set of actuator cylinder, spring set, pins, couplings and its fasteners Qty: 1 Set	Offered designs may not have all the components listed in the specification. For uniformity all the internals except body will be offered for HP Bypass Valve, its spray valve and the corresponding actuators 1 Set is inferred as all the internals required to make one complete assembly of the above equipment.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	II	9	Mandatory Spares	97 of 103	2 (X)	Electro-hydraulic converter/Servo unit and position feedback transmitter for LPBP and HPBP Qty: 1 Set each	1 set each is inferred as 1 EHC/Servo unit and 1 PFT for LPBP valve and HPBP valve. It is to be noted that one 800MW unit contains 2 numbers of LPBP valves and 2 No.s of HPBP Valves	Bid specifications to be followed.
3	III	2	Turbine Generator & Auxiliaries	31 of 87	1.20 (f)	Ensure HP bypass designed to accept continuous spray water at temp. corresponding to all HP heaters out of service and deaerator pegged at 1.5 ata. Spray water shall be sprayed at the most turbulent zone inside the valve having steam velocity in the order of 350 to 400 m/sec. The entire atomization and evaporation of spray water shall be complete within shortest possible distance but not exceeding 1.0m from the spray point. The HP bypass spray controller shall have state controller with observer to achieve accurate control over outlet steam temperature under different operating conditions including the transients	The specification refers to a particular type of design. Proven designs as stipulated vide 4.3.1 (o) of chapter 4 of Volume II can be different from the requirement of this clause. Hence customer is requested to waive this clause because proven designs are offered	Bid specifications to be followed.
4	III	2	Turbine Generator & Auxiliaries	31 of 87	1.20 (i)	Provide separate oil system with 100% redundant pumps, motors, accumulators and control cubicles etc. for HP bypass system. Accumulators shall be sized to take sufficient number of stroking operations of all actuators under a condition of loss of oil supply from the pumps	100% redundant pumps, motors is inferred as one main+ one stand by. 100% accumulators is inferred as minimum 2 accumulators. Control cubicles cannot be offered with 100% redundant quantity. Accumulators will be sized to take 2 stroking operations of all actuators (1 open+ 1 close)	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
5	III	2	Turbine Generator & Auxiliaries	31 of 87	1.20 (k)	Provide HP bypass valves with gland cooling arrangement, preferably using spray water, as per standard practice of manufacturer.	For HP Bypass Valve no gland cooling is provided	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
6	III	2	Turbine Generator & Auxiliaries	31/32 of 87	1.20 (q)	Body shall be protected from damage due to water injection by means of multi-function contoured cage. Contoured cages shall be used as they have higher mechanical strength and no tendency to resonate. Cage shall be designed as free-floating element with streamlined shape to prevent vibration due to resonant frequency. Contoured plug designs are not allowed because of poor acoustic performance.	The specification refers to a particular type of design. Proven designs as stipulated vide 4.3.1 (o) of chapter 4 of Volume II can be different from the requirement of this clause. Hence customer is requested to waive this clause because proven designs are offered	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
7	III	2	Turbine Generator & Auxiliaries	32 of 87	1.20 (q)	HP spray water valve being a high pressure drop and severe service application, the valve trim should have sufficient number of discrete flow paths to limit the trim exit velocity, which is the root cause of most of the control valve problems. While deciding the size of valves, bidder shall ensure that valve trim exit velocity does not exceed 23 m/sec for cavitating liquid services and 30 m/sec for non-cavitating liquids. Body gallery area or valve run diameter should not be considered for calculating exit trim velocity. Valve characteristics profiling shall be provided on the cage and not on the plug	The specification refers to a particular type of design. Proven designs as stipulated vide 4.3.1 (o) of chapter 4 of Volume II can be different from the requirement of this clause. Hence customer is requested to waive this clause because proven designs are offered	Bid specifications to be followed.
8	III	2	Turbine Generator & Auxiliaries	32 of 87	1.20 (h)	Energy for safe opening or closing (e.g. condenser protection) shall be independent of the oil pressure from the HSU, either through steam force or a separate hydraulic accumulator	Requirement is not clear. Customer to clarify	Bid specifications to be followed.
9	III	2	Turbine Generator & Auxiliaries	32 of 87	1.20 (h)	Position control cabinet to perform the modulating function and Quick close/open operation of the valves. DCS shall be the master equipment to communicate with the supplier supplied PCS cabinet.	The specification refers to a particular type of design. Proven designs as stipulated vide 4.3.1 (o) of chapter 4 of Volume II can be different from the requirement of this clause. Hence customer is requested to waive this clause because proven designs are offered	Bid specifications to be followed.
10	III	2	Turbine Generator & Auxiliaries	32 of 87	1.20 (h)	PCS cabinet shall be supplied with the PASO software for initial commissioning/calibration purpose of the connected actuator.	The specification refers to a particular type of design. Proven designs as stipulated vide 4.3.1 (o) of chapter 4 of Volume II can be different from the requirement of this clause. Hence customer is requested to waive this clause because proven designs are offered	Bid specifications to be followed.
11	III	2	Turbine Generator & Auxiliaries	32 of 87	1.20 (h)	Connections to the actuator shall be prefabricated and pluggable	Connection to the actuators need not be pre fabricated and can be terminated at site. The required connectors will be included in supply.	Bid specifications to be followed.
12	III	2	Turbine Generator & Auxiliaries	71 of 87	11	NOISE LEVEL	The equivalent 'A' weighted sound pressure level measured at a height of 1.5 metre above floor level in elevation and a distance of 1 metre horizontally from the nearest surface of any equipment / machine, furnished and installed, expressed in decibels to a reference of 0.0002 microbar,will be maximum 115dBA for HP Bypass Valves	Bid specifications to be followed.
Annexure-20								
DG SET								
1	VOLUME-IV	CHAPTER-2	DG set	2 OF 30	32.01.02	The rating shall be as per the BTG package load requirement, however the DG set rating shall not be less than 2000 kVA, 415 V, 0.8 p.f, 3 phase, 3 wire,	Bidder proposes to supply the DG set of rating as per emergency load requirement as arrived during detailed engg. Minimum rating condition may kindly be deleted.	Bid specifications to be followed.
2	VOLUME-IV	CHAPTER-2	DG set	2 OF 30	32.01.02	The rating shall be as per the FGD Plant load requirement however the DG set rating shall not be less than 750 kVA, 415 V, 0.8 pf, 3 phase, 3 wire.	Bidder proposes to supply the DG set of rating as per emergency load requirement as arrived during detailed engg. Minimum rating condition may kindly be deleted.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	VOLUME-IV	CHAPTER-2	DG set	3 OF 30	32.03.13	Local DG Breaker for each DG set.	Since DG Set is an emergency system , Bidder proposes to connect the DG with EMCC through an ACB in EMCC. It is not recommended to provide more than 1 breaker between DG Set and EMCC to ensure quick availability of DG during an emergency condition. .Further it shall not be possible to accomodate local DG breaker in acoustic enclosure.	Local DG breaker, isolator (for load bank and for outgoing EPMCC feeder), AMF panel altogether shall be assembled in a single panel/enclosure located inside a separate room near DG set. Refer revised main SLD attached at Attachment-8. Flexible unarmoured Copper cable and connecting arrangement shall be provided by the bidder for connecting portable load bank with the DG sets.
4	VOLUME-IV	CHAPTER-2	DG set	4 OF 30	32.04.06	The DG set will be installed indoor in echostic enclosure. All equipment and accessories shall be provided with tropical finish to prevent fungus growth.	Bidder understands that DG Set shall be provided with acoustic enclosure and same shall be installed outdoors. Further Bidder proposes to install DG AMF panel and Battery Charger inside the acoustic enclosure.	Confirmed, however, DG AMF panel along with Local DG breaker & Isolator shall be provided as in seprate room explained in previous query.
5	VOLUME-IV	CHAPTER-2	DG set	5 OF 30	32.05.02	The capacity of Common bulk oil Tank shall be of minimum rated for 8 hours (at rated capacity) consumption of all the four (4) DG set ...	Bidder proposes to provide 2 nos 990 litres day tank for each DG Set. Requirement of common bulk oil tank with associated pumps and accessories may kindly be deleted.	Confirmed, Clause 32.05.02 (v) at Sheet 5 of 30 of Chapter-32, Vol-IV stand deleted.
6	VOLUME-IV	CHAPTER-2	DG set	7 OF 30	32.05.06	One additional back up batteries bank of 24 Volts 100% rated Lead acid battery for each D.G set with changeover facility of suitable rating on 10-hour basis	1 set of battery bank of suitable rating shall be sufficient for cranking of DG Set. The life of the battery bank shall be 3 years. Further it shall not be possible to accomodate 2 sets of battery inside the acoustic enclosure due to space constraint.	Bid specifications to be followed.
7	VOLUME-IV	CHAPTER-2	DG set	11 OF 30	32.05.10	Class of insulation for the alternator shall be Class – F with temperature rise limited to Class B.	Alternators are manufactured with insulation class -H winding. Bidder proposes to offer alternator with winding insulation class-H and temperature rise limited to class-F.	Confirmed.
8	VOLUME-IV	CHAPTER-2	DG set	12 OF 30	32.05.10	The short circuit ratio shall not be less than 0.5 (minimum) for such machines and shall be stated by Bidder.	Bidder proposes to delete this requirement as it may lead to oversizing of the alternator.	Bid specifications to be followed.
9	VOLUME-IV	CHAPTER-2	DG set	13 OF 30	32.05.12	The regulation system shall be provided with equipment for automatic and manual control, solid state type, high speed voltage regulator.	Bidder shall supply alternator with solid state / digital AVR as being supplied for all projects. AVR shall have facility for remote increase/ decrease of voltage .	Confirmed.
10	VOLUME-IV	CHAPTER-2	DG set	21 OF 30	32.05.17	Instruments Tools and Tackles for Erection and Maintenance	Bidder shall supply 1 set of tools and tackles for day to day maintenance of DG Sets.	Confirmed.
11	VOLUME-IV	CHAPTER-2	DG set	22 OF 30	32.05.19	A portable resistive load bank of suitable rating shall be supplied with DG package for load test of DG sets.	Load Bank is not necessary and DG set can be tested by connecting to mains if required	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
12	VOLUME-IV	CHAPTER-2	DG set	23 OF 30	32.06.00	The following acceptance test shall be carried out on DG set at shop	Please note that several test mentioned in this clause are specific to alternator and cannot be carried out at DG Set assemblers factory. Bidder shall offer stage inspection of alternator and shall carry out routine tests as mentioned in contract. Type test reports for the offered alternator shall be submitted for information during detailed engg.	Bid specifications to be followed, further bidder shall carry out acceptance tests at factory or site. The temperature rise test for alternator shall be carried out on 1 DG set of highest rating.
13	VOLUME-IV	CHAPTER-2	DG set	21 OF 30	32.09.00	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.	Bidder proposes to submit type test report for these tests and request to waive off conducting these test again since the DG sets are standard products and procured from reputed approved OEMs. Also the facilities to condct these tests will not be available at site.	Bid specifications to be followed.
14	VOLUME-IV	CHAPTER-1	Electrical Scope of Work	51 OF 58	1.43.04 & 1.43.05	The minimum capacity of generator shall be based on the actual emergency load and the capacity required to satisfy this load while starting the largest motor along with additional margin of 10% overload. While sizing emergency DG, the voltage & frequency drop due to largest motor starting shall be taken care of. Further, base load shall be considered while calculating the voltage drop and dip on the DG set. 10% margin shall be considered for DG sizing.	Bidder proposes consider 50% base load while calculating the voltage drop during staring of the largest motor.	Confirmed.
Annexure-21								
1	Vol - II	Ch-2	---	26 of 87	1.18 (a)	*Turbine Lube Oil System :* In case of complete power failure including DC supply, Turbine Generator set shall be capable of safe coasting down.	This clause is to be deleted as there was no such requirement in the recent tenders of NTPC/SCCL (NPTC consultant).	Out of 2x100% AC Oil Pumps. One pump be connected to the normal cum emergency Bus (DG Set) to cater to the turbine lubrication requirements during safe coasting down of the machine in emergency.
Annexure-22								
1	Vol III	Ch 2	TG & Auxs.	58 of 87	7.1(e)	Shaft Sealing-Mechanical seals for booster pump and main pump.	Customer is requested to allow to add in line with NTPC 2x800 MW Lara tender : Alternatively, bidder can also provide Main pump shaft sealing of throttle type along with all accessories, associated piping, valves & fittings, specialties, instrumentation and control etc. as per standard proven practice of the BFP manufacturer. Throttle type seal (if offered) for main pump shall meet following requirement: 1. Cold condensate injection flow should not enter the Main pump casing under any condition (including standby condition) to avoid sagging of main pump shaft. 2. Withstand capability in case of total AC power failure	Noted.
2	Vol III	Ch 2	TG & Auxs.	61 of 87	7.1 (u)	Efficiency: Not less than 83% (hot).	Customer is requested to allow to modified in line with NTPC 2x800 MW Lara tender : Efficiency: Preferably not more than 83% (hot). However, if higher efficiency is selected then the drive power requirement shall be determined with 83% efficiency only.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	Vol III	Ch15	CW & ACW System	2 of 37 & 30 of 37	15.3 & DAT SHEET SL.NO1	Three (3) (2W+1S) – Vertical wet pit turbine pumps Circulating Water (CW) Pumps	Customer is requested to add Three (3) (2W+1S) -Concrete Volute type Circulating Water (CW) Pumps in-addition to Three (3) (2W+1S)– Vertical wet pit turbine pumps Circulating Water (CW) Pumps	Concrete Volute Circulating Water Pumps Three 3 (2 Working +1 Standby) are also acceptable. Specifications is as per Attachment-9.
4	Vol II	Ch 9	Mandatory Spares	7 of 103+E+E 964:F970	8.i(n)	Mandatory Spares: Hydraulic loading cylinder	Not aplicable for offered mills	Bid specifications to be followed.
5	Vol II	Ch 9	Mandatory Spares	7 of 103	8.i(r)	Mandatory Spares: Mill Bottom	Not aplicable for offered mills	Bid specifications to be followed.
6	Vol II & Volume-III	Ch 8 & Ch-1	FG&LD SG & Aux.	29 of 57 & 45 of 186	5.1 & 1.23	Noise	Wet Ball Mill is ball and tube type mill. Noise level shall be 90dB(A) for wet ball mills, the same is followed by NTPC and other state utility tenders.	Bid specifications to be followed.
7	Volume-III	Ch-30	FGD System	57 of 93	8.1(1)	Mill Separator Tank : The Bidder shall provide one (1 no.) mill separator tank for each mill. Each tank shall be sized to meet 12 hours continuous limestone requirement of the one mill operating at Design point. For tank volume calculation, solid concentration (by weight) in the slurry shall be assumed, not more than 25% or actual required whichever is lower.	Mill Separator tank is part of wet ball milling system. The Mill Separator tank is provided to hold and dilute the circulating slurry of the mill Separator for desired operation of the milling system for limestone grinding. It is also required for changeover of slurry pumps [for each mill, there are two mill circuit pumps (1working + 1standby)]. Normally mill separator tank is sized to meet 5 minutes holding capacity. The same is followed by NTPC and other state utilities. Already main slurry storage tanks are covered under clause no.: 6.0. Request to please provide clarification on mill separator sizing.	Bidder to comply as per bid specification. However, mill seprator tank should be sized to meet 5 minutes holding capacity.
8	Volume-III	Ch-30	FGD System	58 of 93	9)	DATASHEET MILL SEPARATOR TANK: Capacity -- 12 hours limestone storage requirement of one mill		
9	Volume-III	Ch-30	FGD System	59 of 93	10)	DATASHEET WET BALL MILL: Shell/ Head Material Shell – ASTM A 36 Head – ASTM A27 Gr 70 40	MOC shall be as per OEM standard and proven practise. Customer is requested to allow OEM proven practice.	Bid specifications to be followed.
10	Volume-III	Ch-30	FGD System	59 of 93	13) & 14)	DATASHEET WET BALL MILL: Main Gear-Cast Steel ASTM A 148 & Pinion Gear-Forged Alloy Steel	Main gear MOC shall be as per OEM standard and proven practise. Mostly followed gear materials are 34crmo4 or IS2644 or 35crnimo4. Customer is requested to allow OEM proven practice.	Bid specifications to be followed.
Annexure-23								
1	Volume-VII		SECTION : ELECTRICAL			220KV AIS Single Line Diagram, Drg No. 112-10-300	Control room layout and existing panel details required	Requisite Layout details is as per Attachment-10 . However, being an EPC job, Bidder to visit site for further details.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	Volume-VII		SECTION : ELECTRICAL			220KV AIS Single Line Diagram, Drg No. 112-10-300	Following existing SAS drawings/documents required - 1/ Communication System architecture 2/ Functional Design Specification of Existing SAS 3/ GTP of Existing SAS equipments 4/ Existing Networking Panels drawings	Available details is as per Attachment-11 . However, being an EPC job, Bidder to visit site for further details.
3	Volume-VII		SECTION : ELECTRICAL			220KV AIS Single Line Diagram, Drg No. 112-10-300	Existing 220kV busbar protection scheme	Requisite drawing is as per Attachment-12 . However, being an EPC job, Bidder to visit site for further details.
4	Volume-IV	4	GIS	5	4.02.04/O	Disturbance Recorder & Event loggers	As per Clause 4.27.00, Sh-46 of 88, at Sl no. 5 of the table feature is acceptable built-in distance relays proposed. Also as per Clause 5.05.07 of Chapter-5, Event recorder shall be part of IED's. Kindly confirm.	In case IEDs have in Built Disturbance Recorder & Event loggers, then dedicated disturbance recorder is not required in GIS. However Disturbance Recording & Event logging as per clause 5.06.02, 5.06.03 & 5.06.07 of SAS must be provided seperately.
5	Volume-IV	5	Substation Automation System	3	5.03.01/vi	Bidder shall offer the Bay Controller Unit (BCU) (one HOT and one COLD) for each bay in a diameter (One diameter will consists of three bays) at 400kV level.	Contradictory to Clause 4.22.00/iii of Chapter-4 where ONE BCU per bay is called.	Only GT bay shall have 2 BCU (1 working + 1 redundant) for each breaker (main and tie breaker). Cabling for both BCU shall be common. In case of failure of working BCU, redundant BCU shall take over. For other 400 KV bays, single BCU shall be provided with each Breaker. However, 2 Nos. spare BCUs shall be provided by the Bidder as mandatory spares.
6	Volume-IV	4	GIS	34	4.22.00/iii	Each Bay Controller unit will control one circuit and associated disconnecting switches, earth switches and instrument transformers along with bay mimic.	Kindly confirm requirement of BCU per bay.	Only GT bay shall have 2 BCU (1 working + 1 redundant) for each breaker (main and tie breaker). For other 400 KV bays, single BCU shall be provided with each Breaker. However, 2 Nos. spare BCUs shall be provided by the Bidder as mandatory spares.
7	Volume-IV	4	GIS	34	4.22.00/Vii	At least two protective devices operating in parallel on different principles shall be utilized in protection of 400 KV Lines	Two protection relays for 400kV Lines meeting the list of protections tabulated at Clause 4.27.00 are to be provided. Kindly confirm.	Atleast 2 protection devices operating in parallel of different makes and preferably of different principles as specified in Clause 4.27.00 & 4.28.00 of Chapter 4 of Vol. IV shall be provided in protection of 400 KV lines.
8	IV	4	GIS	37	4.26.06	Each 400 KV Line feeders shall have facility for live bus and dead bus closing. Live bus closing shall be ensured through synchro check relay and this synchro check relay is to be provided separately in each Bay Protection Panel.	BCU based control system is envisaged in the project, hence synchronisation facility will be part of BCU in line with Clause 5.05.03 of Chapter-5. Kindly confirm.	Confirmed.
9	IV	4	GIS	43	4.26.21 & 23	Lamps & Transducers	BCU based control and automation is envisaged in the project, hence lamps and transducers are not applicable. Kindly confirm.	Confirmed subject to the condition that all the status indication and parameters of bays are provided through BCU.
10	IV	4	GIS	44	4.26.24.04	Summation (Common for the various bays) :- The summator will be solid-state type of telecounting instrument and flush mounted version. The telecounting instrument will be suitable for operation on 240V AC.	Telecounting instruments are now obsolete. Summators as desired will be part of ABT metering software from OEM of ABT meters. Summation by software is also specified the Clause Chapter-5, Clause 5.09.00 (xvi).	Confirmed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
11	IV	4	GIS	46	4.27.00	Main-II Protection Scheme (composite Numerical Distance Protection Relay- Non switched scheme) Phase Comparison Relay with Auto Re- closing and Check Synchronizing Facility)	As per Clause 4.28.04 (iii), distance with built-in Line differential protection is called, hence phase comparision relays is not applicable.	Phase comparison realy will not be required in Main-I /Main-II Protection of lines. Further, Differential Protection element is also not required in Line Distance Protections, hence Clause 4.28.04 (iii) at Sheet 48 of 88 Chapter-4, of Volume-IV stands deleted.
12	IV	4	GIS	46	4.27.00	Over-fluxing Relay (at Sl no. 13 for line protection)	May not be applicable for line protection. Kindly clarify.	S.No.-13 of Line Protection of Clause 4.27.00 of Chapter 4 at Sheet 46 of 88 in Vol-IV is deleted.
13	IV	4	GIS	46	4.27.00	IRIG port for time synchronisation	IEC61850 based SAS is envisaged in the tender specificaiton and hence SNTP signal will be used for time synchronisation of all relays and BCU.	Confirmed.
14	IV	4	GIS	46	4.27.00	Breaker Failure Protection Relay (50Z)	50Z shall be realised in numerical busbar protection scheme for breakers connected to bus and separate LBB shall be provided for Tie breakers. This is also in line with Clause 3.03.06 (ii) of Chapter-3 at Page 7 of 28.	LBB function as a built-in feature of Bay Protection Unit / Bus Bar is acceptable provided it meets all the requirements specified for the LBB.
15	IV	4	GIS	47	4.27.00	STATION TRANSFORMER BAY PROTECTION PANEL & ICT BAY PROTECTION PANEL	Clubbing of protection functions in two relays Group-A & B shall be provided as per Clause 4.28.15.	Noted, however bidder is to provide two independent Numerical Protection Systems, each fed from a separate DC supply.
16	IV	4	GIS	58	4.28.19	Cross-Triggering feature so all connected IDM units will trigger and provide information across the complete substation during a fault condition.	Kindly clarify what is IDM units. We understand as per Clause 4.02.04/O, Disturbance Recorder built in distance relays are to be considered.	Seprate IED Disturbance Monitoring (IDM) units are not envisaged.
17	IV	4	GIS	59	4.30.00	INDICATIVE LIST OF MAJOR DEVICES MOUNTED IN SYNCHRONISING TROLLEY	BCU based control and automation is envisaged in the project in line with Clause 5.05.03 of Chapter-5, hence trolley is not applicable. Kindly confirm.	Synchronisation shall be achieved through BCU, hence synchronising trolly is not required.
18	IV	3	Elec Control & Relay Panels	8	3.03.07	In addition to disturbance recorder available with numerical relays, a separate standalone disturbance recorder covering all protection system taking different hardware inputs like CT, PT, Breaker, Isolator etc. shall be provided and shall have no connection with numerical protection relay.	We understand that this standalone DR is for GRP (Generator only). Built-in DR is acceptable for other bays as per Clause 4.27.00, Sh-46 of 88, at Sl no. 5 of the table.	Confirmed.
19	IV	5	Substation Automation System	3	5.03.01/xii	Co-ordination in commissioning of Phasor Measurement Unit: If PMU is envisaged by SLDC then the bidder has to make all arrangement to locate the PMU panel and extending auxiliary supply, CT, PT, GPS signals to the PMU panel and PMU data transfer to LDC are also included in the scope.	PMU is not envisaged in the scope of tender and hence this clause is not applicable.	Bidder shall provide only space provision and interfacing arragements for PMU.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
20	IV	5	Substation Automation System	15	5.06.10	A separate serial LAN connecting all the protection relays in multi-drop shall be created and connected to DR/Relay parameterization workstation.	Seial and multidrop is not applicbale in case of IEC61850 based SAS. DR workstation will sit on LAN to access all IED for parametrization. Kindly confirm.	Relays shall be connected on IEC 61850 protocol using star configration.
21	IV	5	Substation Automation System	19	5.09.00 (vii)	Shall have a built-in clock and calendar with an accuracy of less than 15 seconds per month drift without correction by external time synchronizing pulse. Date/time shall be displayed on demand. The clock shall be synchronized by GPS time synchronization equipment to be also supplied by the bidder.	ABT meters will be synchronised by Metering Master Station which will get time pulse over SNTP from GPS.	Confirmed.
Annexure-24								
Valves								
1	II	9	Mandatory Spares	9 of 103	15 (f)	Bearings & oil seals for	It is inferred that the clauses 15(g) and 15(h) are sub clauses to this clause. Kindly clarify	Bidder's understanding is correct.
2	II	9	Mandatory Spares	10 of 103	15 (s)	Spares for rack gear assembly	It is inferred that the clauses 15(t) and 15(u) are sub clauses to this clause. Kindly clarify	Bidder's understanding is correct.
3	III	1	Steam Generator & Auxiliaries	26 of 186	1.26 A 2 (iv)	Four (4) pneumatic emergency retract drives with matching crank tools for each type of soot boiler shall be provided along with required length of connecting pipe, fitting etc. Service air points for actuation of pneumatic drive shall be provided at convenient locations	This clause shall be modified as "Four Emergency retraction tools (emergency hand crank) for each type soot blowers)"	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
4	III	26	Power Cycle Piping, Valves, Fitting & Thermal Insulation	32 of 59	26.6.21	5.0 Construction c. Seat bushing: Renewable type screwed on and held in position by pin	For power cycle piping application, safety valve seat bushing shall be of welded type and this construction has proven performance record in all BHEL supplied boilers. For turbine and other applications, safety valve seat bushing shall be as per tender specification	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
5	III	26	Power Cycle Piping, Valves, Fitting & Thermal Insulation	32 of 59	26.6.21	6.0 Material e Spring: Alloy steel Safety Valves – SS or Tungsten steel Carbon steel Safety Valves – Carbon Steel	We will comply to Tungsten steel and carbon steel springs as per tender requirements. However for applications where temperature is less than 570°C, Springs shall be made of Chromium alloy steel material, which has proven performance record in all BHEL supplied boilers	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
6	III	1	Steam Generator & Auxiliaries	151 of 186	23.1.15 12. Clause j	j) Ammonia pressure relief valves shall be designed with mono block body, bellows lagging and gas-tight hood without lifting device; the stainless steel bellows shall be designed for the maximum counter pressure (static).	Ammonia pressure relief valves shall be with two piece body & bonnet construction. Bellows are required only for variable back pressure applications and in cases where imposed back pressure exceeds 10% of set pressure. Since the back pressure is atmospheric, bellows are not applicable and hence the requirement of bellows shall be removed. Requirement of Gas-tight hood without lifting device are met by our valves	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
7	IV	17	Electrical Actuators With Integral Starters	3 of 10	17.06.01	i)….All actuators shall be certified for SIL 2 or better. Ii) The actuators shall be Non-intrusive electric actuators with accessories. All actuator settings including torque, limit shall be possible without opening the actuator cover and LCD indication shall be available integral to actuator body.	As per Actuator supplier practice, MOV for High torque (> 1000 Nm) non-intrusive electrical actuators are considered without SIL2 certification.	Bid specifications to be followed.
8	IV	17	Electrical Actuators With Integral Starters	4 of 10	17.06.01	x) The integral starter which shall have sophisticated electronic controls with field programming feature.	Field programming feature not considered as per actuator vendor standard.	Noted.
9	IV	17	Electrical Actuators With Integral Starters	6 of 10	17.06.02	ix) 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.	Operating time shall be based on the valve size and system requirement. Generally operating time will be between 60- 90 seconds.	Noted.
10	IV	17	Electrical Actuators With Integral Starters	6 of 10	17.06.03	i) 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.	Two numbers of position limit switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts. The type of limit switch like rotary/drum/cam type shall be as per actuator supplier standard.	Noted.
Quality								
11	Vol 2	5	General Technical Requirement	22 of 86	22.4	The Bidder shall also furnish copies of the reference documents/plant standards/acceptance norms/tests and inspection procedure etc., as referred in Quality Plans along with Quality Plans. These Quality Plans and reference documents/standards etc. will be subject to Owner's approval without which manufacturer shall not proceed. These approved documents shall form a part of the contract. In these approved Quality Plans, Owner shall identify customer hold points (CHP), i.e. test/checks which shall be carried out in presence of the Owner's Project Manager or his authorized representative and beyond which the work will not proceed without consent of Owner in writing. All deviations to this specification, approved quality plans and applicable standards must be documented and referred to Owner along with technical justification for approval and dispositioning.	BHEL has very well established reference document/plant standards/acceptance norms/tests and inspection procedures etc. Owners approval for the same may not be envisaged.	Bid specifications to be followed
12	Vol 2	5	General Technical Requirement	22 of 86	22.8	All welding and brazing shall be carried out as per procedure drawn and qualified in accordance with requirements of ASME Section IX/BS-4870 or other International equivalent standard acceptable to the Owner.	All brazers, welders and welding procedures are qualified as per IBR for Pressure parts and ASME Sec. IX or AWS D1.1 for Non pressure parts.	Bid specifications to be followed

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
13	Vol 2	5	General Technical Requirement	22 of 86	22.9	All welding/brazing procedures shall be submitted to the Owner or its authorized representative for approval prior to carrying out the welding/brazing.	BHEL has very well established welding procedures and welder qualification system. All welders used for pressure parts and valves are approved by IBR authorities. Hence, approval of welding procedures and welder's qualifications by Owner/authorised representative is not envisaged.	Bid specifications to be followed
14	Vol 2	5	General Technical Requirement	22 of 86	22.10	All brazers, welders and welding operators employed on any part of the contract either in Bidder's/sub-vendor's works or at site or elsewhere shall be qualified as per ASME Section-IX or BS-4871 or other equivalent International Standards acceptable to the Owner..	All brazers, welders and welding operators are qualified as per IBR for Pressure parts and ASME Sec. IX or AWS D1.1 for Non pressure parts.	Bid specifications to be followed
15	Vol 2	5	General Technical Requirement	22 of 86	22.11	Welding procedure qualification & Welder qualification test results shall be furnished to the Owner for approval. However, where required by the Owner, tests shall be conducted in presence of Owner/authorized representative	BHEL has very well established welding procedures and welder qualification system. All welders used for pressure parts and valves are approved by IBR authorities. Hence, approval of welding procedures and welder's qualifications by Owner/authorised representative is not envisaged.	Bid specifications to be followed
16	Vol 2	11/Section M1	Steam Generator and Auxiliaries	2 of 103	2.0	I. Seperator - (a) Each plate shall be subjected to a 100% normal ultrasonic at the mill to meet the minimum requirements of EN 10160 1999 / equivalent ASTM standards. Elevated temperature tensile tests shall also be carried out on plate material for each heat.	It is clarified that the Separator is made of seamless pipes and not plate formed pipes. It is understood that the requirement is applicable for PFP.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
17	Vol 2	11/Section M1	Steam Generator and Auxiliaries	2 of 103	2.0	I. Seperator (b) After cutting to size and removal of cut outs, the plates shall be subjected to magnetic particle test along the edges of the plate and on areas adjacent to the cutouts.	It is clarified that the Separator is made of seamless pipes and not plate formed pipes. It is understood that the requirement is applicable for PFP.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
18	Vol 2	11/Section M1	Steam Generator and Auxiliaries	2 of 103	2.0	I. Seperator (d) Fully machined connecting pieces of internal diameter 100mm and above, shall be subjected to magnetic particle examination.	Since all pipes are UT tested ,MPI after machining is not envisaged.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
19	Vol 2	11/Section M1	Steam Generator and Auxiliaries	2 of 103	2.0	I. Seperator [e) Mechanical tests shall be carried out on specimens prepared from the production control test plates of the longitudinal welds.	It is clarified that the Separator is made of seamless pipes and not plate formed pipes. It is understood that the requirement is applicable for PFP.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
20	Vol 2	11/Section M1	Steam Generator and Auxiliaries	2 of 103	2.0	I. Seperator (f) Mechanical tests shall be conducted on the specimens from manhole cutouts of dished ends.	No tensile test is envisaged on manhole cut outs since forming is done using well established procedures. It was informed that there is no manhole in seperator.	Noted.
21	Vol 2	11/Section M1	Steam Generator and Auxiliaries	2 of 103	2.0	I. Seperator (g) All butt welds shall be subjected to 100% radiographic examination before stress relief.	For butt weld joint of other than Gr 91/92 , RT will be done before SR. For butt joints of Gr 91/92- RT/UT will be done after Stress relief (SR).	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
22	Vol 2	11/Section M1	Steam Generator and Auxiliaries	2 of 103	2.0	I. Seperator (i) All butt welds shall be subjected to 100% ultrasonic and magnetic particle examination after stress relief.	For Gr 91/92- RT/UT and MPI will be done after Stress relief(SR). For other than Gr 91/92- Only RT will be done before SR. MPI on butt joints for other than Gr 91/92 material is not envisaged.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
23	Vol 2	11/Section M1	Steam Generator and Auxiliaries	2 of 103	2.0	I. Seperator (j) All full penetration welds shall be subjected to ultrasonic examination after stress relief.	Only full penetration nozzle welds will be subjected to UT. Also UT will be done after SR for Gr91/92 materials and before SR for materials other than Gr91/92.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
24	Vol 2	11/Section M1	Steam Generator and Auxiliaries	2 of 103	2.0	I. Seperator (k) After stress relieving (SR) all welds, internal and external shall be examined by MPI methods depending on size and accessibility and all butt welds shall be subjected to 100% radiography.	Only RT is done before PWHT for Butt welds of materials other than Gr91/92. After PWHT, RT/UT & MPI is done on all Butt welds of Gr91/92. MPI is not done on all other welds.	Bid specifications to be followed.
25	Vol 2	11/Section M1	Steam Generator and Auxiliaries	3 of 103	2.0	II. Headers - (b) All butt welds shall be subjected to RT examination. Also MPI after SR.	For butt weld joint of other than Gr 91/92 , only RT will be done before SR. For butt joints of Gr 91/92- RT/UT and MPI will be done after Stress relief (SR).	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
26	Vol 2	11/Section M1	Steam Generator and Auxiliaries	3 of 103	2.0	II. Headers - (c) All full penetration nozzle and attachment welds shall be subjected to UT prior to stress relieving.	Prior to PWHT, UT is done on full penetration nozzle welds of carbon and low alloy steels. However, UT will be done on Gr 91/92 full penetration nozzle welds after PWHT. On all attachment welds only MPI will be done.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
27	Vol 2	11/Section M1	Steam Generator and Auxiliaries	3 of 103	2.0	II. Headers - (d) All nozzles, branches, stubs and load bearing attachment shall be examined by MPI techniques after the toes of the weld have been ground smooth and stress relieved	All nozzles, branches, stubs and load bearing attachment joints of material Gr X20, 91 and 92 will be examined by MPI+RT techniques after PWHT. For other than Gr X20, 91 and 92 , only RT will done before PWHT.	Bid specifications to be followed.
28	Vol 2	11/Section M1	Steam Generator and Auxiliaries	3 of 103	2.0	Completed closed end headers shall be subjected to hydraulic pressure tests and all compensating pads to be pneumatically tested.	Hydro test will be done on all closed headers only if there are no Elbows or Tees welded on to it.	Bid specifications to be followed.
29	Vol 2	11/Section M1	Steam Generator and Auxiliaries	3 of 103	2.0	III. Tubes and Tube Elements - © All tubes/stubs/panels/coils shall be checked for clearance by steel ball test and for cleanliness by sponge passage.	Flash butt-welded, Straight Tube butt-welded Tubes and Fusion welded panels will be checked by Steel ball test. Fin welded panels are inspected only with sponge. These are not applicable for stubs.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
30	Vol 2	11/Section M1	Steam Generator and Auxiliaries	3 of 103	2.0	III. Tubes and Tube Elements - (d) Finished butt welds shall be subjected to RT or UT. Wherever the code/standard/process specifies random sampling, the same shall be minimum 20%.	All Finished butt welds are subjected to RT/FT prior to SR where SR is applicable. 10% MPI/LPI is done on attachment welds other than fin welded panel welds.	Bid specifications to be followed.
31	Vol 2	11/Section M1	Steam Generator and Auxiliaries	4 of 103	2.0	III. Tubes and Tube Elements - (f) Tubes and fabricated panels/coils shall be subjected to hydraulic pressure test excluding loose tubes but including burner panels, reheaters, superheaters & economizers	Hydro test is done at Shop on 100% of the coils, spiral wall panels, SOFA Panels, Burner panels. For other panels: 100% for tube thickness ≤ 5.5mm; 20% for thickness > 5.5 mm and < 7 mm; NIL if thickness ≥ 7 mm. However, all items are covered under site hydro test after erection.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
32	Vol 2	11/Section M1	Steam Generator and Auxiliaries	4 of 103	2.0	IV. BOILER PIPING - [c) All bent pipes shall be checked for ovality and thinning by UT on first off lot & on random samples for subsequent pieces. Outer surface of bends shall be subjected to MPI/LPI.	MPI will be done on outer surface of bends which are fabricated by hot/incremental bending.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
33	Vol 2	11/Section M1	Steam Generator and Auxiliaries	4 of 103	2.0	IV. BOILER PIPING -(d) The edge preparation for shop and site welds in stainless steel /alloy steel shall be subjected to a dye penetrant check. Non-destructive examination of welds shall be carried out after post weld heat treatment, if any.	Dye penetrant check on the edge preparation for shop and Site welds is not envisaged since edge preparations are made by machining.	Bid specification to be followed, however the issue may be discussed during detailed Engineering.
34	Vol 2	11/Section M1	Steam Generator and Auxiliaries	4 of 103	2.0	IV. BOILER PIPING -(f) All weld joints in alloy steel piping of P 91, X20 and X22 & other material of P5B group and above shall be checked for Hardness. For PWHT Induction Heating shall be deployed. However PWHT can be done in furnace also. 3% hardness check shall be carried out on welds of other alloy steel piping.	Hardness test is envisaged on Gr91/92 butt weld only.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
35	Vol 2	11/Section M1	Steam Generator and Auxiliaries	5 of 103	2	VI Valves - (a) Pressure retaining parts of valves shall be subjected to (min.) NDT as per Table A.	NDT is as follows: 1. For Class 600 and above all sizes of Casting (body, bonnet) are 100% RT tested. 2. Vendors are developed to produce RT quality casting for valves less than Class 600. Hence, MPI is not done. 3. In case of forged valves, UT is done for bar diameter above 40mm used for forging and MPI/LPI done for finished forgings for all classes.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
36	Vol 2	11/Section M1	Steam Generator and Auxiliaries	7 of 103	2	III. SOOT BLOWER - (a) Butt weld between nozzle and lance tube shall be subjected to 100 % radiography tests.	Since it is a low-pressure line, MPI/LPI will be done on butt welds.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
37	Vol 2	11/Section M1	Steam Generator and Auxiliaries	10 of 103	2.6	Coal Feeders - (d) Explosion proof test at 50 psi as per NFPA code shall be done as type test. Leak tightness test shall be done on individual feeder casing. Endurance test for load cell shall be carried out.	Conduction of Explosion proof test (type test) is not envisaged. Report of already conducted explosion proof test will be offered to customer for review.	Bid specifications to be followed
38	Vol 2	11/Section M1	Steam Generator and Auxiliaries	10 of 103	2.60 €	Coal Feeders - (e) Test for weighing accuracy, calibration and repeatability shall be carried out at various speeds by a coal flow on two feeders.	Test for weighing accuracy, calibration and repeatability test at various speeds can be conducted as below. Accuracy: Accuracy test is done with actual coal flow at various feed rate. It is a type test. Calibration : Calibration will be done in all feeders using test weight. Repeatability: Repeatability test is done with test weight at various feed rate. It is a type test. Report of type test conducted as above will be submitted.	Clause 2.6 (e) of Chapter-11 at Sheet 10 of 103 in Vol-II be read as:- "Test for weighing accuracy, calibration and repeatability shall be carried out at various speeds by coal flow on one feeder and submit test report."
39	Vol 2	11/Section M1	Steam Generator and Auxiliaries	10 of 103	2.6	Coal Feeders -(b) Type tests including degree of protection and routine tests shall be done as per relevant Indian Standards or equivalent International Standards.	Degree of protection type test certificate for the motor will be furnished to the customer.	Bid specifications to be followed

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
40	Vol 2	11/Section M1	Steam Generator and Auxiliaries	12 of 103	2.11	Boiler Structure, Ducts, Hoppers etc - (a) Only material which has been identified against mill sheet or test certificates shall be used for construction. Structural steel and built up plate girders for main boiler shall be fully killed fine grained and normalised. All plates of tension and compression flanges and connection material and plates above 40mm thickness shall be 100% ultrasonically tested.	MTC for plates above 40 mm thickness will be given as per mutually agreed quality plan. Plates of thickness above 20 mm will be killed and normalised.	Bid specifications to be followed
41	Vol 2	11/Section M1	Steam Generator and Auxiliaries	12 of 103	2.11	Boiler Structure, Ducts, Hoppers etc - b) Visual inspection of all welds shall be performed in accordance with AWS D.1.1.	RT/UT will be performed only for butt welds of thickness greater than 32 mm. MPI for fillet welds only.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
42	Vol 2	11/Section M1	Steam Generator and Auxiliaries	13 of 103	2.12	III. Hangers and Support - (a) All raw materials used shall have co-related mill test certificate meeting mandatory checks of material specification.	Materials are procured with TCs meeting mandatory checks of material spec and issued to manufacture with correlation to Material specification (certified materials) used.	Bid specifications to be followed
43	Vol 2	11/Section M1	Steam Generator and Auxiliaries	13 of 103	2.12	III. Hangers and Support - [c) Butt welds will be tested for UT and fillet welds will be tested for MT. (d) Turn buckle/ pipe clamps/ Hangers of thickness > 25mm will be checked by MT/DPT on bent portion.	Butt Welds of size >32mm will be tested for UT. For bent portion of pipe clamps MPI is not envisaged and only visual inspection is carried out, 100% MPI will be performed form lug plate and turn buckle welds. For top and bottom plates 10% MPI is envisaged.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
44	Vol 2	11/Section M1	Steam Generator and Auxiliaries	13 of 103	2.13	Metallic Expansion Joint - © All welds shall be subjected to 100% magnetic particle/dye penetrant check and butt welds shall be subjected to 100% radiographic testing.	All welds including Butt welds will be subjected to Magnetic particle/Dye penetrant check.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
45	II	7 - Painting	Painting scheme for C2 and C3 environment	Sheet 12 of 15		Painting scheme for C2 & C3 environment	Painting specification of C3 environemnt is referred for boiler scope of components in view of the project site location.	Noted.
46	II	7 - Painting	Painting scheme for C2 and C3 environment	Sheet 12 of 15	Sl.No.1	Boiler structure, uninsulated ducts, suspensions, hangers temperature <120 deg.C a) Surface Preparation: Sa 2½ by blast cleaning. b) Primer: **Two coats of Inorganic Zinc Silicate Primer - DFT 80µ. c) Intermediate: One coat of HB epoxy MIO - 120µ. c) Finish coat: Two coats of polyurethane finish paint- DFT 60µ. Total DFT = 260µ.	**Application of 2 coats of Zinc silicate primer isn't technically permitted due to inadequate bonding between its subsequent coats by virtue of generic nature of primer. Following scheme is proposed for components exposed to industrial environment like Structures, Boiler supporting structures, Galleries, Bracings, Buck stays, columns, Cold air ducts etc. with operating temp <120ºC. a) Surface Preparation: Blast cleaning to Sa2½. b) Primer: One coat of epoxy zinc phosphate primer to IS13238 - DFT of 30µ. c) Intermediate: One coat of epoxy based MIO coating IS16943- DFT 75µ/coat. d) Finish: 1) One coat of epoxy based finish paint to IS14209 DFT of 30µ. 2) One coat of aliphatic acrylic polyurethane paint to IS13213 DFT of 30µ. Total DFT = 165µ. Shade: Smoke grey to 692 of IS5.	Bid specifications to be followed, however compatible primer shall be considered instead of Zinc Silicate.

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47	II	5 - General Technical Requirement	Preservative Shop coating	Sheet 20 of 86	20.3	Shop primer for all steel surfaces which will be exposed to operating temperature below 95 degrees Celsius shall be selected by the Bidder.	As there is no painting scheme given in the tender, following scheme of painting is proposed as clarification for all un-insulated miscellaneous components like, miscellaneous sheets, plates (thickness ≤5mm) other than structural items mentioned above. (Operating temperature up to 95 deg.C). a) Surface Preparation: St 2/3 by power tool cleaning. b) Primer coat: One coat of Red oxide Zinc Phosphate 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)	a) Noted. b) Noted. c) DFT of each coat shall be 40 microns. Total DFT = 110 microns (min)
48	II	7 - Painting	Painting scheme for C2 and C3 environment	Sheet 12 of 15	Sl.No.6	Fuel pipings a) Surface Preparation: Sa2 grade. b) Primer: 1 coat of ethyl zinc silicate - DFT 40µ. c) Finish Paint: 2 coats of HR aluminum paint to DFT of 20µ/coat. Total DFT = 80µ.	Following painting scheme is proposed in line with BHEL Std. Painting system for un insulated Fuel pipes components > 80 to 120ºC a) Surface Preparation: St3 by power tool cleaning. b) Primer paint: Two coats of General purpose Aluminum Paint to IS 2339- DFT 20□ /coat. Total DFT = 40µ.	Bid specifications to be followed
49	II	5 - General Technical Requirement	Preservative Shop coating	Sheet 20 of 86	20.3	Special high temperature primer shall be used on surfaces exposed to temperature higher than 95 deg. C and such primer shall also be subject to the approval of the Owner.	As there is no painting specification given in the tender, Following painting scheme is proposed in line with BHEL Std. Painting Practice for uninsulated components >120 º C but less than 600 º C (other than those coming in the gas path. Like Safety &BHEL Valves, Silencers, Vent Pipes, Manhole Doors, Seal Boxes etc.) a) Surface Preparation: St3 by Power tool cleaning. a) Two coats of Heat Resistant Aluminum Paint to IS 13183 Gr2 (Up to 400º C)/ Gr.1 (Up to 600º C) - DFT 20 µ/coat Total DFT = 40µ.	Bid specifications to be followed. DFT of each coat shall be 40 microns instead of 20 microns. Total DFT = 80 microns.
50	II	7 - Painting	Painting scheme for C2 and C3 environment	Sheet 12 of 15	Sl.No.3	Insulated parts exposed to temperature >120 º C. a) Surface Preparation: Sa 2 ½ by blasting b) Primer: *2 coats of Inorganic ethyl zinc silicate - DFT 30µ. Total DFT = 60µ.	*Application of 2 coats of Zinc silicate primer is technically not feasible as detailed in Sl.no.1. Inorganic zinc silicate coating will weather fastly without topcoat and forms chalking while exposed to atmosphere till erection. Therefore, tender spec is not feasible. Following scheme with 60microns DFT is technically feasible for components having high temperature working environment with insulation. (for all insulated components like hot ducts, Furnace Casing sheets, Riser tubes, External piping etc.,) a) Surface Preparation: St3 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.	Noted.
51	II	7 - Painting	Painting scheme for C2 and C3 environment	---	---	---	As there is no painting specification given in the tender, Following scheme is proposed as CLARIFICATION for Heat Exchanger Coils coming in the gas path. (Eco, SH, RH coils & Loose tubes etc.) a) Surface Preparation: Power tool cleaning. b) Primer paint: One coat of dip-coat paint –Red-oxide Zinc phosphate primer. Total DFT = 35µ.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
52	II	7 - Painting	Painting scheme for C2 and C3 environment	---	---	---	As there is no painting specification given in the tender, following scheme is proposed for Components coming in the gas path (other than coils), including water walls, SH panels, SH Headers, Hot air ducts etc. a) Surface Preparation: Power tool cleaning b) Primer paint: 2 coats of Red-oxide Zinc phosphate primer to IS 12744 to 30µ/coat. Total DFT = 60µ.	Noted.
53	II	7 - Painting	Painting scheme for C2 and C3 environment	Sheet 10 of 15	Cl.6, Sl.No.1	Suggested colour codes for painting: Ladders and handrails. Dark Admiralty Grey to Shade no. 632 of IS 5.	As there is no painting specification given in the tender, Following scheme is proposed for Hand rails, Posts, Stair and ladders, chequered plates etc., a) Power tool cleaning to st3 grade. b) 1 coat of red-oxide zinc phosphate to IS 12744 to a DFT of 30µ. per coat. c) 2 coats of Synthetic enamel to IS 2932 to a DFT of 20µ. per coat (black shade). Total DFT = 70µ.	a) Noted. b) Noted. c) DFT of each coat shall be 40 microns. Total DFT = 110 microns (min)
C&I								
54	II	9	Mandatory Spares-Controls & Instrumentation	80 of 103	1.00.01.02 (i)	Thermocouple/RTD elements: 100% of flue gas temp, coal air mixture temp, boiler/TG metal temp thermocouples...	Bidder understands that Mandatory spares requirement for this application is 10 % (ten percent). Ms HPGCL to check & confirm	Confirmed.
55	III	Chapter 1: Section 2	Fuel oil preparation & firing system	90 of 186	11.3 (11)	Following features shall be provided for interfacing with other systems/ equipment: a) Adequate local instrumentation such as temperature, pressure, differential pressure, flow switches for independent high and low signaling contacts required for Burner management system and other interlock/alarm.	Bidder proposes to envisage transmitters for all trip,interlock applications in-line with clause No. 4.00.00 (f) of Vol V/Part A-Page 11 of 96. Ms HPGCL to confirm.	Confirmed.
	V	Part A	MEASURING INSTRUMENTS- Type of instruments	11 of 96	4.00.00 (f)	(f) Type of Instruments :- For sequence, protection, control and alarm circuits, electronic transmitters, temperature elements with temperature transmitters etc. are to be provided.		
	V	Part A	MEASURING INSTRUMENTS- Type of instruments	14 of 96	4.00.00	Notes: 7. Level switches / pressure switches / flow switches/any other process switch etc. for OLCS / Alarms / Interlocks / Protection. Pressure switches at inlet, outlet of individual pumps and discharge header of pumps for protection and auto start / stop & alarms shall be provided.		
	V	Part A	MEASURING INSTRUMENTS- Type of instruments	15 of 96	4.00.00	Notes: 18. Process switches like pressure switch, level switch etc. shall be provided with triple redundancy for all the applications required for Trip & protection of HT drives, boiler, ...and the applications, whose non-availability may lead to loss of generation		
	III	Chapter 1: Section 1	Pulverised Fuel (PF) Piping	19 of 186	1.15.10	On line fuel measurement facility for accurate measurement of coal mass flow rate/air fuel ratio in each pulverized fuel (PF) pipe for coal pulveriser. The equipment shall comprise of sensors working on micro wave technology. ...	The performance of Online fuel flow measurement system / Coal mass flow & velocity measurement system is yet to be proved in Indian power stations due to maintenance issues. Hence the system is excluded from bidder's supply scope. M/s HPGCL to confirm	

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
56	V	Part A	MAIN EQUIPMENT RELATED CONTROL & INSTRUMENTATION SYSTEM	10 of 96	3.00.00 (p)	p) Coal Mass Flow & Velocity Measurement System.		Bid specifications to be followed.
	V	Part B/ Chapter 4	Coal Mass Flow & Velocity Measurement System	4 of 19	4.06.00	Coal Mass Flow & Velocity Measurement System On line Fuel flow & velocity measurement facility in each Pulverized Fuel (PF) pipe for each coal pulveriser shall be provided... The equipments shall compromise of sensors working on Micro wave resonance technology for measuring density and electro dynamic correlation method for evolving the velocity....The error in the measuring system (Coal mass flow and velocity) for individual PF pipe shall not be more than +/- 5%, which shall be demonstrated relatively by comparisons with isokinetic measurements as per ISO 9931... The scope of each steam generator shall include four (04) nos or more of erosion free measurement sensors for each PF pipe from each coal mill as per system requirements, redundant control units (including processors, communication modules, power modules etc),visual display unit, connecting cables etc for making system complete.		
57	V	Part A	MAIN EQUIPMENT RELATED CONTROL & INSTRUMENTATION SYSTEM	10 of 96	3.00.00 (j)	j) On Line Carbon in Ash Analyzers System	On line carbon in ash analyser system is yet to be proven for Indian coal fired boilers. Hence, online carbon in fly ash analyser is excluded in bidder's offer. M/s HPGCL to confirm.	Bid specifications to be followed.
	V	Part B/ Chapter 4	On Line Carbon in Ash Analysers System	10 of 19	4.13.00	On Line Carbon in Ash Analysers System The system shall utilize non sampling/extraction type microwave technology for online monitoring/ measurement of the unburnt carbon in fly ash with minimum 4 nos. probes measurement to have complete profile per location... The system shall measure a fly ash at a representative location (The Locations shall be decided & Finalised by owner during detailed engineering)... Accuracy shall be < 0.6 % minimum. The system shall also provide 4-20mA DC output for SG C&I and BOP C&I part of DDCMIS and thru redundant soft link also.... "On Line Carbon in Ash" Analysers System shall be used in optimization package also.		
	V	Part A	MAIN EQUIPMENT RELATED CONTROL & INSTRUMENTATION SYSTEM	10 of 96	3.00.00 (o)	o) Acoustic Pyrometers.	Acoustic pyrometers are not envisaged due to unsatisfactory performance feedback in our earlier power plants installations. Accordingly, Acoustic pyrometer at economizer outlet, furnace exit plane are excluded from bidder's scope of supply. M/s HPGCL to confirm.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
58	V	Part B/ Chapter 4	Acoustic Pyrometers	10 of 19	4.14.00	Acoustic Pyrometers Acoustic Pyrometers are to be provided to determine the average flue gas temperatures and complete flue gas temperature profile at Furnace Exit plane (for FEGT measurements) and at Economiser outlet.... For each temperature measurement plan/section, a system complete with all required software, comprising of minimum eight nos. of acoustic transreceivers or minimum two nos. acoustic transmitters & minimum twelve nos. acoustic receivers,		
59	III	Chapter 1: Section 2	Fuel oil preparation & firing system	88 of 186	11.3 (7)	Trip and Nozzle Valves 1. LDO trip valves & individual burner nozzle valve solenoid shall be: 2. Of single coil heavy duty construction having class 'H' insulation. 4. De-energized/air fail to close type.	Bidder proposes to envisage dual coil solenoid valves for Fuel oil trip & nozzle valves as per Cl 2.14.00- Vol V-Part B/Chapter 2-Page 39 of 64. M/s HPGCL to confirm.	Noted.
	V	Part B/ Chapter 2	Field & Measuring Instruments-Solenoid valves	39 of 64	2.14.00	SOLENOID VALVES f. For operation of the fuel oil corner nozzle valves, fuel oil trip valves etc., double coil solenoid valve (latch coil & relatch coil) shall be adopted. Single coil usage requires always power and loss of power leads to closure of above valves resulting the unit trip or loss of generation.		
60	III	Chaper 1: Section 2	SCR REACTOR AND CATALYST MODULES:Ammonia unloading compressors	142 of 186	23.1.8 (2)	f) After completion of unloading of ammonia from the tank truck, the compressor must be switched off by means of a flow monitor and the unloading process completed.	As per SCR design envisaged by bidder & in line with proven practice of bidder's col-laborator, Compressor is switched off based on low Pressure at Compressor inlet. Ammonia unloading operation is done by operator. Further, since ammonia unloading line has two phase flow (liquid & vapour), flow measurement will not be reliable. Considering above points, flow monitor is not provided for switching off compressor. M/s HPGCL to confirm.	Bid specifications to be followed. However bidder may also give additional provisioning of flow monitoring as per safe & reliable standard practices.
61	V	Part B/ Chapter 2	Field & Measuring Instruments: Electronic Water Level Indicator	8 of 64	2.05.00	Electronic Water Level Indicator Application - ... Boiler Separator Storage tank Electronic Remote level Monitoring System working on principle of difference in electrical conductivity between steam and water	Electronic water level indicator (EWLI) is provided for Drum-type boilers. For the offered Once through super critical (OTSC) boiler with Separator/storage tank, level measurement in Separator/ storage tank is based on DP measurement considering its height. Hence, EWLI is excluded from bidder's scope. This is in line with the standard practice followed by the bidder for all Once through super critical (OTSC) boilers. M/s HPGCL to confirm.	Noted.
62	V	Part B/ Chapter 3	DDCMIS:SG C&I CONTROL SYSTEM: Secondary Air Damper Control System	40 of 86	3.43.03.01	Secondary Air Damper Control System 4. Further Bidder shall provide required secondary air flow devices for measurement of compartmental wind box air flow for each elevation etc.	For tilting tangential windbox with corner-firing offered by bidder, Secondary dampers are modulated based on Furnace-to-Windbox differential pressure measurement as pr design. Compartmental wind box air flow measurement for each elevation is not required & hence, not envisaged. . M/s HPGCL to confirm.	Bid specifications to be followed, however issue may be discussed during detailed engineering.

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63	V	Part B/ Chapter 3	DDCMIS:SG C&I CONTROL SYSTEM: Secondary Air Damper Control System	40 of 86	3.43.03.01	Secondary Air Damper Control System 5. Individual position transmitters are to be provided for each of the secondary air dampers and the same shall be connected to SADC Control System.	For SADC dampers, position transmitters are not envisaged in view of the high temperature ambient operating conditions in their proximity. Instead, pressure switches are provided at the outlet of I/P converters to indicate proper working of SADC power cylinders and to obtain "Damper modulating" feedback. Hence position transmitters are not envisaged for SADC dampers. M/s HPGCL to confirm.	Bid specifications to be followed.
64	V	Part B/ Chapter 4	FURNACE AND FLAME VIEWING SYSTEM	5 of 19	4.07.01	FURNACE AND FLAME VIEWING SYSTEM The flame cameras shall be suitable for direct online continuous viewing in the central control room of the coal and oil flame and condition of the furnace internals including slagging of the water walls and any other deterioration in the furnace condition. The nos. and type of such flame cameras to be included in the proposal shall be selected by the bidder appropriate to his boiler design subject to minimum 4 nos. camera. Separate set of cameras shall be provided for viewing flame and furnace internals based on proven technology for the intended application	It is clarified that Furnace flame viewing system with 4 numbers of cameras is provided for viewing the furnace flame. It may not be possible to view the furnace internals, slagging & any other deterioration during boiler firing conditions. Ms HPGCL to confirm	In clause 4.07.01 of Ch-4 at Sheet 5 of 19, Vol-V, the figure / word ''4 nos.'' be read as "2 nos."
65	III	Chapter 1	Steam Generator & Auxiliaries: Fuel oil system	23 of 186	1.19 (13)	Supply of one (1) flow meter of positive displacement type including all its accessories.	Bidder proposes to offer Coriolis mass flow meter for fuel oil flow measurement as per Cl 2.12.06-Vol V-Part B/ Chapter 2-Page 28 of 64 M/s HPGCL to confirm.	Noted.
	V	Part B/ Chapter 2	Field & Measuring Instruments	26 of 64	2.12.04	The Bidder shall provide positive displacement type flow transmitters for fuel oil flow measurement, ...		
	V	Part B/ Chapter 2	Field & Measuring Instruments	28 of 64	2.12.06	Mass Flow meter Sensor Measuring Principle : Coriolis Mass flow. Application : Fuel Oil main lines, recirculation lines etc.		
66	IV	Chapter 1	LV SWITCHGEAR	32 of 58	1.24.02	All PCC/PMCC/MCC shall be of intelligent type compatible with IEC-61850 communication protocol.	Soot blower MCC (SBMCC) is used to power fractional HP Sootblower motors. Hence, bidder proposes to envisage conventional type Soot Blower MCC with Switch fuse units for protection circuit of blowers. M/s HPGCL to confirm.	Noted.
	IV	20 - LV Power cables	Acceptance test	9 of 12	20.09.00	One drum out of every 10 number of drums or less shall be selected at random sampling basis in each lot for the Acceptance Tests which shall be carried out at manufacturer's/supplier's cost.	For LV Power, control & instrumentation cables, acceptance tests, namely, flammability test, acid gas generation test, smoke density test, oxygen index test, Temp. index test, Rodent & termite repulsion property test, Anti fungal test (only for instrumentation cables) are conducted on 1 sample/lot. For anti-fungal test, since this test requires 4 weeks' time as per ASTM testing methods (ASTM G-21 or ASTM D 5590), it shall be changed under verification category instead of witness inspection	
	IV	21 - Control Cables	Acceptance test	8 of 12	21.06.01 - viii - a	The following test shall be carried out as Acceptance Test in the presence of Owner's 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 for the Acceptance Tests.		

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67	V	9 - Instrumentation and control cables	Acceptance test	34,35 & 36 of 36	9.11.02 - III	Following tests shall be carried out on 1 drum out of every 10 drums or less for each size of cables in each lot, in presence of owner's representative.		FRLS test and flamebillity test to be conducted on one drum of every size and voltage grade of cables. Other acceptance tests sampling quantity as per Appendix-D of IS 7098-2, D 2.2.
	V	9 - Instrumentation and control cables	Routine test	34 of 36	9.11.02 - II	Routine test shall be carried in presence of owner's representation for all type of cables.	Routine test is done for 100% of the quantity. It is unlikely for the customer to witness test covered under routine test on 100% of cable. Customer is requrested to accept "verification" of routine test instead of "witness" since all the routine tests are covered in acceptance tests and acceptance tests will be witnessed on sample basis by customer's representative. Routine test report will be furnished for verification during final inspection.	
	V	9 - Instrumentation and control cables	Type test	31 &32 of 36	9.11.02 - I - B	The type tests shall be carried out on one drum out of every 10 drums or less for each size of cable in each lot, in presence of Owner's representative as per applicable standards in Govt. approved Laboratory if adequate testing facility is not available at works of the supplier.	Type tests will be carried out with sampling plan as 1 sample/lot	
68	V	17 - Quality Assurance and Testing and Gaurantees	Burn-in and Elevated Temperature test	3 of 32	17.02.04.03	Burn-in and Elevated Temperature Test All solid state electronic equipment shall be tested as a complete system/equipment with all devices connected for a minimum of 168 hours continuously under energized conditions prior to shipment from manufacturer's works, as per the following cycle :- During the first 48 hours of testing the ambient temperature shall be maintained at 50 deg.C and relative humidity at 95%. The equipment shall be interconnected with all devices, which will cause it to repeatedly perform all operations; it is supposed to perform in actual service, with load on various components being equal to those, which will be experienced in actual service. The 48 hours tests period shall be continuous but shall be divided into four 12 hours segments. The input voltage during each 12-hour segment shall be nominal voltage for 11 hours, followed by 110% of normal voltage for 30 minutes followed by 90 percent of nominal voltage for 30 minutes. The 48 hours elevated temp test shall be followed by 120 hours of burn in test as specified in the above paragraphs except that the temperature is reduced to ambient temperature prevalent at that time. Alternatively copy of type test certificate for burn-in test shall be submitted.	Manufacturer's standard practice for burn-in and Elevated temperature test shall be followed. Manufacturer's standard practice is as follows. The fully equipped panel is kept energized for 24 hrs. continuously. Out of the 24 hrs., for first 10 hrs., the cabinet/equipment is kept in temp. controlled oven at 50 deg.C +/- 2 deg. C. This 10 hrs. period is divided into 5 cycles of 2 hrs. duration each. In each cycle the voltage varied between 100% for 1 hr, 110% for ½ hr, and 90% for ½ hr. For the balance 14 hrs, the cabinet/ equipment will be kept in ambient temperature prevalent at that time with nominal voltage. Functional test will be performed after this test. During the test, temp. rise inside the cubicle/equipment should not exceed 10 deg.C over ambient. The above test will be carried out for 1 no. of panels for a particular system.	Bid specifications to be followed, however issue may be discussed during detailed engineering.
	II	11 - QAP (Mechanical)	Coal Feeders	10 of 103	2.6 - e	e) Test for weighing accuracy, calibration and repeatability shall be carried out at various speeds by a coal flow on two feeders.	As per convention, calibration and repeatability tests are done with test weight. Report of type test conducted recently for similar design will be presented.	Bid specifications to be followed.

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69	III - Mechanical	1 - Steam Generator & Auxiliaries	Type test	121&122 of 186	22.1 & 22.6	22.1 Full scale type tests using actual equipment shall be conducted by the Bidder for the equipment mentioned in the subsequent clauses below: 22.6 Following tests on Coal Feeder b) Weighing accuracy, calibration and repeatability test at various speeds with coal flow. c) Degree of protection test as per relevant Indian or equivalent International Standards.	22.6 b) As per convention, calibration and repeatability tests are done with test weight. Report of type test conducted recently for similar design will be presented. c) Considering the nature of requirement, the type test report of degree of protection test conducted on similar design will be presented.	Bid specifications to be followed.
Piping								
70	SG-Vol. II A	Chapter 5	General Technical Requirement	Sheet 23 of 86	22.18	All the sub-vendor proposed by the Bidder for procurement of major bought out items including castings, forging, semi-finished and finished components/equipment etc., list of which shall be drawn up by the Bidder and finalized with the Owner, shall be subject to Owner's approval.	BHEL has a very well-established system of assessment, approval and enlistment of both subcontractors and bought out vendors in the Company's directory. Components will be subcontracted to only BHEL-approved vendors having experience of doing similar jobs. Hence, approval by the Owner is not envisaged.	Bid specifications to be followed.
71	SG-Vol. II A	Chapter 7	Painting	Sheet | 12 of 15		PAINTING SCHEME FOR C2 AND C3 ENVIRONMENT Sl No 1, 3, 11	A) Interior of Piping – No painting. B)Exterior of Piping i)Insulated Piping: Surface Preparation-SSPC-SP3 Power tool cleaning Primer- Red oxide Zinc Phosphate (alkyd base) to IS 12744, 2 coatsx30 microns Total DFT =60microns ii)Un insulated piping Surface Preparation-SSPC-SP3 Power tool cleaning Primer- Red oxide Zinc Phosphate (alkyd base) to IS 12744, 1 coat x30 microns Finish-Synthetic enamel paint long oil alkyd to IS 2932 ,2coats x20 microns Total DFT =70 microns	Bid specifications to be followed.
72	SG-Vol. II A	Chapter 11	Quality Assur-ance Require-ments	Sheet | 5 of 14	2.5.4	Inspector’s Qualifications The Contractor shall submit with their QA/QC Manual resumes of contractor’s inspectors detailing their experience, educa-tion and qualifications for Owners re-view/approval. The Inspectors shall have sufficient prior experience and qualifications for the equipment assigned.	Inspection will be carried out by experienced inspectors who possess technical qualification and product orientation. Owner's approval for Inspector not envisaged.	Bid specifications to be followed.

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73	SG-Vol. II A SECTION - M1	Chapter 11	QAP (Mechani-cal) SECTION - M1	Sheet | 4 of 103 Sheet | 16 of 103	IV 5.0	Boiler Piping h) Non-destructive examination of welds shall be carried out in accordance with the relevant design/manufacturing codes. How-ever, as a minimum, the following require-ments shall be met. Further statutory re-quirement, wherever applicable shall also be complied with. POWER CYCLE PIPING h) Non-destructive examination of welds shall be carried out in accordance with the relevant design/manufacturing codes. How-ever, as a minimum, the following require-ments shall be met. Further statutory re-quirement, wherever applicable shall also be complied with	In conformance to IBR and other international standards, the BHEL practice of NDE for piping is as follows: NDE before PWHT (irrespective of service temperature): For Boiler Piping: ID ≤ 102mm : 5% RT 102 < ID ≤ 178 mm : 10% RT ID > 178mm : 100% RT For External Piping : Class I : ID ≤ 102 mm : 10 % RT ID > 102 mm : 100% RT Class II : 10 % RT for all diameter.	Bid specifications to be followed.
74	SG-Vol. II SECTION - M1	Chapter 11	QAP (Mechani-cal)	Sheet | 48 of 103	15	LOW PRESSURE PIPING 1 - Pipes & Fittings and Metered bends – Hydraulic / Water fill test to be done.	Pipes are tested with 100% UT for t ≥ 3.6 mm & 100% ECT for t< 3.6mm. No hydro test envisaged for individual pipes. Complete piping system shall be subjected to hydro test at site after erection.	Bid specifications to be followed. Pipes shall be supplied as per IS 1239 / 3589 as applicale.
Annexure-25								
1	I	IV	Section - IV GCC	57 of 80	43.0	SPARES : i) The Contractor shall agree that the spare parts recommended by him for five (5) years operation and quoted in the Bid Proposal shall be supplied by him at the same terms and conditions as otherwise applicable to this Contract. Further, the Contractor also shall agree to supply spare parts required for the operation and maintenance of the Facilities as per provision of subsequent paragraphs of this sub-clause.	Since the Mandatory spares list as specified in specification is exhaustive and hence recommended 3 years Operation and maintenance spares are not envisaged	Bid specifications to be followed.
2	II	Ch 1	Intent of Specification	7 of 10	4.4.1	The bidder's scope shall include all pre-commissioning and commissioning activities, materials and services as detailed in technical specifications including supply of all consumables (except coal and fuel oil for firing), temporary equipment and piping, instruments, labour/skilled manpower etc. The scope includes complete requirement of flushing oils including fresh oil refilling during the pre-commissioning and commissioning activities and subsequent initial operation.	The supply of anhydrous ammonia (99.5%) is also to be excluded from the scope of supply of consumables for pre-commmissioning and commissioning activities.	Supply of Anhydrous Ammonia for pre-commissioning, commissioning, initial operation, trial run, etc of SCR system shall be in Owner's scope
3	II	Ch 2	Appendix- II	5 of 10	Appendix- II Coal Quality Parameters : Performance/ Design Fuel		Proximate Analysis does not sum to centum. Please provide complete coal analysis.	Consider volatile matter as 22% and fixed carbon as 25%

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4	II	Ch 2	Appendix- II	5 of 10	Appendix- II	Coal Quality Parameters : Performance/ Design Fuel	Kindly provide the complete Ash fusion range for the design coal and also mention the atmosphere at which the ash fusion temperatures have been provided.	Ash fusion range for design coal shall be 1100-1400 deg C. Ash fusion temperature for design coal shall be 1310 deg. C
5	II	Ch 2	Appendix- II	5 of 10	Appendix- II	Coal Quality Parameters : Performance/ Design Fuel	Kindly provide the complete Ash analysis for the Design Coal.	Please refer Attachment 33 for Complete ash analysis.
6	II	Ch 2	Appendix- II	5 of 10	Appendix- II	Coal Quality Parameters : Worst Fuel	Ash Analysis does not sum to centum. Please provide complete analysis.	Please refer Attachment 33 for Complete ash analysis.
7	II	Ch 3	Operating Capability of Plant	2 of 4	3.3 (p)	Plant shall be designed to give life of not less than 25 years. Further, expected numbers of Steam Turbine Generator startups during design life are as follows: Type of starts Number of starts Hot Start 4000 Warm start 1000 Cold start 250	To match the desired plant operating capabilities, the Steam Generator shall also be designed for cyclic / two shift operation. Expected numbers of Steam Generator start-ups during 25 years of design life are as follows: Type of Starts Number of Starts a. Hot start (after 8 hours of unit shut down) 4000 b. Warm start (after 36 hours of unit shut down) 1000 c. Cold start (after 72 hours of unit shut down) 150 To make unit capable of continuous two shifting operation, the number of hot start ups shall be increased from 4000 numbers to 6700 numbers without changing cold and warm start up as well as daily N1 (minimum 13400 cycles in total design life) and N2 (minimum 6700 cycles in total design life) requirements as defined specification. Number of given cold and warm starts translate into approx. 6 to 7 years of standstill / non-productive period of the machine. Practically load cycling will be possible for remaining 18 to 19 years of operation. Further, The unit shall have minimum rate of loading or unloading of 3% per minute above the control load (i.e. 50% TMCR). Plant shall be capable of minimum N1 number of daily load cycles (N1 shall not be less than 2) from load variation from 100% to 50 % (and vice versa) of TMCR with a minimum ramp rate of 3% per minute without affecting the design life of boiler and turbine 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% TMCR 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 systems.	In Clause 3.3 (p) of Ch-3 at Sheet 2 of 4 in Vol-II and Clause 1.10 (a) of Ch-1 at Sheet 41 of 186 in Vol-III, Type & No. of starts during design life be read as:- "Type of Starts No. of Starts Cold Start (after shut down period exceeding 72 hours) 150 Warm Start (after shut down period between 10 hours and 72 hours) 1000 Hot Start (after shut down period less than 10 hours) 4000" Ramp rate is to be considered as per CEA notification no. CEA-TH-17-13/4/2022-TETD Division dated 25/01/2023.
	II	Ch 3	Operating Capability of Plant	2 of 4	3.5	The plant shall be designed to operate as a base load station. However, continuous operation under two shift and cyclic modes during certain periods is also envisaged.		
	II	Ch 3	Operating Capability of Plant	2 of 4	3.7	For the steam generator, in addition to the above requirement, specific design features incorporated and design/process improvements which are being offered for N1/N2 cycles shall be submitted along with the bid.		
	III	Ch1	Steam Generator & Auxiliaries	41 of 186	1.10.	To match the desired plant operating capabilities, the Steam Generator shall also be designed for cyclic/two shift operation. Expected numbers of Steam Generator startups during 25 years of design life are as follows: 1. Hot start (after shut down period less than 10 hours) : 4500 2. Warm start (after shut down period between 10 hours and 72 hours) : 1000 3. Cold start (after shut down period exceeding 72 hours) : 455		

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	III	Ch1	Steam Generator & Auxiliaries	43 of 186	1.13.1	The Steam Generators shall be designed for minimum rate of loading/unloading mentioned below without compromising on design life of pressure parts: a)Step load change :Minimum ± 10% per minute b)Ramp Rate: Minimum ± 3% per minute (30% to 50% load) Minimum ± 5% per minute (50% to 100% load)		
8	II	Ch 5	General Technical Requirement	5 of 86	8.6.1	Basic Engineering Documentation	Documents which are not proprietary in nature shall be shared.	Bid specifications to be followed.
	II	Ch 5	General Technical Requirement		8.6.2	Detailed Engineering Documentation		
9	III	Ch 1	Steam Generator & Auxiliaries	2 of 186	1.0.	Stream Generator should be designed for minimum 10% co-firing with Biomass Torrefied Pellets. Performance Guarantees will be on the basis of design coal.	Kindly provide the Biomass torrified pellets analysis. Bidder understands that the 10% of the biomass cofiring will be based on the weight basis of the total fuel to be fired.	Biomass details are as per Attachment-13.
10	III	Ch 1	Steam Generator & Auxiliaries	3 of 186	1.6 (2).	Double isolation (one motorised and one manual) valve at the suction and Motorised isolation, electrohydraulic operated control valve and a non return valve on the discharge of the pump. Alternatively, electrohydrualic operated control valve and a motor operated stop cum check valve is also acceptable.	One motorised isolation valve at the suction. Electrohydraulic operated control valve and a motorised isolation valve on the discharge of the pump envisaged as per standard practice of the bidder. Non-return valve (NRV) at discharge of start-up recirculation pumps cannot be envisaged as this will reduce the warmup flow thereby affecting the performance of the system. All BHEL supplied boilers are operating satisfactorily with the arrangement offered.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
11	III	Ch 1	Steam Generator & Auxiliaries	7 of 186	1.9	Manually operated isolation valves on steam supply line shall be provided at each stream of furnace blowers or as per standard proven practice of bidder. These valves shall be designed for full flow and shall be tight shut off type.	Tender calls for soot blower to be of self-draining type. To facilitate draining of the condensate, the soot blowers at various elevations are connected to steam line as shown in our drawing (Drawing will be submitted as part of technical offer). This arrangement does not permit elevation wise isolation. Maintenance in LRSB can be done conveniently by closing the main isolating valve. Since the soot blowers are operated only once in a shift, no difficulty will be faced on account of closing the isolating valve for any maintenance work. This practice is followed in all boilers including NTPC units	Bid specifications to be followed.
	III	Ch 1	Steam Generator & Auxiliaries	7 of 186	1.9	Complete soot blower piping shall have warm up and automatic self draining features to preclude water being blown on to the heat absorption surfaces.		
12	III	Ch 1	Steam Generator & Auxiliaries	7 of 186	1.9	Valves for soot blower operation shall include pneumatically operated pressure reducing control valves, (one control valve of 0-40% capacity for wall blowers, one control valve of 0-100% capacity for all types of blowers taken in service in any combinations, one standby 0-100% capacity motorised inching valve with position feedback, drain valves)	One control valve of 0-100% capacity for all types of blowers taken in service in any combinations, one standby 0-100% capacity motorised inching valve are envisaged as per bidders standard practice and working satisfactorily in earlier executed projects.	Noted.

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13	III	Ch1	Steam Generator & Auxiliaries	11 of 186	1.11 18)	Interconnecting auxiliary steam piping from pakage boiler to auxiliary steam station headers(s). The complete engineering, routing, hanger, support and auxiliary structure shall be in the Bidder's scope.	The details of the package boiler is to be provided in the tender specification, which is not available.	Requirement of Auxiliary Boiler has not been envisaged. Auxiliary Steam required for commissioning shall be tapped from the existing 2 x 300 MW Auxiliary Steam Header and connect the same to the new plant. However, bidder may also arrange auxiliary steam, if required, from a portable auxiliary boiler on returnable basis, which can be taken away after use.
14	III	Ch1	Steam Generator & Auxiliaries	12 of 186	1.13 a)	Forced Draft Fans Two (2) FD fans (2X60% BMCR) (Axial type, constant speed variable pitch controlled FD fans……	The FD fan shall be sized for 2x50% BMCR and 2 x 60 % TMCR condition. Pl confirm.	Bid specifications to be followed.
	III	Ch1	Steam Generator & Auxiliaries	91 of 186	12.1	Fan Sizing Criteria: FD Fans : Each fan to be sized for 60% BMCR load (one stream in operation)		
15	III	Ch1	Steam Generator & Auxiliaries	12 of 186	1.13 b)	Induced Draft Fans Two (2) ID fans (2 x 60% BMCR) (Axial type, constant speed, variable pitch controlled, with variable frequency drive) each…….	The ID fan shall be sized for 2x50% BMCR and 2 x 60 % TMCR condition. Pl confirm.	Bid specifications to be followed.
	III	Ch1	Steam Generator & Auxiliaries	91 of 186	12.1	Fan Sizing Criteria: ID Fans : Each fan to be sized for 60% BMCR load (one stream in operation)		
16	III	Ch 1	Steam Generator & Auxiliaries	17 of 186	1.15.5	Each fan shall be provided with self cleaning type filters etc.	One self-cleaning filter in the common line is envisaged, which meet the technical requirement.	Bid specifications to be followed.
17	III	Ch 1	Steam Generator & Auxiliaries	19 of 186	1.15.10	On line fuel measurement facility for accurate measurement of coal mass flow rate/air fuel ratio in each pulverized fuel (PF) pipe for coal pulveriser. The equipment shall comprise of sensors working on micro wave technology.	The coal air flow in coal pipes is equalized by installing custom sized orifices (static) in shorter coal pipes from a mill. This arrange-ment ensures necessary flow equalization among coal pipes. This is the standard prac-tice being followed in all the BHEL boilers. Also, it is to be noted that in tangential firing system, the entire furnace acts like a turbu-lent burner with good interaction between the fuel and air streams from the four corners. Hence, it is not required to have provision to adjust the orifices for flow equalization and On line fuel measurement facility. Also, Tangential fired boilers do not require precise coal/fuel ratio to each corner and hence fixed orifices are provided. Any malfunction of variable orifice may lead to fireball instability and eventual MFT. Hence BHEL recommends only fixed orifice.	Bid specifications to be followed.
	III	Ch 1	Steam Generator & Auxiliaries	19 of 186	1.15.11	Adjustable valve/orifice of erosion resistant/ceramic coated material suitable for highly abrasive pulverised coal applications. The adjustable valve/orifice shall be provided on each P.F. pipe at pulveriser outlets and shall enable onload adjustment of coal flow in PF pipelines.		

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18	III	Ch1	Steam Generator & Auxiliaries	20 of 186	1.16 14.	A suitable interconnecting header shall be provided downstream of the Economizer outlet before APHs (bisector/trisector) for equal distribution of the Flue gas flow between the two Flue gas paths to APHs.	The design of the ducting will take care of the equal distribution of the gas into the two APHs after economizer. Hence, the interconnecting header downstream of economizer outlet will not be provided. This is as per design excecuted for all OTSC boilers supplied by the bidder. It was further informed by BHEL during pre bid meeting that space available in this area is very limited and duct length from Eco outlet to APH inlet is very small.The existing proven arrangement of ducting will take care of equal distribution of gas into two APHs after economiser. Hence there is no requirement of interconnecting header downstream of economizer.	Noted.
19	III	Ch 1	Steam Generator & Auxiliaries	26 of 186	1.26 2 vi.	Four (4) pneumatic emergency retract drives with matching crank tools for each type of soot boiler shall be provided along with required length of connecting pipe, fitting etc.	Pneumatic emergency retract drives are not envisaged for this project. As per BHEL standard practice Emergency Hand crank shall be provided, which can be engaged to move the lance manually to the home position. This is functionally equivalent to the specification requirement. It was further informed by BHEL during pre bid meeting that there is no proven vendor available in the market for the pneumatic emergency retract arrangment.	Noted.
20	III	Ch 1	Steam Generator & Auxiliaries	27 of 186	1.26 E)	One (1) set of Igniter Testing kit shall be provided for the purpose of testing healthiness of (a) solenoid valve, power cylinder, limit switches of the ignitor carriage assembly (b) ignitor cable, rod and spark tip of the sparking system	Ignitor is tested at supplier's end. Hence ignitor testing kit is not required and not envisaged.	Bid specifications to be followed.
21	II	Ch 2	Appendix- II	5 of 10	Appendix- II	Coal Quality Parameters : Performance/ Design Fuel	Owner is requested to provide complete coal analysis	Available analysis is already attacehd in the specification Volume II. Please consider performance coal as design coal.
	II	Ch 1	Steam Generator & Auxiliaries	38 of 186	1.4 (a)	The primary fuel for the Steam Generator(s) shall be coal (coal characteristics of design coal, worst coal, best coal and range of coal for the project to be considered for boiler design).		
22	III	Ch 1	Steam Generator & Auxiliaries	40 of 186	1.9.1 ii	Sliding Pressure Operation from rated pressure down to 30-40% of rated pressure with as well as without any throttle reserve.	Considering the waterwall tube to tube temperature excursion at lower flow, variable pressure operation shall be limited to Min OT load viz. 40% TMCR with operating pressure of 120 kg/cm2 @ Superheater outlet.	In Clause 1.9.1 (ii) of Chapter-I at Sheet 40 of 186 in Vol-III, the figure "30-40%" be read as "40%".

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23	III	Ch 1	Steam Generator & Auxiliaries	44 of 186	1.19	Materials for Steam Generator Components (i) Upto & including 400 °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 (iii) Upto & including 601 °C : Alloy steel ASME SA-335/213: P-91/T-91 or approved equivalent. (iv) Upto & including 610 °C (*) : Alloy steel ASME SA-335:P-92/T-92 or approved equivalent (v) Above 610 °C : Austenitic stainless steel, super 304H, TP347H or approved equivalent * Note: i) Bidder may use ASME SA-335: P-92 or approved equivalent material up to 610°C for the components which are outside the flue gas path for Superheater, Reheater tubes, headers and interconnecting piping as applicable. In case it is proposed by the bidder to use ASTM-A-335 P-92 or equivalent material, Bidder shall be required to furnish operating references. ii) Maximum allowable -stress values for ASME SA-335: P-92/T-92 or approved equivalent material as per code shall be reduced by 10% for calculating the thickness of pressure parts.	The maximum limit of the temperature for materials will be as per IBR/ASME code. ASME SA-213:T-92 is used for terminal tubes (i.e. from header to coil) for ease of welding, then such tubes can also be used beyond design metal temperature of 610 degC and the metal temperature of T-92 will be limited to 620 Deg. C. For Hot Reheat Steam Temperature (HRH), Temperature in the Specified range i.e. up to 610 deg C, Alloy Steel ASME SA -335/213 Gr.P-92 or equivalent can be used for HRH headers, up to & including 620 degree Celsius. Maximum allowable -stress values for ASME SA-335: P-92/T-92 or approved equivalent material as per code and additional 10% reduction of stress value as specified is not envisaged. Further, during pre bid discussions, BHEL requested to delete Note ii) regarding Maximum allowable stress value as this clause is not provided in other tenders. A copy of NTPC, LARA specs was submitted for reference.	Noted.
24	III	Ch 1	Steam Generator & Auxiliaries	45 of 186	1.23	The equivalent weighted average of sound level measured at a distance of 1.5 M above floor level in each elevation and 1 M horizontally from the base of any equipment furnished and installed under these specifications, expressed in decibel to a reference of 0.0002 microbar, shall not exceed 85 dB (A). Noise level for motors shall be specified in motor specification.	The safety valve offered will meet the noise level requirement of 115dBA at a distance of 3 m from the source inline with OSHA stand-ard. Air motor (APH) is an emergency drive and will operate only for a short time during AC motor failure. Noise level during air motor operation will be around 95 dBA. The Mill noise level shall be 95 dB (marginally more than the specified value), intermittently, especially during entry of foreign materials or difficult to grind materials. However BHEL informed during pre bid discussions that except for above, bid specifications regarding equivalent weighted average of sound level are agreed for regular / normal operation of boiler and auxillary equipments.	Noted.
25	III	Ch 1	Steam Generator & Auxiliaries	46 of 186	1.25 d)	The working fluid temperature to be considered for design of boiler tubes, headers, separators and other pressure parts upto first stage of attemperation shall be arrived by adding an additional margin of minimum 40°C to the maximum predicted/expected fluid temperature in these pressure parts. The margins as per IBR and other codes shall be taken over and above the working fluid temperatures so arrived.	Pressure parts design temperature will be based on worst case of all operating conditions and over and above adding additional margin will increase the thickness of the pressure part components. For cyclic loading design thickness of components is important and should be as minimum as possible and hence margins will be as specified in the IBR. Customer is requested to remove requirement of additional margins specified in the specification.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
26	III	Ch1	Steam Generator & Auxiliaries	46 of 186	1.25 b	Design pressure of the Steam Generator pressure parts shall be atleast 1.05 times the maximum operating pressure, or as required by IBR/other international codes, whichever is higher. Further, design pressure of the steam generator pressure parts upstream of separators shall be atleast 1.05 times the maximum operating pressure, or as required by IBR / ASME, or pressure arrived based on lowest set pressure of spring loaded safety valve on the separators plus the pressure drop from separator to the respective pressure part; whichever is higher.	Design pressure of the Steam Generator pressure parts and separator shall be atleast 1.05 times the maximum operating pressure, or as required by IBR/ASME, whichever is higher.	Noted.
	III	Ch1	Steam Generator & Auxiliaries	53 of 186	5.0 ©	c) Design Pressure: 1.05 times the max. operation pressure or highest set pressure of the spring loaded safety valve for full discharge whichever is higher		
27	III	Ch 1	Steam Generator & Auxiliaries	63 of 186	8.0 iii	Economizers shall be provided with:- a) Minimum 1.5 m clear cavity height between two sections/banks of the economizer for maintenance access	1.0 m cavity height between two sec-tions/banks of horizontal heat transfer surfaces is sufficient for the maintenance access, this is also inline with earlier projects where Desein is the consultant.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
	III	Ch 1	Steam Generator & Auxiliaries	61 of 186	7.4	For maintenance/inspection of SH/RH, provide: i. 1.5 m clear cavity height between two sections/banks of horizontal heat transfer surfaces for personnel access.		
	III	Ch 1	Steam Generator & Auxiliaries	47 of 186	2.0	7. In the Steam Generator enclosure, minimum 1.5 M cavity height shall be provided in between the horizontal banks/sections of economizer, superheater and reheaters for maintenance purpose.		
28	III	Ch 1	Steam Generator & Auxiliaries	47 of 186	3.0 e)	Maximum heat input per burner, kcal/hr/burner =700 x 10^5	For given range of coals Heat Input per burner criteria can be 850x10^5 kcal/hr/burner.	Bid specifications to be followed.

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29	III	Ch 1	Steam Generator & Auxiliaries	47 of 186	3.0 l)	Furnace Bottom hopper Design of Boiler and its supporting structure shall be considering 50% ash/clinker loading in furnace bottom hopper and corresponding to ash density of 1600 Kg/M3.	For supercritical boilers with spiral wall construction, the tubes are almost horizontal and ash accumulation is to be avoided to protect the panel tubes from deformation. Boiler should not be operated with ash accumulation in furnace bottom as this is an unsafe condition and boiler should be stopped immediately if accumulation is experienced. This is safety recommendation and customer is requested to abide. Hence the 50% ash load will not be considered in Furnace hopper bottom.	For design of Boiler and its supporting structure, ash density of 1350 kg/m3 shall be considered instead of 1600 Kg/m3.
						Further minimum sixteen (16) load cells shall be installed in the furnace roof enclosure to give indication of ash build up in the furnace bottom hopper.	Load cells will not be provided in the furnace roof enclosure since, at high temperature these load cells will not provide the reliable values. It may also be noted that, Furnace bottom hopper is not meant for storage of ash.	
30	III	Ch 1	Steam Generator & Auxiliaries	49 of 186	3.0 4	A minimum allowance of 0.6 mm over and above the calculated thickness as per IBR shall 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 shall 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.	A minimum allowance of 0.6 mm over and above the calculated thickness as per IBR shall be provided for entire water wall. However, additional 1 mm tube thickness on water wall tubes coming within a radius of one meter around each wall blower has not been envisaged so as to avoid high pressure drop in the furnace walls which results from the geometrical constraints of a once through spiral wall furnace design.	Noted
31	III	Ch 1	Steam Generator & Auxiliaries	50 of 186	3.0 12 ix	Maximum steam side temp. imbalance in the LHS & RHS at boiler outlet (with the average) 10 deg. C (max.)	Based on the bidder's experience, the steam temperature imbalance between outlets will exceed 10 degC during load transients; therefore, the specified imbalance is only offered during steady state operation.	Bid specifications to be followed.
32	III	Ch 1	Steam Generator & Auxiliaries	51 of 186	3.0	Alarm set point for tube metal temperature shall not exceed the design temperature of respective tube	Alarm temperature shall be allowable as per Code. Alarm set point shall be mutually agreed and decided during detailed engineering.	Bid specifications to be followed.
33	III	Ch 1	Steam Generator & Auxiliaries	51 of 186	14. c)	Tapping points at five levels for furnace vacuum monitoring (in addition to routine monitoring)	Furnace pressure near to roof and Superheater Platen section inlet will be measured and used in the draft control as per the proven practice of bidder. Furnace vacuum monitoring at different levels is not required as per the bidder's operating philosophy and hence tapping points at different levels are not envisaged.	Bid specifications to be followed.
34	III	Ch 1	Steam Generator & Auxiliaries	51 of 186	3.0 15)	Panel to panel welding in burner zone to be avoided to maximum possible extent.	For spiral wall design Panel to Panel welding cannot be avoided in the burner zone.	Bid specifications to be followed.

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35	III	Ch 1	Steam Generator & Auxiliaries	53 of 186	4.0 b	The casing/pent house and its supporting system shall be capable of taking additional loads due to accumulations of ash upto 300 mm height or actual expected (in between two overhauls of the unit), whichever is higher. This additional load is over and above other loads considered for casing design. The ash density for the purpose of ash loading shall be at least 1600 kg/m³.	Ash ingress in to pent house is negligible as Boiler roof tubes are of fin welded construction. Hence additional load due to accumulations of ash is not considered.	Bid specifications to be followed.
36	III	Ch 1	Steam Generator & Auxiliaries	56 of 186	6.0 4 v	Pump casing shall be one piece casting with end suction & dual side discharges.	The pump casing shall be forged construction with inlet and outlet discharge nozzles welded to it	Bid specification to be followed, however, the issue may be discussed during detailed engineering.
37	III	Ch 1	Steam Generator & Auxiliaries	57 of 186	7.2 3	Maximum depth of tube banks/sections in the direction of gas flow: a) 2 Meters or maximum soot blowing radius, whichever is lower.	The maximum tube bank depth provided is around 2500 mm. However effective clean-ing of tube banks is ensured.	Bid specification to be followed, however, the issue may be discussed during detailed engineering.
38	III	Ch 1	Steam Generator & Auxiliaries	57 of 186	7.1 2)	SUPER HEATERS & REHEATERS Maximum average flue gas velocity in section/tube banks with transverse tube pitching 600 mm or less and with 25% excess air at economizer outlet 10 M/sec. (The maximum localized velocities across the cross- section shall not exceed 12m/ sec.)	Maximum average flue gas velocity of 10m/s shall be used for SH/RH/ECO considering 20% ex-cess air at economiser outlet.	Bid specifications to be followed. However 20% excess air at economiser outlet be considered.
	III	Ch 1	Steam Generator & Auxiliaries	61 of 186	8.0 i 3)	Economisers Maximum average flue gas velocity through the Economizer tube banks, with 25% excess air at Economizer outlet. 10 M/sec. (The maximum localized velocities across the cross-section shall not exceed 12 M/sec) With any coal from specified range		
39	III	Ch 1	Steam Generator & Auxiliaries	57 of 186	7.1 5. b)	5. Means of Temperature Control b) Reheaters* Tilting of burners/gas biasing/gas recirculation (gas to be tapped off after ID fans), spray water attemperation (utilizing water tapped off from interstage of BFP)	Tilting of burners and Excess Air will be used for RH Temperature control as per Bidders practice.	Bid specification to be followed, however, the issue may be discussed during detailed engineering.
40	III	Ch1	Steam Generator & Auxiliaries	58 of 186	7.2 4 a)	All horizontal heat transfer surfaces shall be supported by steam/water cooled hanger tubes designed for a minimum of 2 times the calculated load so as not to cause any dislocation / damage to the tube banks/sections.	The hanger tubes sizing will be done based on the loads to be carried by these tubes. Since the failure of even one tube will lead to shut down of the unit, the operation with 50% failure condition is not feasible and designing for this condition is not considered. The operation with 50% failure condition is not feasible and hence this condition is not considered for designing.	Bid specifications to be followed.
	III	Ch1	Steam Generator & Auxiliaries	62 of 186	8.0. (ii) d)	Supported by steam/ water cooled hanger tubes/headers forming part of steam circuit with hanger tubes designed for a minimum of 2 times the calculated load so as not to cause any dislocation / damage to the tube banks/setting. Necessary calculations in support of this shall be furnished by the bidder.		Bid specifications to be followed.

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41	III	Ch 1	Steam Generator & Auxiliaries	59 of 186	7.2 7	Minimum tube thickness a) LEADING TUBES OF THE BANK: Provide 1.0 mm (min.) over and above the calculated thickness as per IBR (Ref. as specified at clause no 1.25 of this section) for erosion allowance. b) BALANCE OF TUBES IN THE BANK: Provide 0.6 mm (min.) over and above the calculated thickness as per IBR (Ref. as specified at clause no 1.25 of this section) for erosion allowance.	Tube thickness calculation will be as per IBR. Appropriate erosion allowances as per Bidder practice will be considered.	Bid specifications to be followed.
42	III	Ch 1	Steam Generator & Auxiliaries	60 of 186	7.3	For continuous monitoring of tube metal temperatures of SH and RH elements, adequate number of thermocouples shall be provided as per standard and proven practice of the OEM. A suggested criterion for provision of thermocouples is indicated as below: a) For supherheaters and reheaters elements placed before furnace exit plane (in the direction of gas flow), chromel-alumel thermocouples on at least two elements of every fifth assembly between the two headers shall be provided. b) In addition to the above, adequate number of chromel-alumel thermocouples for measurement of tube metal temperatures outside the gas path shall also be provided. Total number of thermocouples including those at (a) above shall, however, not be less than 2 (two) thermocouples per RH/SH assembly between the two headers".	As per design practice of bidder, approxi-mately 210 numbers of Chromel-Alumel thermocouples located outside the gas path are sufficient for measurement of tube metal temperature covering all stages of Super-heaters and Reheaters. Acromat thermocouples for measuring metal temperatures in side gas path are not envisaged,as the mesuruement is not reliable and not used in any process control.	Bid specifications to be followed.
43	III	Ch 1	Steam Generator & Auxiliaries	58 of 186	7.0 .	SUPER HEATERS & REHEATERS 3. Maximum depth of tube banks/sections in the direction of gas flow: a) 2 Meters or maximum soot blowing radius, whichever is lower.	Due to design requirement, tube banks / sections depth will be more than 2 metres(<2500mm) to minimize the sectional pressure drop.. However it will be limited to maximum soot blower radius.	Bid specification to be followed, however, the issue may be discussed during detailed engineering.
	III	Ch 1	Steam Generator & Auxiliaries	62 of 186	8.0.	Economisers 6. Maximum depth of tube banks / sections in the direction of gas flow: 2 M or maximum soot blowing radius, whichever is lower.		
44	III	Ch 1	Steam Generator & Auxiliaries	70 of 186	10.2 e)	Manual isolating SS rod type needle gate before bunker shut off gate shall be provided.	Rod type needle gate will be provided at bunker outlet before the motor operated bunker shut-off gate. However, the needles will be made of carbon steel tubes /rods, since these needles will not be in place or in the coal path, while coal is flowing from bunker to feeder. Moreover, these gates are closed (by inserting needles) only in a specific case of establishment of standing coal column between bunker and feeder. In all other normal operating conditions, the motorised gates would fulfill the open/close requirement and these gates are in open condition only i.e needles not in contact with coal. Hence, SS rods are not envisaged for this application. However, the needle gate body transition, which is continuously in contact with flowing coal is made of SS material	Bid specification to be followed, however, the issue may be discussed during detailed engineering.
	III	Ch1	Steam Generator & Auxiliaries	65 of 186	9.1 II a)	Regenerative Air Pre-Heaters (Trisector type RAPH): Design ambient air temperature & humidity : 30 °C & 75% RH		
	III	Ch1	Steam Generator & Auxiliaries	67 of 186	9.1 VI f)	Regenerative Air Pre-Heaters (Trisector type RAPH) : Design ambient air temperature & humidity : 40°C & 60% RH		

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45	III	Ch1	Steam Generator & Auxiliaries	92 of 186	12.1	FD Fans : 2x60% BMCR and 1x100% BMCR : 40°C with 60% relative humidity	The consistent design temperature and Relative humidity is to be clearly specified for all the equipments, boiler auxiliaries.	The following design criteria for design ambient air temperature & relative humidity shall be considered : 1. Steam Generator - 27^0C & 65% 2. RAPH - 27^0C & 65% 3. ID Fan - 48^0C & 87% 4. FD - Fan - 48^0C & 87% 5. PA Fan - 48^0C & 87% 6. Seal Air Fan - 48^0C & 87% 7. SCR - 48^0C & 87% 8. Flue Gas Ducting - 48^0C & 87%
	III	Ch1	Steam Generator & Auxiliaries	92 of 186	12.1	ID Fans : 2x60% BMCR and 1x100% BMCR : 40°C with 60% relative humidity		
	III	Ch1	Steam Generator & Auxiliaries	154 of 186	23.1.23	SCR System Sizing Criteria For 50% BMCR flue gas flow and temperature at BMCR load for range of coal as specified corresponding to 47 deg.C ambient temperature and 60% RH		
	III	Ch1	Steam Generator & Auxiliaries	75 of 186	10.5 VI c	Seal Air fans : ambient temperature of 40 degree Celsius, relative humidity of 60%		
	III	Ch1	Steam Generator & Auxiliaries	81 of 186	10.8 II 3.	Primary Air Fans: Ambient air temp. – 40 degree Celsius & RH 90%.		
	III	Ch1	Steam Generator & Auxiliaries	97 of 186	13.1 b iii	Duct Work : iii. Design ambient temperature of 30 degree Celsius and 75% RH.		
	III	Ch1	Steam Generator & Auxiliaries	140 of 186	23.1.7 7)	The dilution air system shall be designed for entire ammonia required to reduce the flue gas NOx as per SCR design criteria and shall consider 25% margin on entire air flow and 30% margin on pressure head required considering ambient temperature of 47°C and relative humidity of 60%.		
	III	Ch1	Steam Generator & Auxiliaries	155 of 186	23.1.23 C)	Flue Gas Duct inlet and outlet : flue gas flow and operating temperature corresponding to 47 deg.C ambient temperature and 60% RH		
	III	Ch1	Steam Generator & Auxiliaries	159 of 186	23.1.23 E)	Dilution Air Heater : Heating capacity Considering minimum inlet temperature 7°C to 47°C or process requirement whichever is higher		
	III	Ch1	Steam Generator & Auxiliaries	65 of 186	9.1 II 5	Regenerative Air Pre-Heaters (Trisector type RAPH): Air Leakage (at 100% TMCR i.e. 800 MW unit load for complete range of coals) : Less than 7% of the Flue gas weight entering airheater		
46	III	Ch 1	Steam Generator & Auxiliaries	80 of 186	10.7 iii	Each coal burner shall be served by one separate coal pipe and shall be provided with one knife edge type gate valve at burner inlet. The valve shall be power operated (electric / pneumatic) and hooked up to Burner Management System.	Electric power operated gate before each coal burner will block the burner front and make it difficult to approach scanners, HEA igniters and secondary air dampers for maintenance. Considering the access and maintenance requirements, we have envisaged manual operated shut off gates for this application.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
47	III	Ch 1	Steam Generator & Auxiliaries	81 of 186	10.7 XIII	Burner shall be removable or replaceable from outside the Steam Generator without entry to the furnace.	In Tilting Tangential firing arrangement, the nozzle tips are to be removed / installed from inside the furnace.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.

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48	III	Ch 1	Steam Generator & Auxiliaries	81 of 186	10.8	Primary Air Fans II. Fan Sizing Criteria 4. Air-heater leakage of 15% of flue gas flow entering in case of Bi-sector APH or 10% of flue gas flow entering in case of Tri-sector APH or guaranteed whichever is higher.	In Trisector Airheater system, the air leakage from the secondary side will be very less i.e., not more than 1% of gas entering AH at BMCR. Hence Predicted leakage is used for the FD fan sizing and 10% leakage is considered for PA fan & ID fan sizing.	PA Fans: In clause 10.8 (II) (b) (4) at Sheet 82 of 186 in Vol-III, Chapter-I, the figure "12%" be read as "10%" FD Fans: 3rd coulmn against S.No. (e) of Table at Sheet 92 of 186, be read as under:- "Minimum 10% of flue gas flow entering bisector APH or minimum 10% of flue gas flow entering trisector APH or actual guaranteed whichever is higher." In 3rd coulmn against S.No. (6.) of Table at Sheet 93 of 186, the figure "8%" be read as "10%". ID Fans: Bid specifications to be followed.
	III	Ch 1	Steam Generator & Auxiliaries	92 of 186	12.1	Fan Sizing Criteria FD Fans : e) Air-heater air-in-leakage :Min. 7.5% of flue gas flow entering Bisector APH or Trisector APH or actual guaranteed whichever is higher ID Fans: e) Air-heater air-in-leakage : Based on min. 15% of flue gas flow entering PAPH & 10% of the flue gas flow entering SAPH in case of Bisector or 12% of the flue gas flow entering Trisector APH or actual guaranteed value, whichever is higher		
49	III	Ch 1	Steam Generator & Auxiliaries	97 of 186	13.1	Duct Work I. Sizing Criteria: a) Allowable velocities in the duct work. i. Maximum velocity for cold air and hot air shall be 16 m/sec and 20 m/sec respectively. ii. Maximum gas velocity shall be 13 m/sec except flue gas duct from ID fan outlet to chimney inlet. iii. Maximum Flue gas velocity from ID fan outlet to chimney inlet shall be 16m/sec. b) The velocities in the ducts shall not exceed the above limits under the following conditions, all occurring together: i. Design/best/Worst coal firing at 100% BMCR load whichever gives maximum flow. ii. 25% excess air over and above the stoichiometric air at economizer inlet. In case of Trisector air preheater, air heater air in leakage 12% of flue gas flow at inlet of air preheater or actual guaranteed whichever is higher.	The following criteria used for duct sizing. i. Maximum velocity in cold air ducts shall be 16 m/sec. ii. Maximum velocity in hot air ducts shall be 20 m/sec. iii. Maximum velocity in flue gas ducts shall be 15 m/sec (before ESP) and 20 m/sec (after ESP). The velocities in the ducts will be calculated based on 100% BMCR load firing Design coal/Worst coal/Best coal , whichever gives maximum flow with 20% Excess air at Economiser outlet. Air heater air in leakage 10% of flue gas flow at inlet of air preheater or actual guaranteed whichever is higher shall be considered.	Bid specifications to be followed. However 20% excess air at economiser outlet be considered.
50	III	Ch 1	Steam Generator & Auxiliaries	91 of 186	11.4 II b)	Piping fittings shall be of carbon steel butt welded connection (where possible) conforming to ASTM-A 234 (or approval equivalent standard).	2 inch and below pipe and pipe fittings will be of socket welded connection whereas 3″ and above will be of Butt welded connections.	Bid specifications to be followed.
51	III	Ch 1	Steam Generator & Auxiliaries	91 of 186	11.4 II c) 1	Type of valves (for oil services) Plug type (metallic seated), leak proof, fire safe as per the requirement of API 6FA	Ball valves shall be provided in place of plug type valves as the same technically meets the envisaged requirement	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
52	III	Ch 1	Steam Generator & Auxiliaries	91 of 186	11.4 II d)	Instrument root valves on heavy oil lines shall be of 40 NB size, flanged OS & Y type, with body rating in ASA as per process condition	Instrument root valves on LDO lines shall be of NB 15 size and socket welded in line with all BHEL supplied boilers as LDO is a low viscous fluid.	In clause 11.4.II(d) of Ch-1 at Sheet 91 of 186 in Vol-III, the word "heavy oil" may be read as "LDO" however, valve size etc. may be discussed during detailed engineering.

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53	III	Ch 1	Steam Generator & Auxiliaries	98 of 186	13.1 II c)	Horizontal ducts to be designed for minimum 245 kg/m² additional fly ash loading on the surface or for one fourth of duct full of ash or for maximum possible accumulation of ash in the ductwork, under all normal, upset or abnormal operating conditions, whichever is higher. For flue gas ducts downstream of ESP, additional fly ash loading on the surface or for one tenth of duct full of ash or for maximum possible accumulation of ash in the ductwork, under all normal, upset or abnormal operating conditions, whichever is higher. The ash accumulation considered for economizer bypass duct (if provided) upto Guillotine gate shall be 100% filled with ash. The ash density for the purpose of loading shall be at least 1600 kg/m3.	1) For flue gas ducts downstream of ESP, fly ash loading on the surface will be considered for one foot (0.3m) of ash accumulation for design purposes. 2) The ash density for the purpose of loading shall be at least 1300 kg/m3.	Bid specifications to be followed.
54	III	Ch 1	Steam Generator & Auxiliaries	79 of 186	10.6 xi)	Following PF pipe portions shall be ceramic lined with ceramic thickness not less than 15 mm. b) All bends between 11 degree & 30 degree angle and straight length downstream of the bends equivalent to one pipe diameter.	Bends between 15 degree & 30 degree angle and straight length downstream of the bends equivalent to one pipe diameter will be ceramic lined.	Bid specifications to be followed.
55	III	Ch 1	Steam Generator & Auxiliaries	86 of 186	11.3 4)	Air flushing points with isolation valves for cleaning during commissioning	In the case of HFO or viscous fuels, LDO flushing is required but no air flushing is required for LDO. Hence not envisaged.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
56	III	Ch 1	Steam Generator & Auxiliaries	86 of 186	11.3 3) b)	(2) Double Isolation valves from discharge onwards of pressurizing pumps	Single isolation valve meet the all technical requirements envisaged. Also provide the flexibility in operation and easy to handle.	Single Isolation Valve shall be considered for pressure below 40 kgf/cm2.
57	III	Ch 1	Steam Generator & Auxiliaries	88 of 186	11.3 6) c)	Aperture size for fine filter shall not exceed 108 micro meter or at least 30% smaller than smallest oil orifice or passage to the burners.	250 micron filter is provided in line with other projects as applicable to LDO oil.	Bid specifications to be followed.
58	III	Ch 1	Steam Generator & Auxiliaries	89 of 186	11.3 9)	Following maintenance facilities shall be provided in the fuel oil system for the Steam Generator: a) Burner maintenance trolley alongwith accessories.	Burner Maintenance Rack will be provided for oil gun maintenance.	Bid specifications to be followed.
59	III	Ch 1	Steam Generator & Auxiliaries	89 of 186	11.3 10) g)	Means of determining oil flow to each burner like calibration curves and pressure measurements at the burner as a minimum requirement	Means of Oil flow determination by tip characteristic curves and pressure measurement are envisaged. However individual burner flow measurement device is not required and not envisaged.	Bid specifications to be followed.
60	III	Ch 1	Steam Generator & Auxiliaries	89 of 186	11.4 II) a) 1)	Fuel Oil Piping API-5L GR B or ASTM-A-106 Gr. B (before preD70:G71ssurizing pump). IS1978 or approved equivalent (from discharge of pressurizing pump to boiler).	Fuel oil piping is as per the ASTM 106Gr B /SA106 Gr A/B/C.	Bid specifications to be followed.

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61	III	Ch 1	Steam Generator & Auxiliaries	81 of 186	10.7 XII	Minimum operating life of burner parts without requiring any maintenance and replacement shall be 16000 hrs.	The offer envisages a service life of 8000 hrs. for coal nozzle assembly.. An additional one set of coal nozzle tips will be supplied to meet 16000 hours life.	Bid specifications to be followed.
62	III	Ch 1	Steam Generator & Auxiliaries	26 of 186	1.26	2. Special Maintenance Tools i. Tube expanders for heat exchangers	Tube expanders are not applicable for SG System equipments.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
63	III	Ch 1	Steam Generator & Auxiliaries	99 of 186	13.1 V d)	Duct stiffening shall be by means of rolled sections.	Internal stiffening shall be made of pipes. External stiffening shall be made of rolled sections	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
64	III	Ch1	Steam Generator & Auxiliaries	31 of 186	1.29.6.1 vi) c	Isolation gates at inlet of cyclone separator, SCR outlet and SCR bypass duct of SCR reactor and isolation gate & control damper in economizer bypass duct to SCR inlet duct.	As per bidder design practice and easy and effective operation of the system, dampers will be provided at SCR inlet, outlet and SCR bypass duct.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
	III	Ch1	Steam Generator & Auxiliaries	103 of 186	13.2 I h	At economizer by pass duct, SCR inlet duct, SCR outlet duct (only incase of Bi-sector APH) & SCR bypass duct.		
65	III	Ch 1	Steam Generator & Auxiliaries	100 of 186	13.1 ix b) ii.	Such internal stiffeners for the flue gas duty between boiler and ESP shall be provided with erosion protection shields	Internal stiffeners are provided with sufficient thickness to take care of the flue gas erosion. Separate erosion protection shields are not required.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
66	III	Ch 1	Steam Generator & Auxiliaries	105 of 186	13.2 XIV	Outlet dampers of seal air fans, scanner air fans and emergency dampers of scanner air shall be pneumatically operated, suitable for remote manual operation.	Auto transfer damper is envisaged instead of pneumatically operated dampers at seal air fans and scanner air fans discharge	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
67	III	Ch 1	Steam Generator & Auxiliaries	108 of 186	14.2 V c)	Temperature elements on all drain lines, including soot blower drain line.	Temperature elements will be provided only for those drains which may be used during operation like soot blower drains, wall blower drains & Airheater soot blower drains. Start-up and shut down drains will not be provided with temperature elements.	Bid specifications to be followed.
68	III	Ch 1	Steam Generator & Auxiliaries	108 of 186	14.2 V) e)	Start-up vents shall be sized for a minimum flow of 15% at turbine start-up pressure.	Start-up vents will be used only until HP-LP Bypass comes into operation. Hence Start-up vents will be sized for approximately 3% to 5% of TMCR flow.	Bid specifications to be followed.
69	III	Ch 1	Steam Generator & Auxiliaries	109 of 186	14.2 X)	For all remote operated control valves provide: a) 100% bypass control valves, remote operated and exactly identical to main control valve.	Startup drain control system and control valves configuration will be as per BHEL standards and P&ID .	Bid specification to be followed, however, the issue may be discussed during detailed engineering.

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70	III	Ch 1	Steam Generator & Auxiliaries	109 of 186	14.2 VII	Provide plugging/locking for each isolating drain valve such that to open the valve, the key has to be inserted and key can be withdrawn when the valve is closed.	Chain and padlocking arrangement, which is simple and effective for the intended purpose, is envisaged for the furnace lower header drain valves only.	Bid specifications to be followed.
71	III	Ch 1	Steam Generator & Auxiliaries	109 of 186	14.2 IX	Valves shall have plugging/locking keys as indicated as specified at clause no 14.2 (V) of this chapter and shall be located at appropriate location for convenient operation.		
72	III	Ch 1	Steam Generator & Auxiliaries	110 of 186	15.1 a. b)	Fully automatic & sequentially controlled through SG C&I control system. Alternately, a SMART Soot Blowing system based on heat flux sensors and flue gas exit temperature may be implemented with a fall back to sequential control, if required.	Electrically operated automatic sequential type conventional soot blowing system is en-visaged.	Noted.
73	III	Ch 1	Steam Generator & Auxiliaries	121 of 186	22.5	Following tests for Steam Generator Startup drain recirculation pump at shop on assemble unit: a) Tests to establish unit functioning of pump at temp. & pressure b) Hot standstill and startup tests	The pump vendors are reputed and have supplied BCW pumps across the world. The pumps supplied by them in the past for supercritical power stations are running successfully without any issue. These vendors have already substantiated their pump quality and have proven the same in the past. Please note that the Hot type test requirement is significantly impacting the production process and enduring safety issues. In view of the above, these tests shall be exempted.	Noted subject to submission of Type Test Certificates of same design pump.
74	III	Ch 1	Steam Generator & Auxiliaries	162 of 186	1.01.13	Thermal Insulation along with aluminum cladding, lagging, reinforcement wiremesh, cleats and supports, shall be provided for all the equipments surfaces having skin temperature more than 60 degree Celsius.	Insulation for fuel piping from Mill to burners is not required / envisaged, considering the fuel piping layout. It was informeded by BHEL during pre bid discussions that this is as per their proven practice.	Bid specifications to be followed.
75	III	Ch 1	Steam Generator & Auxiliaries	186 of 186	8.0.0	During commissioning, the Bidder shall conduct a comprehensive TPT to demonstrate the Furnace Exit Gas Temperature (FEGT) and various flue gas Multi-shield High Velocity Temperature (MHVT).	TPT will be combined along with PG Test. No separate TPT is envisaged.	Bid specifications to be followed.
76	III	Ch 1	Steam Generator & Auxiliaries	184 of 186	4.1.1.5	Bidder shall balance the primary air as well as coal flows in the pulverised fuel pipes such that the minimum PF and PA flow imbalance in the PF pipes from each coal pulveriser does not exceed 5% of average flows.	Coal flow unbalance in coal pipes will be marginally higher than 5% and will be in line with generally accepted Industry practice. This is not a critical criterion for a tangentially fired boiler wherein the furnace is the burner.	Bid specifications to be followed.
77	III	Ch 30	Flue Gas Desulphurisation System	14 of 93	1.18	Supply and erection of Lining/cladding/wallpaper of 2 mm (minimum) thickness of alloy 276/ Alloy-59 or better material in the FGD duct down stream of absorber upto chimney inlet and complete FGD bypass duct shall be in the scope of the bidder.	Bidder understands that the duct to Absorber inlet shall be made of Carbon steel of minimum 7mm thickness. The duct from Absorber outlet to bypass duct shall be made of Carbon steel of minimum 7mm thickness with 2 mm (minimum) thickness lining / cladding / wall paper of Alloy C276 / Alloy 59 or better material.	Bid specifications to be followed.
	III	Ch 30	Flue Gas Desulphurisation System	25 of 93	iii)	The duct to Absorber inlet shall be made of Carbon steel of minimum 7mm thickness. The duct from Absorber outlet to bypass duct shall be made of Carbon steel of minimum 7mm thickness with 2 mm (minimum) thickness lining / cladding / wall paper of Alloy C276 / Alloy 59 or better material. The absorber wet-dry interface shall be of solid Alloy 59 or C276 of minimum 6 mm thickness.		

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78	III	Ch1	Steam Generator & Auxiliaries	67 of 186	9.1 VI 10	Air Leakage (at 100% TMCR i.e. 800 MW unit load for complete range of coals) Less than 7.5% of the Flue gas weight entering air heater	The air heater leakage is to be clearly specified at 100% TMCR load.	In 3rd coulmn of table against S.No.-10 at Sheet 67 of 186, Chapter-1, Vol-III, the figure "7.5%"be read as "10%". In 3rd coulmn of table against S.No.-5 at Sheet 65 of 186, Chapter-1, Vol-III, the figure "7%"be read as "10%".
79	III	Ch1	Steam Generator & Auxiliaries	172 of 186	11.00.00	ESP SIZING CRITERIA: GAURANTEE POINT DESIGN POINT and other loads : 25 % excess air at economiser outlet	ESP sizing for all the conditions shall be at 20% excess air. Please confirm.	In Coulmn no. 4 to 9 against S.No. 4 of Table at Sheet 172 of 186 of Ch-1, Vol-III, the figure "25%" be read as "20%"
80	II	Ch 8	FG & LD	7 of 57	3.1 ix	SCR Efficiency for Control of NOx emission - the SCR efficiency for control of NOx emission (from thermal as well as fuel) shall not be less than 80% at 6% oxygen (O2) content in flue gas on dry gas basis and ammonia slip not exceeding 3ppm at 100% TMCR load condition, when firing any coal from the range of coal(s) specified.	Bidder understand that the NOx at SCR inlet is 500 mg/Nm3 at 6% O2 dry basis and at outlet the NOX emission is 100 mg/Nm3 at 6% O2 dry basis from 40% TMCR to 100% BMCR. Pl confirm.	Major Design and Guarntee point parameters for designing of SCR system shall be as under:- 1) NOx at SCR Inlet (mg/Nm3 at 6% O2 on dry basis, keeping ammonia slip within the maximum limit): - Guarantee Point: Limited to 500 (shall be increased from actual level by adjustment of air staging and other measures) - Design Point: 500 2) SCR efficiency for control of NOx Emission (%) (keeping ammonia slip within the maximum limit): - Guarantee Point: 84 - Design Point: 84 (after 16000 operational hours) 3) Ammonia slip after last catalyst layer (ppm at 6% O2 on dry basis) be read as: - Guarantee Point < 3 - Design point < 2.5 4) NOx emission at SCR outlet shall not exceed 80 mg/Nm3 (with Ammonia Slip less than 3 ppm at 6% O2 dry basis) at the end of 16000 operation hours for range of coal(s) specified from 40% TMCR to 100% BMCR. *** <u>Note:</u> Following changes have also been incorporated in the Tender specifications: <u>Functional Guarantees under category-I</u> 1) In clause 3.1 (ix) at sheet 7 of 57, Chapter-8, Volume-II, figure "80%" shall be read as "84%". 2) In clause 3.1 (ix) (4th and last line of second stanza) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%". 3) In clause 3.1 (x) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%". <u>Functional Guarantees under category-II</u> In clause 4.1.1 at sheet 28 of 57, Chapter-8, Volume-II, "100 grams of NOx (from themal as well as fuel) per giga joule of heat input (at 6% O2 level and as per equivalent NO2) to the boiler" shall be read as "80 mg/Nm^3 (at 6% O2 level and as per equivalent NO2)". <u>Functional Guarantees under category-III</u> 1) In clause 5.12 at sheet 31 of 57, Chapter-8, Volume-II, "2.5 ppm" shall be read as "3 ppm". 2) Clause 5.14 at Sheet 31 of 57, Chapter-8, Vol-II stands deleted.
	II	Ch 8	FG & LD	28 of 57	4.1.1	NOx emission Bidder shall guarantee that maximum total NOx emission from the unit shall not be more than 100 grams of NOx (from thermal as well as fuel) per giga joule of heat input (at 6% O2 level and as per equivalent NO2) to the boiler during the entire operating range of steam generator for the range of coals specified.		
	II	Ch 8	FG & LD	31 of 57	5.14	The Bidder shall demonstrate NOx emission outlet at SCR shall not exceed 80 mg/Nm3 @ 6% O2 dry basis (with ammonia slip less than 2.5 ppm at 6% O2 dry basis) at the end of 16000 operation hours for range of coal(s) specified from 40% BMCR to 100% BMCR.		
	III	Ch 1	Steam Generator & Auxiliaries	44 of 186	1.20.	Limits of NOx Emission Combustion system along with wind box, air ducting and other associated parts shall be designed for guaranteed maximum NOx emission of 100 mg/Nm3 at 6% O2 on dry gas basis at Selective Catalytic Reduction (SCR) outlet. Bidder will demonstrate its guaranteed maximum NOx emission of 80 mg/ Nm3 on part load operation		
	III	Ch 1	Steam Generator & Auxiliaries	154 of 186	23.1.23 B)	4) NOx at SCR Inlet (mg/NM3 at 6% O2 on dry basis, keeping ammonia slip within the maximum limit) : Guarantee point : Actual but limited to 500 Design point : 500		
	III	Ch 1	Steam Generator & Auxiliaries	154 of 186	23.1.23 B)	SCR efficiency for control of Nox Emission (%) (keeping ammonia slip within the maximum limit) : Guarantee point : 85 Design point : 85		

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81	III	Ch1	Steam Generator & Auxiliaries	19 of 186	1.16 5.	Flue gas duct from economizer outlet to cyclone separator inlet, from cyclone separator outlet to SCR reactor inlet, from SCR reactor outlet	The cyclone separator is not envisaged, since the provided SCR is of high dust design and have been provided for various OTSC boilers firing indian coal.	Noted.
	III	Ch1	Steam Generator & Auxiliaries	28 of 186	1.29.3	The scope for SCR System along with ammonia unloading, storage and handling system, Cyclone Separators shall include all items.		
	III	Ch1	Steam Generator & Auxiliaries	31 of 186	1.29.6.1 vi) c	Isolation gates at inlet of cyclone separator		
	III	Ch1	Steam Generator & Auxiliaries	29 of 186	1.29.5 1)	Flue gas from downstream of economizer shall be taken through two (02) independent streams. Each stream shall have one (01) number of cyclone separator and one (01) number of SCR Reactor. Cyclone Separator shall be used to reduce inlet dust concentration at the inlet of SCR reactor		
	III	Ch1	Steam Generator & Auxiliaries	31 of 186	1.29.7	Cyclone Separators		
	III	Ch1	Steam Generator & Auxiliaries	93 of 186	12.2 8	Pressure drop through Cyclone Separator : 50 mmWC or actual whichever is higher		
	III	Ch1	Steam Generator & Auxiliaries	123 of 186	23.1.1 1)	Cyclone Separator shall be provided in the flue gas duct between economizer and SCR reactor to reduce the dust burden.		
	III	Ch1	Steam Generator & Auxiliaries	137 of 186	23.1.4 13	Cyclone Separator		
82	III	Ch1	Steam Generator & Auxiliaries	29 of 186	1.29.5 2)	Flue gas after NOx removal shall be taken to the Air Pre-heater. SCR bypass duct i.e., Economizer to APH shall be provided for facilitating operation of unit without SCR in case of any emergency requirement. This shall also facilitate the online maintenance of SCR system and associated equipment.	The online maintenance of the SCR is not recommended as per safety concern. SCR bypass duct i.e., Economizer to APH is envisaged facilitating operation of unit without SCR in case of any emergency requirement. Associated equipment of SCR shall be taken for maitenance execpt SCR reactor considering safety concern.	Bid specifications to be followed.

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83	III	Ch1	Steam Generator & Auxiliaries	29 of 186	1.29.5 2)	Liquid ammonia from the storage tank is sent through ammonia vaporizer and diluted with air before injection on upstream of SCR reactor.	The SCR system design offered is without ammonia vaporizer, which is proven in various operating unit offered by collaborator. Refer the P&ID submitted during technical offer submission.	Noted, if it is as per standard practice of OEM.
	III	Ch1	Steam Generator & Auxiliaries	145 of 186	23.1.8 5)	Ammonia Vaporizer		
84	III	Ch1	Steam Generator & Auxiliaries	29 of 186	1.29.6.1 i)	SCR reactor shall have three (03) working catalyst layers and one (01) spare (future) catalyst layer.	The SCR system is envisaged with 02 Working and 01 furure layer, which will be sufficient to meet the tender requirement and which facilitate easy operation and maintenance.	Bid specifications to be followed.
	III	Ch1	Steam Generator & Auxiliaries	123 of 186	23.1.1 1)	r. A reactor gas side by-pass shall be provided for operational flexibility. The total catalyst requirement shall be arranged in minimum three (3) layers, on horizontally arranged support frames inside the reactor. Further provision for one spare future layer of catalyst shall be made within the reactor		
	III	Ch1	Steam Generator & Auxiliaries	127 of 186	23.1.3 iv)	The reactor should be sized to accommodate minimum three (3) catalyst layers with provision for one (1) future catalyst layer for future addition.		
85	III	Ch1	Steam Generator & Auxiliaries	30 of 186	1.29.6.1 iv) a	Adequate number of Rake retractable type steam operated Soot blowers shall be provided for each catalyst layer (including future layer)	Sonic horn and Ash sweapers are envisaged for SCR catalyst layers (including future layer)	Noted as per OEM practice.
	III	Ch1	Steam Generator & Auxiliaries	30 of 186	1.29.6.1 iv) b	In addition to steam type soot blowers, bidder to provide additional Sonic horns & Air Cannons for each catalyst layer (including future layer) complete		
86	III	Ch1	Steam Generator & Auxiliaries	31 of 186	1.29.6.1 vii) a	Bidder's scope shall include Computation Fluid Dynamics (CFD) and Physical modelling for SCR reactor, upstream duct work from economizer outlet (including economizer bypass) along with cyclone separator and downstream ductwork from SCR reactor outlet upto Air preheater inlet.	The CFD and physical modelling will include SCR reactor, upstream duct work from economizer outlet (including economizer bypass) and downstream ductwork from SCR reactor outlet upto Air preheater inlet. The cyclone separator will not be included as the same will not be envisaged.	Noted.
87	III	Ch1	Steam Generator & Auxiliaries	31 of 186	1.29.6.1 vii) b	Bidder's scope shall also include conductance of laboratory/ shop test to establish and demonstrate the activity of the catalyst selected for Indian coal/ash. Further, such test shall be conducted and report shall be provided to customer before supply of catalyst to site.	The catalyst supplied will be designed and manufactured for the high ash indian coal, however the test reports will be propreitary in nature and can not be shared.	Bid specifications to be followed.

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88	III	Ch1	Steam Generator & Auxiliaries	32 of 186	1.29.8	i) Complete Ammonia Injection system for SCR system consisting of, but not limited to, nozzle lances or ammonia injection grid, ammonia-air mixer, piping for distribution of ammonia/air mixture, valves etc.	The provided system for SCR is having highly effective delta mixers and doesnot use the ammonia injection grids, ammonia accumulators, vaporizer and glycol-water system. The complete system description will be submitted as part of technical offer.	Noted, if it is as per standard practice of OEM.
	III	Ch1	Steam Generator & Auxiliaries	138 of 186	23.1.6 2)	The Ammonia injection grid (AIG) shall uniformly distribute the ammonia/air mixture across the gas duct. It shall be structured to avoid unbalanced ammonia injection caused by ash deposition		
	III	Ch1	Steam Generator & Auxiliaries	32 of 186	1.29.9 d	Two (2) (1W+1S) Ammonia vaporizer and associated systems. Each ammonia vaporizer shall be capable of vaporizing the ammonia to meet the requirements of SCR system.		
	III	Ch1	Steam Generator & Auxiliaries	32 of 186	1.29.9 e	Two (2) ammonia accumulators and associated systems.		
89	III	Ch1	Steam Generator & Auxiliaries	32 of 186	1.29.9 f	2x100% Glycol-water recirculation pumps with common water/ glycol heater for each ammonia vaporizer and common overhead make up water/glycol tank. Make up shall be tapped from suction header connecting the Condensate storage tank (CST).	Ammonia vaporiser and glycol/water heating system is not required per the standard design of the collaborator. In the proven collaborator ammonia injection design, liquid ammonia is forwarded by pump and vaporized in a heated air stream to the SCR reactors. All projects have been designed by the QSCRM to comply with applicable safety code (ANSI/CGA-G2.1-2014) and have undergone complete US OSHA process reviews for safety as applied for SCR systems and meets all safety requirements.	Noted, if it is as per standard practice of OEM.
90	III	Ch1	Steam Generator & Auxiliaries	146 of 186	23.1.8 6)	Accumulator	Any sudden surge/drop in requirement can be absorbed by the system inherently, hence separate accumulator is not required. The differential pressure across the constant speed pump is maintained by the pump return line pressure regulating valve. This valve maintains pressure set point for any process upset that occurs (e.g., ammonia injection demand changes). The system design results in relatively constant ammonia supply to the injection flow control valve.	Noted, if it is as per standard practice of OEM.
91	III	Ch1	Steam Generator & Auxiliaries	32 of 186	1.29.9 b	One (1) ammonia storage tank including all supports and other accessories with all fittings, monitoring and safety devices. The storage tank capacity shall be of 14 days ammonia requirement of SCR system.	Bidder understands that the two (02) number of ammonia tanks of combined storage capacity of 14 days for SCR system is required.	No. of Ammonia tanks shall be as per Clause 23.1.23 D) of Ch-1 at Sheet 157 of 186, Vol-III. Total capacity of Ammonia storage shall be for 7 days requirement.
	III	Ch1	Steam Generator & Auxiliaries	142 of 186	23.1.8 3 a)	Two (02) storage tanks shall be provided for the SCR System. One (01) storage tank shall be in service at a time i.e. shall supply the ammonia to SCR System while other tank(s) shall be in stand-by mode.		

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	III	Ch1	Steam Generator & Auxiliaries	157 of 186	23.1.23 D)	1) No. of tanks : Two (02), Cylindrical, Horizontal 2) Storage capacity of each tank : Catering the requirement of two (02) reactor SCR System for steam generator under design condition meeting 14 day requirement		
92	III	Ch1	Steam Generator & Auxiliaries	32 of 186	1.29.9 i	One (1) Waste water retaining basin near ammonia unloading & storage system along with 2x100% waste water/ ammonia disposal pumps with motors for transferring drains CMB. Chemical dosing system for controlling PH of waste water before sending to CMB.	The waste water system, includes only the retaining basin and neutralization pit, further the transfer of drains will not be in bidder's scope.	Bid specifications to be followed.
93	III	Ch1	Steam Generator & Auxiliaries	39 of 186	1.7	Flue gas temperature at air-heater outlet (corrected) at TMCR (800 MW) load & 105% TMCR load : 125°C (minimum)	The flue gas temperature at airheater outlet (corrected) at 55% TMCR, 100% TMCR and 105% TMCR is to be mentioned clearly.	Flue gas temperature at air preheater outlet at 55% TMCR shall be 115° C or as predicted by the Bidder whichever is higher. The same at 100% TMCR & 105% TMCR shall be 125 deg. C (min).
	II	Ch 8	FG & LD	17 of 57	3.6 b	Corrected flue gas temperature at air preheater outlet (at 55% & 100% TMCR) : 115° C or as predicted by the Bidder whichever is higher		
94	III	Ch1	Steam Generator & Auxiliaries	127 of 186	23.1.3 2) I c	A temperature gradient of 100 °C between catalyst support beams and inner part of the reactor wall shall not be exceeded.	The temperature ramp will be controlled for the SCR reactor as per the bidder's practice to safeguard the structural integrity of the structural beams and columns.	Bid specifications to be followed.
95	III	Ch1	Steam Generator & Auxiliaries	137 of 186	23.1.5 2)	The Bidder shall provide the result of computer simulation for fluid dynamics of the SCR De-NOx system at 100% BMCR, 80% BMCR, 60% BMCR and turn down load for the SCR system. Bidder shall load the final CFD model alongwith all necessary files on Owner's Computer.	Results of CFD shall be shared to owner. CFD native files will not be shared.	Bid specifications to be followed.
96	III	Ch1	Steam Generator & Auxiliaries	137 of 186	23.1.5 3) a	The Bidder shall fabricate a three dimensional model of one complete flue gas stream of the SCR System from economiser outlet to APH inlet consisting of one (01) cyclone separator , one (01) SCR reactor and associated ductwork & ash hoppers with a scale of not less than 1:10. As a minimum the study shall be conducted to simulate 100%, 80% and 60% BMCR gas flow equivalent to one (01) flue gas stream. The Bidder shall submit the detailed procedure for carrying out model study for the approval of the Owner.	Proper selection of scale model will help match aerodynamics of model and prototype. As this scale is of critical importance to simulate the actual/prototype in model, BHEL recommends that the scale ratio shall be decide by OEM. As cyclone separator is not envisaged, the same will not be included in flow model.	Bid specification to be followed, however, the issue of scale ratio shall be discussed during detailed engineering. Non envisaging of cyclone separator is noted.

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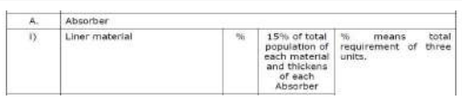
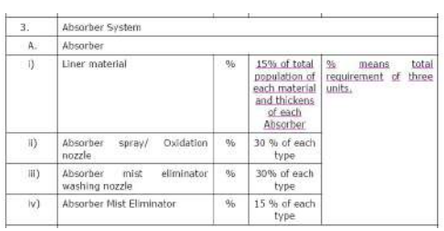
97	III	Ch1	Steam Generator & Auxiliaries	152 of 186	23.1.15 13)	Electric pipe trace heating shall be provided to maintain flowing media temperature and to prevent condensation,	Steam pipe trace heating will be provided, which is more effective than the electric heat tracing.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
98	III	26	Power Cycle Piping, Valves, Fitting & Thermal Insulation	Sheet 40 of 59	26.6.34 S. No.05	Wire mesh netting shall be 10 to 13mm aperture at least 0.71 mm diameter wire	Wire mesh netting shall be 10 to 13mm aperture at least 0.56 mm diameter wire. The lesser dia of wiremesh gives flexability to LRB wool causing in easiness during application of wool on curved surfaces such as pipes. As per BHEL practice 0.56mm wire dia for Wiremesh netting is sufficient.	Bid specifications to be followed.
99	III	1	Steam Generator & Auxiliaries	66 of 186	9.1 V (4) ii	The maximum air-in leakage to flue gas after 3000 hours continuous operation of the boiler with coal shall be guaranteed and demonstrated. The Bidder shall also demonstrate that the drift in air heater leakage (percentage change in air-in-leakage) does not exceed 1%, one year after demonstration of above guaranteed air-in-leakage. Within this period of operation till all air heater leakage demonstrations are completed only external adjustments of seals, without needing any shut down for replacements and without internal adjustments, shall be allowed. The seal design/construction shall be such that the above requirements are satisfied.	Boiler tuning is mandatory for conducting APH Leakage test. Hence the test shall be conducted along with Boiler PG test within or just after completion of 3000 hours. The drift in leakage shall be 1 to 2%. Prior to boiler PG test, internal inspection / adjustment of Air Preheater Seals & Sealing surfaces is required as per Air preheater test code ASME PTC 4.3.	Bid specifications to be followed.
100	III	1	Steam Generator & Auxiliaries	68 of 186	XII (a)	Sufficient space provision for future installation of minimum additional 15% of APH heating surface area shall be made in the design so that, the same can be installed if required.	In boilers with SCR application, the Air Preheater heating elements are subjected to Ammonium bisulphate (ABS) deposition since part of the heating elements falls under the ABS formation temperature zone. Hence, it is important to limit the ABS formation temperature zone within cold end layer (deep cold end) to retain all the ABS deposition in cold end for effective using HP water cleaning. Cold end heating element is designed to absorb all the ABS in the cold end layer itself. Accordingly, proportion of cold end depth to total APH is decided. Further adding elements either at hot end or cold, the temperature zone shifts up or down. Adding future element in hot end will shift the ABS zone upward in to the intermediate layers which may lead to chocking. Future provision space also reduces the effectiveness of cleaning, since the cleaning nozzle to heating element surface distance is increased. Because of this, cleaning (steam) jet has to travel the future provisional space before actually impinging on the heating element surface thereby losing the effectiveness of cleaning. It may also be noted that original APH is selected for maximum effectiveness, adding future element will not help in further heat recovery. Considering all the above, Future element space is not recommended.	Bid specifications to be followed, however it will be reviewed and finalised during detailed engineering.
101	III	1	Steam Generator & Auxiliaries	67 of 186	VI (10)	Air leakage (at 100% TMCR i.e 800 MW unit load for complete range of coals) : Less than 7.5% of flue gas weight entering Air heater	Air heater leakage shall be less than 8% flue gas weight entering APH at 100% TMCR-DC	In 3rd coulmn of table against S.No.-10 at Sheet 67 of 186, Chapter-1, Vol-III, the figure "7.5%"be read as "10%". In 3rd coulmn of table against S.No.-5 at Sheet 65 of 186, Chapter-1, Vol-III, the figure "7%"be read as "10%".

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
102	III	9	Mandatory spares	8 of 103	12	a) Worm & worm wheel for gear reducer - 1 set b) Coupling - 1 set c) Bearing & Seals for cleaning device - 1 set g) Bushing for worm gear reducer - 1 set	Long Retractable cleaning device (LRNR) is used for this project. The enquired items are not applicable (not used) for LRNR. Hence the following equivalent spares items applicable for LRNR will offered instead of the enquired items. A) Chain for LRNR cleaning device b) Glands for LRNR cleaning device c) Gaskets for LRNR cleaning device g) Bushing for LRNR cleaning device	Bid specifications to be followed.
103	III	9	Mandatory spares	8 of 103	12 k	Motor bearing	The requirement (which motor bearing) is not clear. Hence, bearing for APH main drive motor will be offered.	Bearings for all motors as applicable shall be provided.
104	III	9	Mandatory spares	9 of 103	15 d	Reduction gear box & motor for air preheater soot blower oscillation	These items are not applicable. Power pack assy which is the single equivalent item will be offered	Bid specifications to be followed.
105	II	Ch-8	FG & LD	29 of 57	5.1	5.1 Noise	Wet Ball Mill is ball and tube type mill. Noise level shall be 90dB(A) for wet ball mills, the same is followed by NTPC and other state utility tenders.	Noise level for wet ball mill shall not exceed 90 dB(A).
106	II	Ch-1	Intent of Specification	45 of 186	1.23	1.23 Noise	Wet Ball Mill is ball and tube type mill. Noise level shall be 90dB(A) for wet ball mills, the same is followed by NTPC and other state utility tenders.	Noise level for wet ball mill shall not exceed 90 dB(A).
107	III	Ch-1	Steam Generator & Auxiliaries	73 of 186	10.5	10.5 II. Sizing of Coal Pulversier 3(c) Rated Pulverized coal fineness* at rated capacity of the pulverizer, not less than Note: * To be demonstrated at site for each mill by coal sampling as per ISO 9931 & with grinding elements within the guaranteed wear life of respective wear element.	Demonstration shall be in-line with Vol-II, Ch -8 FG & LD, Clause 5.24(i). i) Coal Pulverizer capacity at rated fineness Performance testing shall be conducted on coal pulverizers toward establishing their guaranteed capacity meeting the specification requirement. (a) The Bidder shall demonstrate capacity output on one coal pulveriser (of Owner's choice) of Steam Generator for establishing its capacity at 100% mill loading, at rated pulverized coal fineness with specified design coal with new set of grinding elements. (b) Further, Bidder shall also demonstrate capacity output on four coal pulverisers (of Owner's choice) of Steam Generator, not less than the 85% of guaranteed value of (a) above, at 100% mill loading with the originally installed grinding elements in nearly worn-out condition or at the end.	Demonstration test shall be carried in line with Volume II.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
108	III	Ch-1	Steam Generator & Auxiliaries	75 of 186	10.5 - Xiii	XIII. Material of Construction S. No. MILL COMPONENT SPECIFICATION a) Classifier Cone--Lined with minimum 15 mm thick ceramic tiles on both inside and outside surfaces of the cone. b) Vanes--Lined with suitable material to provide minimum specified wear life.	(i)Classifier (a)Classifier cone not applicable for offered mill. (b)Classifier vanes not applicable for offered mills.	Bid specification to be followed. The issue can be discussed during detailed Engineering.
109	III	Ch-1	Steam Generator & Auxiliaries	76 of 186	10.5 - XIV	XIV. Minimum Guaranteed Life of Coal Pulverizer Wear Parts a) Seals – 20000 d) Classifier cone and other items lined with Ceramic material – 25000 e) Classifier vane (if applicable) - 25000	a) Seals are not applicable for offered mills. d) Classifier Cone not applicable for offered mills. e) Classifier vanes not applicable for offered mills.	Bid specification to be followed, however, the issue can be discussed during detailed engineering.
110	III	Ch-30	Flue Gas Desulphurisation System	57 of 93	8.1	8.1 Mill Separator Tank 1) The Bidder shall provide one (1 no.) mill separator tank for each mill. Each tank shall be sized to meet 12 hours continuous limestone requirement of the one mill operating at Design point. For tank volume calculation, solid concentration (by weight) in the slurry shall be assumed, not more than 25% or actual required whichever is lower.	Mill Separator tank is part of wet ball milling system. The Mill Separator tank is provided to hold and dilute the circulating slurry of the mill Separator for desired operation of the milling system for limestone grinding. It is also required for changeover of slurry pumps [for each mill, there are two mill circuit pumps (1working + 1standby)]. Normally mill separator tank is sized to meet 5 minutes holding capacity. The same is followed by NTPC and other state utilities. Already main slurry storage tanks are covered under clause no.: 6.0. Request to please provide clarification on mill separator sizing.	Bid specification to be followed. However, mill seprator tank should be sized to meet 5 minutes holding capacity.
111	III	Ch-30	Flue Gas Desulphurisation System	58 of 93		DATASHEET MILL SEPARATOR TANK 9) Capacity -- 12 hours limestone storage requirement of one mill		
112	III	Ch-30	Flue Gas Desulphurisation System	59 of 93		DATASHEET WET BALL MILL 10 Shell/ Head Material Shell – ASTM A 36 Head – ASTM A27 Gr 70 40	MOC shall be as per OEM standard and proven practise. Customer is requested to allow OEM proven practice.	Bid specifications to be followed.
113	III	Ch-30	Flue Gas Desulphurisation System	59 of 93		13 Main Gear-Cast Steel ASTM A 148 14 Pinion Gear-Forged Alloy Steel	Main gear MOC shall be as per OEM standard and proven practise. Mostly followed gear materials are 34crmo4 or IS2644 or 35crnimo4. Customer is requested to allow OEM proven practice.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
Annexure-26								
1	Volume VI	Chapter-6	Power Transformers, PART A: GENERATOR TRANSFORMER (GT)	Pg. 26 of 105	Cl. 6.02.07	Short circuit test – The procedure shall be as per IEC 60076-5.	Short circuit test has been successfully conducted on similar rating 315 MVA, 27/420 kV,1-ph GT for M/s TATA project. Test report can be furnished for the same, Hence, Short circuit test is not required to be done.	For Power Transformers (GT, ICT, ST and UT), Dynamic Short Circuit Withstand Test shall be conducted on one unit of each type and rating of transformers to validate the design and quality unless such tests has been successfully conducted as per Indian Standard 2026 Part-5 within last 10 years (as on last date of bid submission) on transformer of similar design. Further, Type Test report of transformer shall only be acceptable provided the offered transformer has been manufactured from the same plant. Criterion for similar design shall be as per Annexure-J of Central Elecricity Authority "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" and inline with the latest Central Electricity Authority "Technical Standard for Construction of Electrical Plants and Electrical Lines Regulations 2022". For Auxillary Power Transformers (11 / 6.9 kV) and Service Transformers (11 / 0.433 kV), Short Circuit Test shall be carried out on 01 No. of each type and rating.
2	Volume VI	Chapter-6	Power Transformers, PART B: STATION TRANSFORMER (ST)	Pg. 51 of 105	Cl. 6.02.07	Short circuit test – The procedure shall be as per IEC 60076-5.	Short circuit test has been successfully conducted on similar rating 120 MVA, 400/11.5-11.5 kV,3-ph ST for M/s NTPC LARA project. Test report can be furnished for the same. Hence, Short circuit test is not required to be done.	
3	Volume VI	Chapter-6	Power Transformers, PART D: INTERCONNECTING TRANSFORMER (ICT)	Pg. 102 of 105	Cl. 6.02.07	Short circuit test – The procedure shall be as per IEC 60076-5.	Short circuit test has been successfully conducted on similar rating 315 MVA, 400/220/33 kV,3-ph ICT for M/s POWERGRID Bhinmal project. Test report can be furnished for the same. Hence, Short circuit test is not required to be done.	
4	Volume II	Chapter-9	Mandatory Spares	Pg. 64 of 103		Generator Transformer - Mandatory Spares , Set of Tap changer contacts (1 set)	Set of Tap changer contacts (1 set) is mentioned twice at sl. No. 14 & 16. Kindly clarify no. of set of tap changer contacts to be considered	Items at S.No. 12 & 14 at Sheet 64 of 103 and Item at S.No. 12 at Sheet 67 of 103, Ch-9, Vol-II stands deleted.
5	Volume II	Chapter-9	Mandatory Spares	Pg. 66 of 103		STATION TRANSFORMER - Mandatory Spares , OIL FLOW INDICATOR (1 SET)	OIL FLOW INDICATOR (1 SET) is mentioned twice at sl. No. g) & w). Kindly clarify no. of set of oil flow indicators to be considered.	Item at S.No. (w) at Sheet 66 of 103, Ch-9, Vol-II stands deleted.
6	Volume II	Chapter-9	Mandatory Spares	Pg. 66 of 103		STATION TRANSFORMER - Mandatory Spares , Breather , Breather with silicagel (1 SET)	Breather and Breather with silcagel is mentioned at sl. No. p) & y). Kindly clarify no. of set of bretaher with silicagel to be considered.	Item at S.No. (p) & (e) at Sheet 66 of 103, Ch-9, Vol-II stands deleted.
7	Volume II	Chapter-9	Mandatory Spares	Pg. 64-67 of 103		MANDATORY SPARES FOR TRANSFORMERS	Mandatory spares for Generator Transformer (pg. 64), Station Trasnformer (pg. 66), Unit Transformer (pg. 67) is explicitly indicated however, mandatory spares for Interconnecting Transformer are not mentioned. Kindly furnish list of mandatory spares to be considered for Interconnecting Transformer , if any.	Mandatory spares for Inter Connecting Transformer (ICT) are mentioned at Pg. 78-79 of 103, Ch-9, Vol-II. For Items at S.No. (w) & (x) at Pg.-79 of 103, Vol-II, qty. shall be one (1) set each. Item at S.No. (g) at Page 78 of 103, Vol-II stands deleted.
Annexure-27								

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	5 of 93	6	The waste water from the system shall be discharged to effluent treatment plant as specified elsewhere in the specification.	As per bidder's understanding, Waste water from FGD shall be discharged to ETP. Hence, waste water treatment plant and thickner after secondary hydrocyclone are not applicable in line with tender drawing 111-13-5212. Please confirm.	Confirmed.
2	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	10 of 93	1.6	1.6 Waste Water Treatment Plant: The over flow from the secondary hydro-cyclone in gypsum dewater system shall be taken to one no. fines thickener followed by One (1) waste water tank. 2x100% waste water pumps. The treated water from the waste water pumps discharge shall be taken to the CMB.		
3	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	13 of 93		Bidder shall provide buildings for Limestone grinding System, slurry recirculation pumps & oxidation blowers/compressors, Gypsum Dewatering system, FGD control room, process water pump house, Waste Water Building, Chemical House, Dozer Shed, Waste Water Control Room, DMCW Pump house, electrical panel room, control cubical & Analyser room (if required) etc.	1. As per bidder's understanding, Waste water from FGD shall be discharged to ETP. Hence, waste water building, chemical house & waste water control room are not applicable. Please confirm. 2. As per standard practice, Bidder provides common structural steel shed with steel roof & sides open for housing Recirculation slurry pumps and oxidation blowers. Please confirm.	1. Bidder's understanding is correct. 2. Bid specifications to be followed.
4	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	20 of 93		The FGD auxiliaries (like. agitator(s) in absorber and limestone slurry tanks, flue gas dampers, agitator(s) in absorber, process water (as applicable), mist eliminator wash pump(s) (if applicable), lube oil system of mills etc.) which may impact serious damage to the FGD System shall be connected to the emergency power supply system for total power failure condition.	As per bidder's collaborator practice, there is no need of emergency power supply to process water pump & Mist Eliminator wash pump(s). Customer is requested to confirm.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
5	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	23 of 93		The FGD shall be designed considering 0.6% Sulphur content in coal.	FGD shall be designed as per the design point conditions specificied in the Table-I of the section-3, i.e., considering design coal.	Bid specifications to be followed.
6	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	25 of 93	1	The duct from Absorber outlet to bypass duct shall be made of Carbon steel of minimum 7mm thickness with 2 mm (minimum) thickness lining / cladding / wall paper of Alloy C276 / Alloy 59 or better material.	Bidder requests customer to give an option of titanium for Absorber outlet duct lining.	Bid specifications to be followed.
7	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	35 of 93		Provision shall be kept for addition of one more layer of mist eliminator for future use.	Three stage Mist Eliminators (ME) is already envisaged in the tender specification and additional provision for one more layer is not required. Please confirm.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
8	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	42 of 93	24	It It should be possible to discharge the absorber retention tank into the emergency absorbent tank within 2 hrs with 1x 100% gypsum bleed pump running. Bidder may provide additional pumps to meet this requirement.	1. Bidder understands that 2 hours requirement is to discharge/evacuate the slurry in absorber upto pump suction level. 2. During transfer of absorber retention tank slurry to emergency absorbent tank, 2x100% gypsum bleed pumps will run as per bidder's standard practice.	It is clarified that 1. 2 hours requirement is to discharge/ evacuate the slurry within the maximum and minimum levels in the absorber. 2. Bid specifications to be followed. The discharge / evacuation within 2 hours shall be met by 1 x 100% Gypsum Bleed pump.
9	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	69 of 93		Primary Hydrocyclone, Solid contents of feed, % : 20	As per bidder's design, Gypum bleed slurry from absorber consists of 30% solid content.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
10	Volume III Mechanical Works	Ch 1	Steam Generator & Auxiliaries	93 of 186		Pressure drop through FGD: 200 mmWC or actual whichever is higher for ID fan sizing	As per bidder's design, Pressure drop through FGD is around 150 mmWC. Considering 200 mmWC will oversize the ID fan. Customer is requested to allow bidder to consider actual requirement.	Pressure drop through FGD shall be considered as 150 mmWC or actual whichever is higher.
11	Volume VII Tender drawings		Flow diagrams of Absorber System, Limestone slurry preparation system, Gypsum Dewatering system.			Dwg no: 111-13-5210, 111-13-5211 & 111-13-5212.	Bidder understands that the referred flow diagrams are typical in nature and will be finalised during detail engineering. Some of the valves/instruments shown in these tender drawings are not required, same will be finalised during detail engineering with substantial documents.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
12	Volume II General & Schedules	Ch.9	Mandatory Spares	50 OF 103	3.A.i	 A. Absorber i) Liner material — % — 15% of total population of each material and thickens of each Absorber — % means total requirement of three units.	As per specification, Absorber liner material is C276/Alloy 59. Since the life of these materials is around 25 years for absorber application, mandatory spares for liner material is not required. Customer is requested to review the requirement as these mandatory spares will lie at site for a very long period.	Requirement of Liner Material stands deleted.
13	Volume II General & Schedules	Ch.9	Mandatory Spares	50 OF 103	3.A.i	 3. Absorber System A. Absorber i) Liner material — % — 15% of total population of each material and thickens of each Absorber — % means total requirement of three units. ii) Absorber spray/ Oxidation nozzle — % — 30 % of each type iii) Absorber mist eliminator washing nozzle — % — 30% of each type iv) Absorber Mist Eliminator — % — 15 % of each type	1. 30% requirement for spray nozzles is very high. Spray nozzles are made up of Silicon carbide and their service life is also high. Customer is requested to review the requirement. 2. In remarks column it is mentioned that the requirement is for 3 units, but this tender is for only one unit.	1. Bid specifications to be followed. 2. Three units may be read as 1 unit.
14	Volume II General & Schedules	Ch.9	Mandatory Spares	48 OF 103	1.C	Raw gas Duct liner% : 10 % of total population	Lining in the raw gas duct is not applicable, Hence the mandatory spare requirement is also not applicable.	Refer Clause 1.1 f) at Sheet 1 of 103, Chapter 9 of Volume II.
15	Volume II General & Schedules	Ch.9	Mandatory Spares	48 OF 103	1.C	Clean Gas duct liner (%): 10 % of total population	As per specification, Absorber outlet duct liner material is C276. Since the life of the materials is around 25 years, mandatory spares for liner material is not required. Customer is requested to review the requirement.	Requirement of Liner Material stands deleted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1	II	4	Provenness/Generator	Sheet 1 of 42	4.1.2	The turbine to be supplied under this contract shall be manufactured, assembled and tested in a factory where turbines of at least 500 MW rating have been manufactured in the past	For Turbine, provenness experience requirement is 500 MW and 1 year (Sheet 1, Clause 4.1.1 & 4.1.2) whereas for Generator, it is 660 MW & above and 1 year at (Sheet 1, Clause 4.2.1 & Sheet2, Clause 4.2.3) and 500 MW & 2 years at Sheet 39 & 40. To avoid ambiguity, it should be 500 MW and 1 year for Generator also as in case of Turbine. Hence requirement of 660MW may please be replaced with 500MW in line with the NTPC Talcher & SCCL Singreni.	Bid specifications to be followed
					4.2.1	The generator offered shall be of proven design of the Qualified Generator Manufacturer. At least one (1) number generator of 660MW or above rating made on the proven design should be in successful operation for a minimum period of one (1) year prior to the date of Techno-Commercial bid opening.		Bid specifications to be followed
				Sheet 2 of 42	4.2.3	The generator to be supplied under this contract shall be manufactured, assembled and tested in a factory where generator of at least 660MW rating have been manufactured in the past.		Bid specifications to be followed
				Sheet 39 & 40 of 42	Annexure-II	Sl. No. 15 (Page 39 of 42) Factory /Works where the Generator rating equal to 500MW or more was Manufactured, assembled & tested (Page 40 of 42) Certificate(s) from Owner that the Generator with above mentioned technical parameters is in successful operation for a minimum period of two (2) years prior to the date of Techno-Commercial bid opening		Against S.No.-15 of table at Sheet 39 of 42, Ch-4, Vol-II, the figure "660 MW" be read as "500 MW". In the para below table at Sheet 40 of 42, Ch-4, Vol-II, the word "two (2) years" be read as "one (1) year"
2	II	4	Provenness	4& 5 of 42	4.3.1	"Turbine controls viz. DEHC, ATT, TSC and Main Turbine Protection system shall be designed and supplied complying the TMR–Triple modular redundant philosophy and same shall be SIL3 certified via TUV, Rheinland-Germany."	It is clarified that Turbine Generator controls shall be implemented in BHEL make VALMET DNA DDCMIS. Turbine Control System of Boiler shall be configured using proven fail safe configuration in line with latest edition of IEC 61508 guidelines and OEM recommendations. The certification is through third party International certification authority, EXIDA USA. In view of the above, TUV certification is not envisaged. Kindly note that we have executed various project for NTPC/ State electricity boards/public and pvt. customers with Valmet DNA based control system.	International certification authority EXIDA USA, SIL3 can also be considered, if bidder provides document regarding 99.9% availability of the system.
3	II	4	Provenness	5 of 42	4.3.1	Sensor redundancy required (2 out of 3 or 1 out of 2) requirement have been specified in respective control system specifications. However, sensor utilization will be decided during detailed engineering. It is mandatory to use sensors with 2 out of 3 logic for critical control & protection (Analog & Binary) application/service and sensors with 1 out of 2 logic for all other control & interlock (Analog & Binary) application /service.	MFT subgroup of BMS (FSSS) shall meet the requirement of Sil-3 as per latest edition of IEC 61508 guidelines. The certification is through third party International certification authority, EXIDA USA. In view of the above, TUV certification is not envisaged. Kindly note that we have executed various project for NTPC/ State electricity boards/public and pvt. customers with Valmet DNA based control system.	International certification authority EXIDA USA, SIL3 can also be considered, if bidder provides document regarding 99.9% availability of the system.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
4	II	4	Provenness/Boiler start up drain recirculation pumps	3 of 42	4.3.1 (f)	Pump rating not less than that supplied for 800 MW or higher size super-critical unit.	HPGCL is requested to kindly modify the Provenness criteria as "Pump rating not less than that supplied for 500 MW or higher size super-critical unit. This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	In last column of table against S.No.-(f) at Sheet 3 of 42, Ch-4, Vol-II, the figure "800 MW" be read as "500 MW"
5	II	4	Provenness/Condenser	3 of 42	4.3.1 (h)	Condenser of 800 MW or higher size unit.	HPGCL is requested to kindly modify the Provenness criteria of condenser as "Condenser of a 500 MW or higher size unit. This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	In last column of table against S.No.-(h) at Sheet 3 of 42, Ch-4, Vol-II, the figure "800 MW" be read as "500 MW"
6	II	4	Provenness/Condensate Extraction Pumps (CEP)	3 of 42	4.3.1 (i)	Capacity not less than 1025 Ton/Hr and total developed Head not less than 30 kg/cm2.	HPGCL is requested to kindly modify the Provenness criteria of condenser as "Condensate Extraction Pump (CEP) rating not less than that supplied for minimum 660 MW size Steam Turbine Generator Unit. This is inline with NTPC Lara 800 MW project.	Last column of table against S.No.-(i) at Sheet 3 of 42, Ch-4, Vol-II, be read as ''Condensate Extraction Pump (CEP) rating not less than that supplied for minimum 660 MW size Steam Turbine Generator Unit''.
7	II	4	Provenness/Feed Water Low Pressure Heaters	3 of 42	4.3.1 (k)	Feed Water Low Pressure Heater of 660 MW or higher size unit.	HPGCL is requested to kindly modify the Provenness criteria of condenser as "Feed Water Low Pressure Heater of 500 MW or higher size unit. This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	In last column of table against S.No.-(k) at Sheet 3 of 42, Ch-4, Vol-II, the figure "660 MW" be read as "500 MW"
8	II	4	Provenness/Air Pre-heater	3 of 42	4.3.1 (g)	Air pre-heater rating not less than that supplied for 800 MW or higher size unit.	HPGCL is requested to kindly modify the Provenness criteria of condenser as "Air pre-heater rating not less than that supplied for 500 MW or higher size unit.. This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	In last column of table against S.No.-(g) at Sheet 3 of 42, Ch-4, Vol-II, the figure "800 MW" be read as "500 MW"
9	II	4	Provenness/Feed Water High Pressure Heaters	4 of 42	4.3.1 (l)	Feed Water High Pressure Heater of 800 MW or higher size unit	HPGCL is requested to kindly modify the Provenness criteria of condenser as "Feed Water High Pressure Heater of 500 MW or higher size unit. This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	In last column of table against S.No.-(l) at Sheet 4 of 42, Ch-4, Vol-II, the figure "800 MW" be read as "500 MW"
10	II	4	Provenness/Deaerator	4 of 42	4.3.1 (m)	Deaerator of 800 MW or higher size unit.	HPGCL is requested to kindly modify the Provenness criteria of condenser as "Deaerator of 500 MW or higher size unit." This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	In last column of table against S.No.-(m) at Sheet 4 of 42, Ch-4, Vol-II, the figure "800 MW" be read as "500 MW".
11	II	4	Provenness/Boiler Feed pumps	4 of 42	4.3.1 (n)	Capacity not less than 1250 Ton/hr and total developed Head not less than 320 Kg/cm2.	HPGCL is requested to kindly modify the provenness criteria as "Boiler Feed Pump (BFP) rating not less than that supplied for minimum 660 MW size Super-critical Steam Turbine Generator Unit." This is in line with NTPC Lara 800 MW projects	Last column of table against S.No.-(n) at Sheet 4 of 42, Ch-4, Vol-II, be read as ''Boiler Feed Pump (BFP) rating not less than that supplied for minimum 660 MW size Super-critical Steam Turbine Generator Unit.''

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
12	II	4	Provenness	5 of 42	4.3.1	The provenness criteria for equipment (PA fans, ID fans and FD fans) stipulated at (a), (b) & (c) above shall also be considered acceptable provided the rating parameters (i.e., flow, head and rated rpm) is covered within the operating regime of the respective fan performance curve of the reference plant equipment.	BFP incl BP are operated at different RPM to meet the flow and head required by the system. The pump model supplied by HPEP to 800 MW sets are working for different conditions like design point, emergency point, BEP point etc. HPEP is offering MDG 455 model for 50% duty in 800 MW sets. Same model has been supplied by M/s MHI for 1050 MW unit and is working satisfactorily. HPGCL is requested to kindly modify the clause as "The provenness criteria for equipment (PA fans, ID fans ,FD fans and Boiler feed pump incl Booster Pump) stipulated at (a), (b), (c) & (n) above shall also be considered acceptable provided the rating parameters (i.e., flow, head and rated rpm) is covered within the operating regime of the respective equipment performance curve of the reference plant equipment."	Bid specifications to be followed.
13	II	4	Provenness/HP Bypass system	4 of 42	4.3.1 (o)	Capacity of each valve not less than 750 Ton/hr at rated steam parameters (i.e. pressure & temperature).	HPGCL is requested to kindly modify the Provenness criteria of condenser as "Capacity of each valve not less than 750 Ton/hr at supercritical steam parameters (i.e. pressure & temperature)."	Last column of table against S.No.-(o) at Sheet 4 of 42, Ch-4, Vol-II, be read as '''HP bypass system of 500 MW or higher size unit'.''
14	II	4	Provenness/NaturalDraught Cooling tower	8 of 42	4.4.2	Natural Draught Cooling Tower: 4.4.2.1 The Bidder/its sub-vendor should have designed, constructed and commissioned at least one (1) number of Natural Draft Cooling tower in RCC construction with splash type fill, of capacity not less than 60,000 M3/hr or 80% of offered capacity whichever is lower and which should have been in successful operation for at least one (1) year prior to the date of Techno Commercial bid opening. The reference cooling tower should be of the same type, as is being offered by the Bidder/ sub vendor. 4.4.2.2 Bidder/its sub-vendor who do not fulfil the requirement in clause 4.4.2.1 above can also participate	HPGCL is requested to modify PQR of Cooling Tower System as below in line with NTPC Talcher/Singreni:: 4.4.2.1 The Bidder/its sub-vendor should have designed, constructed and commissioned at least one (1) number of Natural Draft Cooling tower in RCC construction with splash/film/grid type fill, of capacity not less than 30,000 M3/hr or 80% of offered capacity whichever is lower and which should have been in successful operation for at least one (1) year prior to the date of Techno Commercial bid opening. The reference cooling tower should be of the same type, as is being offered by the Bidder/ sub vendor. 4.4.2.2 Delete. 4.4.2.3 In case the reference cooling tower was designed by a party other	Bid specifications to be followed.
15	II	4	Provenness/CW Pumps	9 of 42	4.4.3.1	4.4.3 CW Pumps The Bidder/its Sub-vendor should meet the qualifying requirements of any one of the qualifying routes stipulated under clause 4.4.3.1 or 4.4.3.2 or 4.4.3.3 for the type of CW pump specified in the Technical Specification. 4.4.3.1 The Bidder/its sub-vendor should have designed either by itself or through its Collaborator/Associate, manufactured/got manufactured, supplied, erected/ supervised erection, and commissioned/supervised commissioning of at least two (2) nos. of vertical wet pit pumps, each of capacity 36,000 M3/hr or offered capacity whichever is lower, having specific speed in the range of 4000–7000 (*) (US units) which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening. 4.4.3.2 ..... 4.4.3.3 a)	HPGCL is requested to kindly modify the clause as follows: "The Bidder/its Sub-vendor should meet the qualifying requirements of any one of the qualifying routes stipulated under clause 4.4.3.1 or 4.4.3.2 or 4.4.3.3 for the type of CW pump specified in the Technical Specification. 4.4.3.1 The Bidder/its sub-vendor should have designed either by itself or through its Collaborator/ Associate, manufactured/got manufactured, supplied, erected/supervised erection, and commissioned / supervised commissioning of at least one (1) no. vertical wet pit pump or one (1) no. concrete volute pump , each of rated capacity 36,000 cum/hr or offered rated capacity whichever is lower, having specific speed in the range of 4000–7000 (*) (US units) which should have been in successful operation for at least one (1) year." This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	In clause 4.4.3.1, 4.4.3.2 & 4.4.3.3 of Ch-4 at Sheet 9 of 42:- i) the words "vertical wet pit pumps" be read as "vertical wet pit pumps / concrete volute pumps". ii) the word "two (2) years" be read as "one (1) year". iii) the figure "36,000" be read as "35,000".
	II	4		9 of 42	4.4.3	Note (i) For qualification under clause 4.4.3.1, a firm can meet the requirements stipulated under clause 4.4.3.1 above either singularly or collectively along with its Subsidiaries.In such a case the Bidder shall be required to furnish a Deed of Joint Undertaking(s) (DJU) jointly	HPGCL is requested to modify the clause as below: Notes for clause 4.4.3.1, 4.4.3.2 and 4.4.3.3 (i) For qualification under clause 4.4.3.1, ... Or In case the bidder/its sub-vendor has acquired the design and technology of the offered pump model from its collaborator under the Technology	Note (i) at the bottom of Sheet 9 of 42 of Ch-4 in Vol-II be read as:- "(i) For qualification under.....equally divided amongst them. OR

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16						executed by the Bidder, its sub-vendor, Associate or collaborator, the Holding company along with all its subsidiaries extending support to the holding company/ Associate or collaborator for complying requirements of clause 4.4.3.1 and each executant of DJU shall be jointly and severally liable to the Owner for successful performance of CW pumps, as per the format enclosed with the bidding documents. The Deed of Joint Undertaking(s) (DJU) should be submitted at the time of placement of order on approved sub-vendor. In such a case, the Holding company/ Associate or collaborator along with all its subsidiaries extending support to the holding company/ Associate or collaborator for complying requirements of clause 4.4.3.1 shall be required to furnish an on demand bank guarantee for INR 10 Million (Rupees Ten Million) equally divided amongst them. (ii) (*)Specific speed as stipulated above is the specific speed calculated at the best efficiency point of the pumps as defined in Hydraulic Institute Standards (HIS).	transfer/Assistance/Licensing Agreement and has executed/is executing the contract(s) for the offered pump model involving design, manufacturing, supply, erection and commissioning, the bidder/its sub-vendor is required to submit the copy of whole/part of the agreement or any other supporting document(s) establishing technology transfer covering drawings/documentation of design, manufacturing, quality assurance plans and imparting relevant training of personnel. Further, the bidder shall be required to submit a letter for satisfactory performance of CW pumps along with the techno commercial bid, as per the format enclosed in the bidding documents. (ii) (*)Specific speed as stipulated above is the specific speed calculated at the best efficiency point of the pumps as defined in Hydraulic Institute Standards (HIS). This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	In case the bidder / its sub-vendor has acquired the design and technology of the offered pump model from its collaborator under the Technology transfer / Assistance / Licensing Agreement and has executed / is executing the contract(s) for the offered pump model involving design, manufacturing, supply, erection and commissioning, the bidder / its sub-vendor is required to submit the copy of whole/part of the agreement or any other supporting document(s) establishing technology transfer covering drawings/documentation of design, manufacturing, quality assurance plans and imparting relevant training of personnel. Further, the bidder shall be required to submit a letter for satisfactory performance of CW pumps along with the techno commercial bid."
17	II	4	Provenness/Ash Handling Plant	14,15,16 of 42	4.4.15	Ash Handling Plant	HPGCL is requested to kindly modify the clause as per Attachment-5 to this document. This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	Following changes are made in Chapter-4 of Vol-II:- <u>Clause 4.4.15.1 (Sheet 14 of 42)</u> i) In sub clause (a), the word / figure, "Jet Pump: 3 x 65 TPH (dry ash basis)" be read as "Jet Pump: 3 x 50 TPH (dry ash basis)" ii) In sub clause (b), the figure "45" be read as "30". iii) In sub clause (c), the words "through conveying air blowers" stands deleted. iv) In sub clause (d), the words "two (2) plants" be read as "one (1) plant". <u>Clause 4.4.15.2 (Sheet 15 of 42)</u> i) In second para of sub clause (b), the words "two (2) plants" be read as "one (1) plant".
18	II	4	Provenness/Coal Handling Plant	16,17 of 42	4.4.16	Coal Handling Plant	HPGCL is requested to kindly modify the clause as per Attachment-5 to this document. This is inline with NTPC Lara and SCCL Singareni 800 MW projects.	Following changes are made in Clause 4.4.16 of Ch-4 at Sheet 16/17 of 42, Vol-II:- a) The word / figure "two (2)" be read as "one (1)". b) Second para of clause 4.4.16.1 be numbered as 4.4.16.2 and following provision is also added:- "And Bidder/ its Sub-vender should have designed, manufactured/ got manufactured, erected and commissioned at least one (1) number of side discharge wagon tippler suitable for tippling Indian Railway Wagons used for transportation of coal or other minerals which should have been in successful operation for at least one (1) year prior to the date of Opening of Techno-commercial Bid (Part-I)." c) Last line / sentence of clause 4.4.16.1 (Atleast.....handling plants) stands deleted.

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19	II	4	Provenness/400 kV Switchyard	29 of 42	5.14	400 KV SWITCHYARD The Vendor/his Group Company should have Designed, Manufactured, Supplied, Erected/Supervised erection, Commissioned/Supervised Commissioning of one (1) Gas Insulated Switchgear (GIS) Installation having at least Six (6) bays of 400 kV or above voltage class with a short circuit rating of not less than 50 kA for 1 second, which should have been in successful operation for a period of not less than two (2) years prior to the date of Techno-Commercial bid opening. AND The above Vendor should have established manufacturing facilities in India and should have supplied atleast Four (4) GIS bays of 400 kV or above from their Indian manufacturing facility.	In order to increase the vendor base, HPGCL is requested to modify the provenness as below: "The Vendor/his Group Company should have Designed, Manufactured, Supplied, Erected/ Supervised erection, Commissioned/Supervised Commissioning of one (1) Gas Insulated Switchgear (GIS) Installation having at least Two(2) bays of 400 kV or above voltage class with a short circuit rating of not less than 40 kA for 1 second, which should have been in successful operation for a period of not less than One (1) year. AND The above Vendor should have established manufacturing facilities in India and should have supplied atleast Two (2) GIS bays of 400 kV or above from their Indian manufacturing facility.	Bid specifications to be followed.
20	II	4	PROVENNESS CRITERIA FOR CIVIL WORKS	34 of 42	7.6	The Main Contractor shall engage one or two sub-contractors for carrying out civil & Structural works excluding Chimney and natural draught Cooling Tower.	HPGCL is requested to delete this clause as it may restrict the option of De-packaging of civil works to more than two subcontractors to enhance participation.	Deleted
21	II	4	Provenness / Auxiliary Oil Filled / Dry Type Transformers	25 of 42	5.3	Auxiliary Oil Filled/ Dry Type Transformers:- 5.3.1 Bidder/Sub Vendor should have manufactured & supplied at least two numbers (one each at two different installations) of at least highest offered rating oil filled/ dry type transformers which should have been in successful operation for a period of at least two (2) years prior to the date of Techno-Commercial bid opening. 5.3.2 Bidder/Sub Vendor should have his own facilities for conducting all routine and type tests as per IS: 2026 (except short circuit test). 5.3.3 The transformer considered for the above (5.3.1) should have been successfully short circuit tested. Note (applicable for clauses 5.2 & 5.3): Two different installations means two different projects or two different contracts.	HPGCL is requested to kindly review the Provenness Criteria for Auxiliary Oil Filled/ Dry Type Transformers and may please modify the same as :- 5.3.1 (a) Bidder/Sub Vendor should have manufactured & supplied at least two numbers (one each at two different installations) of at least highest offered rating oil filled/ dry type transformers (b) Oil filled/ dry type type transformers of applicable rating should have been in successful operation for a period of at least two (2) years prior to the date of Techno-Commercial bid opening. 5.3.2 Bidder/Sub Vendor should have his own facilities for conducting all routine and type tests as per IS: 2026 (except impulse withstand & short circuit test). 5.3.3 Availability of type test certificates (including short circuit test) conducted at independent lab or witnessed by third party for atleast one design for the applicable category of transformers. Two different installations means two different projects or two different contracts.	Bid specifications to be followed, however in clause 5.3 of Ch-4 at Sheet 25 of 42, Vol-II, the words "Auxiliary Oil Filled / Dry Type Transformers" be reread as "Auxiliary Oil Filled Tansformers".
22	II	4	Provenness/1.1 KV Power Cables	28 of 42	5.9	1.1 KV Power Cables :- The Bidder/ Sub Vendor should have manufactured and supplied prior to the date of Techno-Commercial bid opening the following: (a) At least 100 km of aluminium conductor, XLPE insulated, PVC sheathed power cables of 1.1kV or higher grade in one single contract (b) At least 100 km of aluminium conductor, PVC insulated, PVC sheathed power cables of 1.1kV or higher grade in one single contract (c) At least one (1) km of flame retardant low smoke cables. (d) 1.1kV or higher grade power cable of minimum 630sq.mm conductor size.	HPGCL is requested to kindly review the Provenness Criteria for 1.1 KV Power Cables and may please modify the same as :- The Bidder/ Sub Vendor should have manufactured and supplied prior to the date of Techno-Commercial bid opening the following: (a) At least 100 km of LT Power Cables (b) to be Deleted (c) At least one (1) km of flame retardant low smoke cables. (d) 1.1kV or higher grade power cable of minimum 630sq.mm conductor size.	Bid specifications to be followed, however clause 5.9(b) of Ch-4 at Sheet 28 of 42, Vol-II stands deleted.

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23	II	4	Provenness/DC Batteries	29 of 42	5.12	DC Batteries : The Bidder / Sub Vendor should have manufactured and supplied at least two (2) numbers of highest offered rating or above of High Discharge type Plante type (in case bidder offers Lead Acid Plante type battery) or High Discharge type Nickel Cadmium battery (in case bidder offers Nickel Cadmium battery), at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening. Note: Two different installations mean two different project sites or two different contracts	HPGCL is requested to kindly review the Provenness Criteria for DC Batteries and may please modify the same as :- The Bidder / Sub Vendor should have manufactured and supplied at least two (2) numbers of 1200Ah or above of High Discharge type Plante type (in case bidder offers Lead Acid Plante type battery) or 600Ah or above High Discharge type Nickel Cadmium battery (in case bidder offers Nickel Cadmium battery), at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening. Note: Two different installations mean two different project sites or two different contracts	Bid specifications to be followed
24	II	4	Provenness/Battery Charger	29 of 42	5.13	Battery Charger:- The Bidder/Sub Vendor should have manufactured and supplied at least two (2) numbers of Static Automatic Voltage Regulator type Battery Chargers of highest offered rating or above, at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening. Note: Two different installations mean two different project sites or two different contracts	HPGCL is requested to kindly review the Provenness Criteria for Battery Charger and may please modify the same as:- The Bidder/Sub Vendor should have manufactured and supplied at least two (2) numbers of SCR based Automatic Voltage Regulator type Battery Chargers of 300A or above, at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening. Note: Two different installations mean two different project sites or two different contracts	Bid specifications to be followed, however in Clause 5.13 of Ch-4 at Sheet 29 of 42, Vol-II, the word "Static" is replaced with "SCR Based".
25	II	4	Provenness/Vacuum Belt Filters	19-20 of42	4.4.20.1 (f)	Vacuum Belt Filters :- Vaccuum Belt Filters ..... offered by the bidder shall be sourced from only such manufacturer(s) who has previously designed (either by itself or under colloboration/ licensing agreement), manufacturerd/ got manufactured the respective equipment (s) of the type, application and minimum equipment rating as stipulated ... 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 prior to techno commercial bid opening... : 80% of the offered Vaccum Belt filter capacity.	The Vacuum Belt Filter as a technology/ process is an established one and finds widespread application in various processes in mineral and industrial sectors as well; such as Phosphoric Acid, Coal Washeries, Ore Benefication, Potash recovery, process slurry dewatering, pharmaceutical processes and so on. NTPC and other state utilities like RRVUL (M/s Fitchner is consultant) have also accepted provenness of the Vacuum Belt filter in other process application in addition to Wet limestone based coal fired power plant. Regarding equipment rating for qualifying vacuum belt filter, NTPC mentions specific value rather than percentage of offered capacity. For 2x800 MW Lara TPS, NTPC has mentioned it as 35 T/hr. It is proposed that qualifyting equipment rating may be set 17 T/hr or 50% of the offered vacuum belt filter capacity for 1x800 MW Yanumanagar TPS as Yamunanagar is one (1) unit of 800 MW whereas Lara project is two (2) units of 800 MW). Thus, PQR may please be modify as below: - Vacuum Belt Filters ..... offered by the bidder shall be sourced from only such manufacturer(s) who has previously designed (either by itself or under colloboration/ licensing agreement), manufacturerd/ got manufactured the respective equipment (s) of the type, Wet FGD application OR in Any other Process application and minimum equipment rating as stipulated ... 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 reckoned with the date of submission of vendor proposal for approval but not later than six (6) months from LOA ... : 17 T/hr VBF capacity. This will enable reputed Indian manufacturers to participate in bidder's bid and also comply with the Govt. of India'a 'Make in India' policy. NTPC's 2x800 MW Lara TPS, Vacuum Belt filter PQR is attached for reference. Please accept.	Following changes are made in Clause 4.4.20.1 of Ch-4 at Sheet 20 of 42 in Vol-II:- a) 4th Coulmn of table against S.No. (f) be reread as "Wet Limestone based FGD application in Coal Fired power plant or in any other process application". b) 5th Coulmn of table against S.No. (f) be reread as "20T/Hr VBF capacity".

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26	II	4	Provenness	20 of 42	4.4.20.2	…. himself should have sourced / shall source such proven equipment(s) for at least one first 660 MW unit completely from such qualified manufacturer….	There is only one unit of 800 MW in the tender. Bidder understands that the clause is not applicable. Please confirm.	Last 9 lines of first para of clause 4.4.20.2 of Ch-4 at Sheet 20 of 42 , Vol-II, ("However, in this…….for such equipments") be read as under:- "Before taking up the manufacturing of such equipment(s), the bidder/ his sub-vendor(s) must create /have created manufacturing facilities at his works as per collaborator's/licenser's design, manufacturing and quality control system for such equipment(s)."
27	II	4	Provenness/Air Conditioning System	11 of 42	4.4.6	Air Conditioning System: The bidder/its sub-vendor should have designed, supplied, erected and commissioned atleast two (2) numbers of Air conditioning systems each having a total installed capacity of 300 TR or more, which should have included atleast one chilling unit with a minimum capacity of 60 TR at each reference system in Industrial/Commercial installations. The systems should have been in successful operation for atleast two (2) years prior to the date of techno-commercial bid opening. In addition, the chiller unit(s) proposed to be supplied for this package shall be sourced from the manufacturer(s) who have manufactured and supplied atleast two (2) nos. of similar type of chiller units each having a capacity of not less than 150 TR, which should have been in successful operation for atleast two (2) years prior to the date of techno- commercial bid opening.	For maximum participation of indigenous vendors, we recommanded following qualification requirement. "The bidder/its sub-vendor should have designed, supplied, erected and commissioned atleast one (1) number of Air conditioning systems having a total installed capacity of 300TR or more, which should have included atleast one chilling unit with a minimum capacity of 60TR in Industrial/ Commercial installations. The systems should have been in successful operation for atleast one (1) year prior to the date of submission of vendor proposal for approval but not later than one (1) year from LOA. In addition, the chiller unit (s) proposed to be supplied for this package shall be sourced from the manufacturer(s) who have manufactured and supplied atleast one (1) no. similar type of chiller units having a capacity of not less than 150 TR, which should have been in successful operation for atleast one (1) year prior to the date of submission of vendor proposal for approval but not later than six (6) months from LOA". NTPC also follows above mentioned PQR for Air conditioning system. NTPC's 2x800 MW Lara TPS, AC system PQR is attached for reference. Please accept.	In clause 4.4.6 of Ch-4 at Sheet 11 of 42, Vol-II, the word (figure) "two (2)" be read as "one (1)".
28	II	4	Provenness/Ventilation System	11 of 42	4.4.7	Ventilation System: The bidder/ its sub-vendor should have designed, supplied, erected, and commissioned atleast two (2) numbers ventilation systems including air washer units having individual fan capacity of 1,25,000 Cum./Hr. or more at each ventilation system, in Industrial/ Commercial installations. The systems should have been in successful operation for atleast two (2) years prior to the date of techno- commercial bid opening.	For maximum participation of indigenous vendors, we recommanded following qualification requirement. "The bidder/ its sub-vendor should have designed, supplied, erected, and commissioned atleast one (1) number ventilation systems including air washer units having individual fan capacity of 80,000 Cum./Hr. or more, in Industrial/ Commercial installations. The systems should have been in successful operation for atleast one (1) year prior to the date of submission of vendor proposal for approval but not later than six (6) months from LOA." NTPC also follows above mentioned PQR for Ventilation system. NTPC's 2x800 MW Lara TPS, Ventilation system PQR is attached for reference. Please accept.	In clause 4.4.7 of Ch-4 at Sheet 11 of 42, Vol-II, following changes are made:- a) The word (figure) "two (2)" be read as "one (1)". b) Figure "1,25,000" be read as "80,000".
29	II	4	Provenness/Turbine Hall EOT Crane	13 of 42	4.4.13	Turbine Hall EOT Crane:- The Bidder/its sub-vendor should have designed, manufactured, erected and commissioned EOT cranes of capacity 100T or more with minimum crane span of 28 meters, which is in successful operation in at least two (2) power stations for a minimum period of one (1) year prior to the date of Techno-Commercial bid opening.	EOT crane finds widespread application in various other industrial sectors apart from power stations. IS: 3177 is the only applicable standard for manufacturing of EOT cranes (including goliath crane) used in various industries. Thus, PQR may please be modify as below: - The Bidder/its sub-vendor should have designed, manufactured, erected and commissioned EOT cranes (including goliath crane) of capacity 100T or more with minimum crane span of 28 meters, which is in successful operation in at least One (1) station for atleast one (1) year prior to the date of submission of vendor proposal for approval but not later than six (6) months from LOA." NTPC also follows above mentioned PQR for TG Hall EOT crane. NTPC's 2x800 MW Lara TPS, TG Hall EOT crane PQR is attached for reference. Please accept.	In clause 4.4.13 of Ch-4 at Sheet 13 of 42, Vol-II, the word (figure) "two (2) power stations" be read as "one (1) power station".

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30	II	4	Provenness/Water Pre-treatment Plant & Liquid Effluent Treatment Plant	12 OF 42 And 23 of 42	4.4.9 and 4.6.0.0	Water Pre-treatment Plant & Liquid Effluent Treatment Plant The Bidder/its sub-vendor should have designed, supplied, erected and commissioned at least two (2) numbers water/waste water treatment plants, each with a capacity of not less than 1500 M3/hr, comprising of clarifiers/tube settlers/ thickeners or a combination thereof including civil works. The plants should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening. AND The Bidder /Sub- Contractor should have designed , supplied, erected and commissioned during the last ten years at least one number sea water reverse osmosis plant with a permeate water capacity of minimum 30 m3 / hour. which should have been in successful operation for a period of not less than one year as on date of LOA.	1.In line with the general practice followed in power industry, the qualifying capacity of PT plant may be reduced to 1000 cum/hr and from two (2) plants to one (1) plant. Also the civil work included in PT plant PQR may be removed as the civil agency PQR (clause 7.1, sheet 34 of 42) includes experience of DM/PT plant. Thus, PQR of Water Pre-Treatment Plant may be revised as below: "The Bidder/its sub-vendor should have designed/ got designed, supplied, erected and commissioned at least one (1) water/waste water treatment plants, with a capacity of not less than 1000 Cu.m/hr, comprising of clarifiers/ tube settlers/ thickeners etc. or a combination thereof. The plant should have been in successful operation for at least one (1) year prior to the date of submission of vendor proposal for approval but not later than six (6) months from LOA." This shall enhance capable bidder's participation during tendering of the package. 2. It is proposed that LETP PQR may not be kept same as that of PT plant as LETP capacity may not be as high as PTP. Hence by laying high capacity parameters in PQR, qualified vendors for LETP may get eliminated. Civil works criteria should also be removed from LETP PQR to enhance bidder's participation. ALso the ETP PQR mentioned at clause no 4.6.0.0 is sea water based that is not applicable for 1x800 MW Yamunanagar project. We Request Owner to revise PQR of Liquid Effluent Treatment Plant/ ETP as below, "The Bidder/its sub-vendor should have designed/ got designed, supplied, erected and commissioned at least one (1) water/waste water treatment plants, with a capacity of not less than 50 Cu.m/hr, comprising of clarifiers/ tube settlers/ thickeners/ lamella/ RO plant etc. or a combination thereof. The plant should have been in successful operation for at least one (1) year prior to the date of submission of vendor proposal for approval but not later than six (6) months from LOA."	1) Clause 4.4.9 of Ch-4 at Sheet 12 of 42, Vol-II be reread as under: "Water Pre-treatment Plant The Bidder/its sub-vendor should have designed, supplied, erected and commissioned at least one (1) number water/waste water treatment plants, each with a capacity of not less than 1000 M3/hr, comprising of clarifiers/tube settlers/ thickeners or a combination thereof. The plant should have been in successful operation for at least one (1) year prior to the date of opening of technocommercial bid." 2) Clause 4.6.0.0 of Ch-4 at Sheet 23 of 42, Vol-II be reread as under: "Effluent Treatment Plant The Bidder /Sub- Contractor should have designed , supplied, erected and commissioned during the last ten years at least one number water reverse osmosis plant with a permeate water capacity of minimum 30 m3 / hour. which should have been in successful operation for at least one (1) year prior to the date of openning of technocommercial bid."
31	II	4	Provenness/Ion Exchange Demineralization Plant	12 of 42	4.4.10	Ion Exchange Demineralization Plant : The Bidder /its sub-vendor should have designed, supplied, erected and commissioned at least one (1) number of ion exchange based demineralising plant, consisting of at least two (2) streams each of minimum 40 M3/hr capacity, capable of producing outlet water quality of silica and conductivity not more than 0.01 ppm as SiO2 and 0.1 micromho/cm respectively, which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening.	Specified PQR of Ion Exchange DM Plant in Tender Specifications is more stringent and will restrict the eligible and capable bidders to participate in the tender. PQR of Ion Exchange DM Plant may be revised as below: "The Bidder/its sub-vendor should have designed, supplied, erected and commissioned (or supervised erection and commissioning) of at least one (1) number of ion exchange based demineralising plant of minimum capacity of 60 m3/hr (wherein, if more than one stream is used, capacity of each stream shall be 30 m3/hr or more), capable of producing outlet water quality of silica and conductivity not more than 0.02 ppm as SiO2 and 0.2 micromho/cm respectively. The plant should have been in successful operation for at least one (1) year prior to the date of submission of vendor proposal for approval but not later than six (6) months from LOA." Similar PQR for ion exchange based DM Plant was followed by state utility MAHAGENCO for its 1x660 MW Bhusawal project.	Clause 4.4.10 of Ch-4 at Sheet 12 of 42, Vol-II be reread as under:- "Ion Exchange Demineralization Plant The Bidder /its sub-vendor should have designed, supplied, erected and commissioned at least one (1) number of ion exchange based demineralising plant, consisting of at least two (2) streams each of minimum 30 M3/hr capacity, capable of producing outlet water quality of silica and conductivity not more than 0.02 ppm as SiO2 and 0.2 micromho/cm respectively, which should have been in successful operation for at least one (1) year prior to the date of openning of technocommercial bid."
	II	4	Provenness/Mill Reject Handling System	12 of 42	4.4.11	4.4.11.1 Mill reject handling system offered by the Bidder shall be only from such manufacturer who has previous experience of manufacturing and supplying pneumatic type coal mill rejects handling systems of capacity 5 TPH or higher which are in successful operation in at least one (1) plant for a period not less than one (1) year prior to the	There are limited suppliers who meets the credentials of pneumatic type coal	

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32						date of Techno-Commercial bid opening. 4.4.11.2 In case the Bidder or the sub vendor is not a manufacturer of proven equipment as per clause 4.4.11.1 above but is a manufacturer of pneumatic conveying systems and has manufactured and supplied pressure type pneumatic conveying systems of capacity 5 MTPH or higher for any material which are in successful operation in at least one (1) plant for a period not less than one (1) year prior to the date of Techno- Commercial bid opening , the Bidder/sub vendor can manufacture such equipment for mill rejects handling also provided he has valid collaboration or licensing agreement for design, engineering, manufacture, and supply of such equipment in India with a manufacturer who meets the requirements of clause 4.4.11.1above. In such a case, the Bidder shall be required to furnish a Deed of Joint Undertaking (DJU) jointly executed by the Bidder, its sub-vendor (if applicable) and the Collaborator/ Associate and each executant of DJU shall be jointly and severally liable to the Owner for successful performance of the system, as per the format enclosed with the bidding documents. The Deed of Joint Undertaking (DJU) should be submitted at the time of placement of order on approved sub-vendor. In such a case, the Collaborator/ Associate shall be required to furnish an on demand bank guarantee for INR 2 Million (Rupees Two Million).	There are limited suppliers who meets the credentials of pneumatic type coal mill rejects handling systems as specified in MRS PQR. Pneumatic conveying system has widespread applicability for other applications also, that is bottom ash handling, sintering plant, mining industry, etc. Generally, these limited coal mill rejects handling suppliers do not collaborate/ form licensing agreement with suppliers in same business of pneumatic conveying (other than coal mill reject handling). Therefore PQR may please be modify as below: - 4.4.11.1 Mill reject handling system offered by the Bidder shall be only from such manufacturer who has previous experience of manufacturing and supplying pneumatic type coal mill rejects handling systems of capacity 5 TPH or higher which are in successful operation in at least one (1) plant for a period not less than one (1) year prior to the date of submission of vendor proposal for approval but not later than six (6) months from LOA. 4.4.11.2 In case the Bidder or the sub vendor is not a manufacturer of proven equipment as per clause 4.4.11.1 above but is a manufacturer of pneumatic conveying systems and has manufactured and supplied pressure type pneumatic conveying systems of capacity 5 MTPH or higher for any material which are in successful operation in at least one (1) plant for a period not less than one (1) year prior to the date of submission of vendor proposal for approval but not later six (6) months from LOA , the Bidder/sub vendor can manufacture such equipment for mill rejects handling also.	Bid specifications to be followed.
33	II	4	Provenness/Hydrogen Generation Plant	17 of 42 and 23 of 42	4.4.18 and 4.7.0.0	The bidder/its sub-vendor should have designed and supplied at least one (1) hydrogen generation plant of the type specified, comprising of electrolyser(s) and gas compressor(s) to generate Hydrogen at 5 NM3/hr (minimum) of 99.7% purity (minimum) at the main electrolyser outlet which should have been in successful operation for at least two (2) years prior to the date of Techno- Commercial bid opening. Bidder/its Sub-vendor shall offer only the type of hydrogen generation plant for which he is qualified.	Please note that PEM Technology has been introduced recently in India and has a very limited vendor base. Hence, customer is requested to allow Indian Hydrogen plant vendors in collaboration with OEM of PEM technology meeting PQR requirment. Further, Customer is requested to accept successful operation for at least one (1) year prior to the date of submission of vendor proposal for approval but not later six (6) months from LOA for both the clauses.	Clause 4.4.18 & 4.7.0.0 of Ch-4, Vol-II at Sheet 17 & 23 of 42 stands deleted.
34	II	4	Provenness/Chemical Treatment (System) Programme for CW System	10 of 42	4.4.4	The Bidder/its sub-vendor should have executed contracts for cooling water treatment program of at least two (2) different cooling water systems each having a flow rate not less than 36,000 M3/hr operating in alkaline pH range and both the treatment programs should have been in successful operation for at least one (1) year prior to the date of Techno-Commercial bid opening. These contracts should include supply of chemicals, operation and maintenance of the system. The Chemicals used in these programme should have been organic polymers/ organic phosphorous compounds/ organic phosphates based chemicals.	In line with the general practice followed in power industry, the qualifying capacity of Chemical treatment for CW system may be reduced to 10000 cum/hr. Also the number of cooling water system (installation) may be reduced from two (2) plants to one (1) plant. PQR of Chemical treatment for CW system may be revised as below: The Bidder/its sub-vendor should have executed contracts for cooling water treatment programme of at least one (1) cooling water system having a flow rate not less than 10,000 Cu.M/hr operating in alkaline pH range and treatment program should have been performed for at least one (1) year by the bidder prior to the date of submission of vendor proposal for approval but not later than six (6) months from LOA. This contract should include supply of chemicals. This shall enhance bidder's participation during tendering of the package.	In clause 4.4.4 of Ch-4 at Sheet 10 of 42 , Vol-II, the figure "36,000" be read as "10,000".
35	II	4	Provenness	-	-	In PQR for various BOP items, customer has specified that the system, "…..should have been in successful operation for at least one (1)/ two (2) year(s) prior to the date of Techno-Commercial bid opening."	It is proposed that this requirement may be modified as, "….should have been in successful operation as on the date of submission of vendor proposal for approval but not later six (6) months from LOA." This may enable new suppliers to participate in respective package tender. NTPC also follows such PQR, relevant clause of 3x800 MW Patratu TPS is attached.	Bid specifications to be followed.

Annexure-29

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1	I	Sec I	IFB	2 of 76	1.1.1.2	UNFORESEEABLE SUB-SURFACE CONDITIONS Any additional cost and expense incurred by the Contractor to overcome such physical conditions or artificial obstructions referred to in clause 1.1.1 above shall be borne by the Contractor	Clause may be read as under: Any additional cost and expense incurred by the Contractor to overcome such physical conditions or artificial obstructions referred to in clause 1.1.1 above shall be mutually discussed and settled between Owner and Contractor	Bid specifications to be followed.
2	I	Sec-II	ITB	21 of 75	10.6	Concessional Custom Duty for Power Projects	For taking the custom duty benefits, the responsibility of furnishing document/ certificates will be of Owner only even it is to be taken from Central/State Govt. However, Bidder will give all required inputs including import de-tails to Owner to facilitate for issuance of the same.	Bid specifications to be followed.
3	I	Sec-II	ITB	23 of 75	12.6	The Bid Security may be forfeited (c) In the case of a successful Bidder, if the Bidder fails within the specified time limit (i) To sign the Contract Agreement, in accordance with ITB Clause 33, and/ or (ii) to furnish the required Contract Performance Guarantee/ Security Deposit, in accordance with ITB Clause 34.0.	HPGCL is requested to kindly review this clause for forfeiture of Bid Security.	Bid specifications to be followed.
4	I	Sec-I Sec-II	IFB ITB	43 of 76 23 of 75	Note: 9 13	The bids submitted by the bidders shall remain valid for acceptance for a period of one hundred eighty (180) days from the date of opening of price bid. Bid initially shall remain valid and open for acceptance for one hundred eight (180) days from the date of opening of Price Bid.	Bid initially shall remain valid and open for acceptance for one hundred eight (180) days from the date of ~~opening of Price Bid~~ submission of Part-I (Techno- Commercial Bid) & Part-II (Price Bid).	In Clause 13.1 at 23 of 75 of ITB / Section-II / Vol-I and Clause 9.0 at Sheet 43 of 76 of IFB / Section-I / Vol-I, the word "one hundred eighty (180) days from the date of opening of Price Bid" be read as, "two hundred twenty five (225) days from the date of opening of Part-I (Techno-commercial) Bid"
5	I	Sec-II	ITB	41 of 75	44	"RESTRICTIONS ON PROCUREMENT FROM A BIDDER OF A COUNTRY WHICH SHARES A LAND BORDER WITH INDIA"	HPGCL to confirm that, "Restrictions on procurement from a Bidder of a country which shares a land border with India" shall be complied by all the bidders for the subject tender	Bid specifications to be followed.
6	I	Sec-II	ITB	31 of 75	27.2 (v)	Evaluation of Part II:Price Bid Bid Price for Optional Item/works quoted in Schedule 12	HPGCL is requested to exclude the bid price for Optional Item/works from the price evaluation as the optional items/works are tentative in nature.	Noted
7	I	Sec-II	ITB	31 of 75	27.2 (vi)(to be added)	Evaluation of Part II:Price Bid Adjustment for the Interest during construction (IDC) to price bid in line with recent tenders	Since IDC is an important component of project cost for the Owner, it is proposed that same may be made part of bid evaluation. The modality of same can be discussed.	Noted. Refer attachment-25.
8	I	Sec-III	BDS ITB	50 of 60 31 of 75	12.2 27.2 (iv)	Adjustment factors for Bid evaluation Adjustment for the functional guarantees of the facilities offered in attachment-6(P) to price bid.	The adjustment factors for Bid evaluation as mentioned in Clause No 12.2 of BDS(Section III;SHeet 50 of 60) and attachment 6(p) are different. Bidder understand that the evaluation shall be for those parameters as mentioned in Clause No 12.2 of BDS(Section III;SHeet 50 of 60) only.HPGCL to kindly confirm.	Confirmed

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9	2 of 3	VII	Price Schedules	BID FORM PART II PRICE BID	PRICE SCHEDULES (1,2,3,4,5)	PRICE SCHEDULES (1,2,3,4,5)	Price Schedules stipulate for furnishing of price break-up for supply and installation services under various heads such as SG, STG, BOP, Electrical/C&I, Site fabricated Steel Structures, mandatory spares etc. As the price break-up in above various heads does not provide any support to customer for evaluation of the bid, it requested to kindly dispense with the requirement of same. Bidder shall provide price break-up in terms of supply, Installation, civil and mandatory spares etc. as per industry practice.	Bid specifications to be followed.
10	I	Sec-IV	GCC (Annexures) Annexure - C.1(GCC)/C.2(GCC)/ C.3(GCC)	13 of 97	2.3(i)	The following documents shall constitute the Contract between the Owner and the Contractor, and each shall be read and construed as an integral part of the Contract: (a) This Contract Agreement and the Appendices hereto (b) LOI including MOM Pre-Bid/ Post Bid Discussions (c) Special Conditions of Contract (d) General Conditions of Contract (e) Bidding document including IFB, ITB, and ECC. (f) The Bid and Price Schedules submitted by the Contractor (g) Procedures	The following documents shall constitute the Contract between the Owner and the Contractor, and each shall be read and construed as an integral part of the Contract: (a) This Contract Agreement and the Appendices hereto (b) LOI including MOM Pre-Bid/ Post Bid Discussions (c) Special Conditions of Contract (d) General Conditions of Contract (e) Bidding document including IFB, ITB, ECC and Technical Specifications and Drawings (g) The Bid and Price Schedules submitted by the Contractor (h) Procedures	Bid specifications to be followed.
11	I	Sec-IV	GCC	1 of 80 13 of 80	2.2 8.2 d)	The Contract shall be read as whole. In the event of any conflict between the above-mentioned documents, the more stringent requirement shall govern and the Owners decision shall be final and binding upon the parties.	In the event of any ambiguity or conflict between the Contract Documents listed in Clause No 2.3 (i) of Annexure -C.1(GCC)/C.2(GCC)/C.3(GCC), the order of precedence shall be the order in which the Contract Documents are listed above in Clause No 2.3(i)	Bid specifications to be followed.
12	I	Sec-IV	GCC	3 of 80	3.13	Change in Law" means the occurrence of any of the following after the bid opening date: a) the enactment of any new Indian law or Directive; b) the modification or repeal of any existing Indian law or enactment of any Indian law during the existence of the contract.	If, after the date seven (7) days prior to the deadline set for Price 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 Time for Completion, the Contract Price shall be correspondingly increased or decreased, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract.	In Clause 3.13 at Sheet 3 of 80 of GCC / Section-IV / Vol-I, the word "bid opening date" be read as "bid opening date of Part-I".
13	I	Sec-IV	GCC	7 of 80 52 of 80	3.59 35.0	Warranty Period" or "Defect Liability Period" of plant is 12 months period from Final Taking Over.	Warranty Period" or "Defect Liability Period" of plant is 12 months period from completion of trial operation/COD.	Bid sepcifications to be followed.
14	I	Sec-IV	GCC	15 of 80	9.3	The Agreement will be signed in four (4) originals and the Contractor shall be provided with one (1) signed original and the rest will be retained by the Owner.	Three (3) originals in place of four (4)	Bid specifications to be followed.

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15	I	Sec-IV	GCC	15 of 80	9.4	The Contractor shall provide immediately after issue of LOI, free of cost to the Owner all the engineering data, drawings and descriptive materials submitted with the Bid Proposal, in at least ten (10) hard bound copies to form a part of the Contract.	six (6) copies in place of Ten (10) copies	Bid specifications to be followed.
16	I	Sec-IV	GCC	15 of 80	9.5	Subsequent to signing of the Contract, the Contractor at his own cost shall provide the Owner with at least ten (10) true copies of Agreement.	ten (10) soft copies on CD ROM/pendrive of the Contract Agreement in place of ten (10) true copies of Agreement.	Bid specifications to be followed.
17	I	Sec-IV	GCC	19 of 80	9.13.4 b)	At any given point in the project if the deviation is beyond 60 days from the schedule, HPGCL shall have the right to take alternate corrective measure to bring back the activity(s) to the schedule at Contractor's risk and cost.	Bidder shall take all necessary action to complete the project (including taking corrective measures to bring the delayed activity on track) to meet the completion schedule. Further specific provision of stage LD/delay LD is available in the contract. In view of the same, Clause no 9.13.4 b) may please be deleted	In last para of Clause 9.13.4(b) at Sheet 19 of 80 of GCC / Section-IV/Vol-I, the word "60 days" be read as "90 days".
18	I	Sec-IV	GCC	21 of 80	11.2 i)	any other equipment including special tools & tackles and services required for satisfactory completion of the project and operation & maintenance of the same on total turnkey basis;	Bidder understand that Operation and maintenance (O&M) of power plant is not in the scope of Bidder. Please confirm	HPGCL shall only deploy its manpower for operation of Unit during trial operation and onwards, however they shall work under the direct supervision of contractor and the contractor shall be responsible in case of any operational defect/fault in the equipments/system or any shortfall in the performance of equipments before FTO. The contractor shall not put onus for such deficiencies/defects etc. to the operational lapses of deployed manpower. Maintenance of plant shall remain in the scope of contractor up to FTO.
19	I	Sec-IV	GCC	24 of 80	14.2.2	The Owner will deduct GST at source at the applicable rates in case transactions under the contract are liable to GST deduction at source as per the prevailing provisions of GST Law. The Owner shall also deduct TDS as applicable in accordance with IT Act and Labour Cess as applicable in accordance with BOCW Act.	Owner to issue relevant certificate/TDS certificate to the contractor	Noted.
20	I	Sec-IV	GCC	29 of 80	17	DEMURRAGE, WHARFAGE ETC. All demurrage, wharfage and other expenses, levied by any agency, incurred due to any reason including but not limited to delayed clearance of the material shall be to the account of the Contractor till final taking over.	Owner, as a consignee shall furnish promptly necessary clarifications and documents for the purpose of customs clearance.	Bid specifications to be followed.
21	I	Sec-IV	GCC	34 of 80	20.1.2	Liquidated Damages (LD) for Delay in Unit(s) completion: The Contractor guarantees that it shall attain final taking over including supply of mandatory spares within the time of completion specified in the contract. If the Contractor fails to achieve final taking over of the unit/s within stipulated period indicated vide Clause no 1.0 of SCC, the Contractor shall pay to the Owner Liquidated damages for the delayed period at the rate of ¼% total contract price per week of delay or part thereof for a period of four (4) weeks delay. Subsequently LD shall be levied @ ½% of total contract price per week of delay or part thereof	Liquidated Damages shall be linked to Completion of Trial Operation/COD of the unit	Bid specifications to be followed.

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22	I	Sec VI Sec IV	SCC GCC	8 of 12 34 of 80	8 20.1.2	The total amount of Liquidated Damages for Delay shall be subject to a maximum of 10% (Ten percent) of the contract price plus GST (if and as applicable).	The total amount of Liquidated Damages for Delay shall be subject to a maximum of 5% (Five percent) of the contract price plus GST (if and as applicable).	Bid specifications to be followed.
23	I	Sec-IV	GCC	34 of 80	20.2.2	Liquidated Damage for Shortfall in Guaranteed Performance Parameters Maximum Ceiling is Twenty Percent 20%	Liquidated Damage for Shortfall in Guaranteed Performance Parameters shall not exceed fifteen percent (15%) of the contract price	Bid specifications to be followed.
24	I	Sec-IV	GCC	35 of 80	20.3	Contractor's aggregate liability to pay liquidated damages for delay in completion of project and for shortfall in guaranteed performance parameters, cumulatively shall not exceed twenty five percent (25%) of the Contract Price, which is a genuine pre-estimate of damages and not by way of penalty.	Contractor's aggregate liability to pay liquidated damages for delay in completion of project and for shortfall in guaranteed performance parameters, cumulatively shall not exceed twenty percent (20%) of the Contract Price, which is a genuine pre-estimate of damages and not by way of penalty.	Bid specifications to be followed.
25	I	Sec-IV	GCC	39 of 80	22.5 d)	In no event shall a Force Majeure Event excuse the obligations of such Party that are required to be performed prior to the occurrence of a Force Majeure Event.	In no event shall a Force Majeure Event excuse the obligations of Parties (both affected party and aggreived party) that are required to be performed prior to the occurrence of a Force Majeure Event.	Bid specifications to be followed.
26	I	Sec-IV	GCC	39 of 80	22.5 e)	The Affected Party's obligations to make payments of money due and payable under this Agreement shall not be suspended or excused due to the occurrence of a Force Majeure Event affecting the Affected Party's facilities.	Following to be added: Force Majeure shall not apply to any obligation of the Owner to make payments to the Contractor herein.	Clause 22.5 e) at Sheet 39 of 80 of GCC / Sec. IV / Vol- I be read as:- "The affected or aggrieved party's obligations to make payments of money as per contractual provisions under this Agreement shall not be suspended or excused due to the occurrence of a Force Majeure Event affecting the affected or aggrieved party's facilities."
27	I	Sec-IV	GCC	42 of 80	26	SETTLEMENT OF DISPUTES/ CONCILIATION/ ARBITRATION	As per recent circular no. F. No. 4(1)/2013/-DPE(GM)/FTS-1835 from Department of Public Enter-prises, Ministry of Heavy Industries, Government of In-dia, Permanent Machinery of Arbitrators (PMA) has been replaced with Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD). Bidder requests HPGCL to issue suitable amendment in this regard. "In case the parties are a Public Sector Enterprise or a Government Department, the dispute shall be referred for resolution in Administrative Mechanism for Resolu-tion of Commercial Disputes (AMRCD) of the Depart-ment of Public Enterprise, Government of India."-	Bid specifications to be followed.
28	I	Sec-IV	GCC	45 of 80	29.3.1	Title of the Plant and Equipment (including spare parts) to be supplied from abroad shall be transferred to the Owner upon loading on to the mode of transport to be used to convey the Plant and Equipment (including spare parts) from the country of origin to that country where the site is located and upon endorsement of the dispatch documents in favour of the Owner.	As custom clearance in the scope of bidders (Refer cl no. 41.2 GCC). Hence the ownership shall be transferred after the custom clearance in Indian territory.	Bid specifications to be followed.

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29	I	Sec-IV	GCC	49 of 80	33.4	SUSPENSION OF WORK 33.4) The Owner's instructions under sub-clauses 33.2 & 33.3 shall be treated as instructions to carry out a variation except to the extent that the suspension instructed by the Owner is necessary by reason of default on the part of the Contractor.	SUSPENSION OF WORK 33.4) The Owner's instructions under sub-clauses 33.2 & 33.3 shall be treated as instructions to carry out a variation (in line with Clause 14.3: Variation) except to the extent that the suspension instructed by the Owner is necessary by reason of default on the part of the Contractor.	Bid specifications to be followed.
30	I	Sec-IV	GCC	54 of 80	35.15	In no event, however, shall the warranty period for any section or part thereof the power plant extend, in the case of the electrical generators and all other plant manufactured by the Contractor beyond four years from the date of "Final Taking-Over" of the relevant section of the power plant and in respect of any other equipment and plant, beyond three years from the date thereof	In no event, warranty period for any section or part thereof the power plant extend beyond Two (2) years from the date of Trial Operation/COD	Bid specifications to be followed.
31	I	Sec-IV	GCC	54 of 80	35.16	If the Contractor fails to commence the work necessary and proceed diligently to remedy such defect or any damage to the Facility caused by such defect within a reasonable time (which shall in no event be considered to be not more than two (2) days),	HPGCL is requested to consider Ten days in place of Two (2) days	In Clause 35.16 at Sheet 54 of 80 of GCC / Section-IV / Vol-I, the word ''two (2) days'' be read as "seven (7) days"
32	I	Sec-IV	GCC	56 of 80	41	TAXES, PERMITS AND LICENCES The Contractor shall be liable and pay all non-Indian and Indian taxes, duties, levies, lawfully assessed against the Owner or the Contractor in pursuance of the Contract.	Income Tax/Property tax etc. assessed against the Owner shall be paid by the Owner.	Noted.
33	I	Sec-IV	GCC	62 of 80	44.5.1 (i)	Mode of Payment The payment of the advance amount, Type Test Charges if any, price adjustment amounts, all supply payments, taxes and duties (wherever	HPGCL is requested to establish an irrevocable Letter of Credit (L/C) in favour of the Contractor for payments due, as per Terms of Payment	Bid specifications to be followed.
34	I	Sec-IV	GCC	64 of 80	44.6.3.1 I.A (i)	Acceptance of Letter of Intent (LOI) and Signing of the Contract Agreement.	Since a lot of activity is linked with signing of contract. Hence, signing of contract may not be insisted as a condition for release of initial advance payment	Bid specifications to be followed.
35	I	Sec-IV	GCC	65 of 80	44.6.3.1 I.B (ii) 44.6.3.1 3.B (ii) 44.6.3.1 4.B (ii) 44.6.3.1 5.B (ii)	Conditions mentioned at IA (i) to IA (vi) above.	Sl No I B (i) takes care of submission of advance BG as repeated in I B (ii). Hence I B (ii) may please be deleted	Bid specifications to be followed.
36	I	Sec-IV	GCC	65 of 80	44.6.3.1 I.B (iii)	Supply and installation of DMS System as per Chapter 20, Vol.VI. However, in case the installation of DMS System is delayed (1% advance value out of advance of 5% shall be released after installation of DMS System).	HPGCL is requested not to link payment of advance with Supply and installation of DMS System	Clause 44.6.3.1- I.B(iii) at Page-65 of 80 of Section-IV/GCC/ Vol-I stands deleted.

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37	I	Sec-IV	GCC	65 of 80	44.6.3.1 IV	Ten Percent (10%) of CIF/ Ex-works Supply Price Component of the contract price on Successful Final Taking Over of the plant.	We request Owner to kindly review the payment terms as below: IV. Five percent (5%) of CIF/ Ex-works Supply Price Component of the contract price on Successful Completion of Trial Operation. V. Five percent (5%) of CIF/ Ex-works Supply Price Component of the contract price on Successful Final Taking Over of the plant. If for reasons attributable to the Owner, the Performance Guarantee (PG) Test of the Facilities or the relevant part thereof cannot be successfully completed within the period of 03 (Three) month from the date of Completion of Trial Operation, then 50% of the amount due on "Final take Over" shall be released to the contractor. Balance 50% shall be released after successful Final take over of the plant	Bid specifications to be followed.
38	I	Sec-IV	GCC	67 of 80	44.6.3.1.1	Hundred Percent (100%) of CIF/Ex-works price component of the spares to be paid on pro-rata basis on receipt and storage at site and on physical verification and acceptance by the Owner for the spares received in good condition and stored at site and Despatch Instructions issued by the Owner.	We request Owner to kindly review the payment terms as below: i) Seventy Five Percent (75%) of CIF/Ex-works price component of the spares to be paid on pro-rata basis upon despatch to site and against invoices and shipping documents along with Material Despatch Clearance Certificate (MDCC) issued by the Owner. ii) Twenty Five Percent (25%) of CIF/Ex-works price component of the spares to be paid on pro-rata basis on receipt and storage at site and on physical verification and acceptance by the Owner for the spares received in good condition and stored at site and Despatch Instructions issued by the Owner.	Bid specifications to be followed.
39	I	Sec-IV	GCC	69 of 80	44.6.3.3 III	Ten Percent (10%) of total Installation Services Component of Contract Price (excluding Civil and Site Fabricated Structural Works) on Final Taking Over.	We request Owner to kindly review the payment terms as below: IV. Five percent (5%) of total Installation Services Component of the contract price on Successful Completion of Trial Operation. V. Five percent (5%) of total Installation Services Price Component of the contract price on Successful Final Taking Over of the plant. If for reasons attributable to the Owner, the Performance Guarantee (PG) Test of the Facilities or the relevant part thereof cannot be successfully completed within the period of 03 (Three) month from the date of Completion of Trial Operation, then 50% of the amount due on "Final take Over" shall be released to the contractor. Balance 50% shall be released after successful Final take over of the plant	Bid specifications to be followed.
40	I	Sec-IV	GCC	71 of 80	44.6.3.4 III	Ten Percent (10%) of total Civil Works Price component of Contract price shall be paid on Final Taking Over.	We request Owner to kindly review the payment terms as below: IV. Five percent (5%) of total Civil Works Price Component of the contract price on Successful Completion of Trial Operation. V. Five percent (5%) of total Civil Works Price Component of the contract price on Successful Final Taking Over of the plant. If for reasons attributable to the Owner, the Performance Guarantee (PG) Test of the Facilities or the relevant part thereof cannot be successfully completed within the period of 03 (Three) month from the date of Completion of Trial Operation, then 50% of the amount due on "Final take Over" shall be released to the contractor. Balance 50% shall be released after successful Final take over of the plant	Bid specifications to be followed.

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41	I	Sec-IV	GCC	73 of 80	44.6.3.5 VI	Ten Percent (10%) of total Structural Works Price Component of Contract Price on Final Taking Over.	We request Owner to kindly review the payment terms as below: IV. Five percent (5%) of total Structural Works Price Component of the contract price on Successful Completion of Trial Operation. V. Five percent (5%) of total Structural Works Price Component of the contract price on Successful Final Taking Over of the plant. If for reasons attributable to the Owner, the Performance Guarantee (PG) Test of the Facilities or the relevant part thereof cannot be successfully completed within the period of 03 (Three) month from the date of Completion of Trial Operation, then 50% of the amount due on "Final take Over" shall be released to the contractor. Balance 50% shall be released after successful Final take over of the plant	Bid specifications to be followed.
42	I	Sec-IV	GCC	67 of 80 68 of 80 69 of 80 70 of 80 71 of 80 72 of 80	44.6.3.3 I A & IB 44.6.3.4 I A & IB 44.6.3.5 I A & IB	interest bearing initial advance payment for Installation services,Civil Works,Structural Works (Site fabricated)	We request Owner to release interest free initial advance payment (10%) for Installation services,Civil Works,Structural Works (Site fabricated)	Bid specifications to be followed.
43	I	Sec-IV	GCC	63 OF 97	ANNEXURE K	PRICE ADJUSTMENT The price adjustment considering variation of all factors shall have ceiling of + 20% for the contract price for equipment/ system, installation, civil works and site fabrication structures as mentioned in S. No. (i) above. The ceiling of + 20% shall be separately applicable for each of the above component.	Owner is requested to consider the Price Adjustment without any Ceiling for the contract price for equipment/ system, installation, civil works and site fabrication structures in line with recent tenders	The last line "The ceiling of + 20% shall be separately applicable for each of the above component" of clause (ii) of Anexure-K at Sheet 63 of 97 of GCC Annexures, Sec. IV, Vol.I shall be read as "The PVC ceiling of $\pm$ 20% shall be linked with overall cost of all items of schedule-2 & schedule-4 (Except training charges)"
44	I	Sec-IV	GCC	64-69 OF 97	ANNEXURE K	For the indices, subscript 'o' refers to indices as on 30 days prior to date of opening of Part-II (Price) bids. '0' refers to indices as on 7 days prior to date set for opening of Part-II (Price) bids.	For the indices, subscript 'o' refers to indices as on 7 days prior to date of submission of Part-I (Techno- Commercial bid)	In Annexure-K at Sheet 63 to 72 of GCC Annexures / Section-IV / Vol-I, the word "Part-II (Price) bids" be read as "Part-I (Techno- Commercial) bids".
45	I	Sec-IV	GCC	74 of 80	44.6.3.5(A)	Payment terms for Price Adjustment Amount Any addition due to adjustment to the Contract Price shall be payable in the similar manner as provided in the clauses 44.6.3.1 to 44.6.3.5 above. The price adjustment amount corresponding to advance payment shall be clubbed with the first progressive payment of that equipment.	Owner is requested for the following: 90% of the Price adjustment amount (to the Contract Price) along with 100% GST to be paid by the Owner	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
46	I	Sec-IV	GCC	76 of 80	47.3 a)	CONTRACTOR'S DOCUMENTS, DRAWINGS & INSTRUCTION MANUALS Within one (1) week of signing of Contract Agreement, the Contractor shall provide the Owner with the following drawings and data: a) Thirteen (13) copies of technical particulars to make them conform to accepted proposals.	Owner is requested for the following: Within one (1) week of signing of Contract Agreement to be replaced with within 30 days of signing of Contract Agreement	In Clause 47.3 at Sheet 76 of 80 of GCC / Section-IV / Vol-I, the word "Within one (1) week" be read as "Within thirty (30) days".
47	I	Sec-IV	GCC	77 of 80	47.4	The Contractor shall submit thirteen (13) prints of each drawing to the Owner for approval. Upon receipt of the prints which have been marked "Approved" or "Approved subject to Comments", the Contractor shall furnish within seven (7) days twelve (12) additional prints of each of the drawings amended as required.	Five (5) No of Prints/copies of drawing may be considered	Bid specifications to be followed.
48	I	Sec-IV	GCC	78 of 80	47.7	The Contractor shall furnish twelve (12) sets of assembly and erection instructions within a reasonable time after signing of the Contract but at least three (3) months before start of erection including the following	Five (5) sets of assembly and erection instructions may be considered	Bid specifications to be followed.
49	I	Sec-IV	GCC	78 of 80	47.9	Before completion of the work, the Contractor shall furnish fifteen (15) complete sets of prints and two (2) reproducible transparency of all detailed drawings of the equipment actually supplied. In addition nine (9) sets of comprehensive manuals for use in the operation and maintenance of the plant shall be supplied at least six (6) months before the plant or equipment is scheduled to be commissioned.	Five (5) No of Sets/prints/comprehensive manuals may be considered	Bid specifications to be followed.
50	I	Sec-IV	GCC	79 of 80	48.3	Total period for above training shall not be less than sixty (60) man-months at manufacturers' works & facilities. 29.6 In all the above cases, wherever the training of Owner's personnel is arranged at the works of the manufacturer's (within Owner's Country) it shall be noted that the lodging and boarding of the Owner's personnel shall be at the cost of Bidder. The Bidder shall make all necessary arrangements towards the same. 29.7 In case the training of Owner's personnel is arranged at the works of the manufacturer's (outside Owner's Country) it shall be noted that the all the expenses including travel, air fare, application processing fees, lodging and boarding of the Owner's personnel shall be at the cost of Bidder. The Bidder shall make all necessary arrangements towards the same.	Total period of training (60 Manmonths) as mentioned in the clause is not in line with the industry practice. The number of man-months training shall be mutually agreed. Training shall be imparted at BHEL manufactur-ing works only. As regards training at Site, we have only envisaged association of the O&M personal during pre-commissioning/Commissioning stage to get acquainted with the operation of equipment. . HPGCL is requested to kindly confirm.	Bid specifications to be followed.
51	I	Sec-IV	GCC	79 of 80	48.6 48.8	In the event of the Owner failing to avail of the training facilities in full or part, the Owner will be entitled to adjust the Contract price by an equivalent amount.	No rebate shall be offered in case training facility is not availed by Owner.	Confirmed

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
52	I	Sec-IV	GCC	35 of 80	21A (to be added)	New Clause to be added OWNER'S DEFAULT (In continuation with Clause No 21.0 of GCC)	If a) the Owner has failed to pay the Contractor any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause or commits a substantial breach of the Contract, the Contractor may give a notice to the Owner that requires payment of such sum, requires approval of such invoice or supporting documents, or specifies the breach and requires the Owner to remedy the same, as the case may be. If the Owner fails to pay such sum, fails to approve such invoice or supporting documents or give its reasons for withholding such approval, or fails to remedy the breach or take steps to remedy the breach within fourteen (14)days after receipt of the Contractor's notice or (b) the Contractor is unable to carry out any of its obligations under the Contract for any reason attributable to the Owner including but not limited to the Owner's failure to provide possession of or access to the Site or other areas or failure to obtain any governmental permit necessary for the execution and/or completion of the Facilities; then the Contractor may by fourteen (14) days' notice to the Owner suspend performance of all or any of its obligations under the Contract, or reduce the rate of progress In case of prolonged suspension due to Owner's defalut, the Contractor may terminate the contract after giving notice of 28 days to the Owner. Contractor shall be entitled to payment in line with the payment as per Termination as per Owner's convenience	Not acceptable
53							If the Contractor's performance of its obligations is suspended or the rate of progress is reduced pursuant to this Clause 21 (Owner's Default), then the Time for Completion shall be extended and any and all additional costs or expenses incurred by the Contractoras a result of such suspension or reduction shall be paid by the Owner to the Contractor in addition to the Contract Price, except in the case of suspension order or reduction in the rate of progress by reason of the Contractor's default or breach of the Contract.	Not acceptable

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
54	I	Sec-IV	GCC	40 of 80	24A (to be added)	New Clause to be added Termination for Owner's Convenience (in continuation with Clause No 24.0)	In the event of termination of the Contract due to Owner's convenience, the Owner shall pay to the Contractor the following amounts: (a) the Contract Price, properly attributable to the parts of the Facilities executed by the Contractor as of the date of termination (b) the costs reasonably incurred by the Contractor in the removal of the Contractor's Equipment from the Site and in the repatriation of the Contractor's and its Subcontractors' personnel (c) any amounts to be paid by the Contractor to its Subcontractors in connection with the termination of any subcontracts, including any cancellation charges (d) costs incurred by the Contractor in protecting the Facilities and leaving the Site in a clean and safe condition (e) the cost of satisfying all other obligations, commitments and claims that the Contractor may in good faith have undertaken with third parties in connection with the Contract and that are not covered by paragraphs (a) through (d) above with third parties	Not acceptable
55						New Clause to be added for " WAR RISKS" inline with latest t	Owner is requested to kindly include a clause for " War Risk" in line with recent tenders (Refer Attachment)	Not acceptable
56						New Clause to be added for " Care of facilities" inline with latest tender of NTPC/Singreni	Owner is requested to kindly include a clause for "Care of facilities" in line with recent tenders (Refer Attachment)	Not acceptable
57	I	Sec-VI	SCC	1 of 12	2.2	Divergences from Statutory Requirements If the Contractor or the Owner finds any divergence between any Indian law or Directive and the technical specification, it shall immediately give to the other written notice specifying the divergence. The Contractor shall promptly upon becoming aware of the same, inform the Owner in writing of its proposed amendment for removing the divergence, and with the Owner's consent the Contractor shall entirely at its own cost and expense complete the works in accordance with the amendment	Owner may please delete "entirely at its own cost and expense" and following may please be added Cost/Expense towards same shall be reimbuirsed to Contractor after mutually discusion and settlement with Owner.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
58	I	Sec-IV	GCC	63 of 80	44.5.1 (ii)	For Payments related to Erection Civil/Site Fabricated Structural Works	Single designated ESCROW account: We understand that HPGCL is concerned about funds being rightly utilized by the Contractor during execution of Contract. However, considering that there is Qualification requirement in the tender for financial soundness of the bidder, such stringent method like Escrow account seems inappropriate. There may be possibility of negative cash flow requirements at various times during the tenure of the project especially during the initial phase of the project. With such Escrow account provisions, we will not be able to manage negative cash flow requirements of the project. Further, we procure major commodities in bulk (and not project wise) and funds generated from one project may be used for other projects, as we execute a number of projects at the same time. To summarize, the current mechanism of Escrow account proposed by HPGCL is not tenable for companies like us. Hence we request you to kindly delete such provisions.	Bid specifications to be followed.
59	I	Sec II	ITB	14 of 75	8.1.2 (u)	Attachment 22: Declaration on Local Component Further, Bidder shall be required to submit a certificate from the statutory auditor or cost auditor (in the case the bidder is a company) or from a practicing cost accountant or practicing chartered accountant (in respect of bidders other than companies) giving the percentage of local content during execution prior to submission of last bill for payment	Owner is requested to kindly delete the requirement of submission of certificate from the statutory Auditor or cost auditor	Bid specifications to be followed.
60	Vol - I / Sec - III. Vol - II	Ch - 8	Conditions of Contract : Commercial & General FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS	50 of 60 9 of 57	12.2 3.2	Adjustment Factors For Bid Evaluation. Amount of Liquidated Damages (LD) Applicable Under Category-I Guarantees.	Liquidated Damages (LD) are generally higher than Bid evaluation rates. Here we found it is same for both Bid Evaluation as well as LD. HPGCL is requested to kindly re-examine the rates.	Bid specifications to be followed.

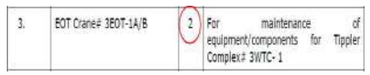
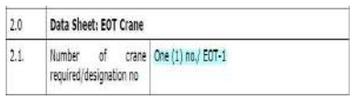
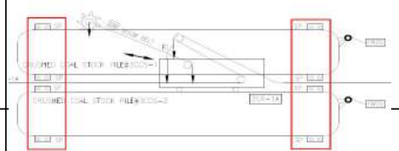
Annexure-30

1	Volume II (General & Schedules) Part- A	Chapter 11	QAP(Mechanical)	Sheet 9 of 103	2.3(f)	Performance Test shall be carried out for each ID/FD/PA/GR Fan instead of one (1) for each type and size.	Performance test for FD, ID, PA & Seal air Fans is a type test and shall be conducted as per BS 848, part-I for one no. of Fan of each type as per tender specification clause 22.2 Volume III Mechanical Works Ch 1: Steam Generator & Auxiliaries Sheet: 121 of 186. Customer is requested to issue suitable amendment in this regard as both clauses are contradictory. Refer tender specification from NTPC Talcher 2x660 MW EPC clause 22.01.01, Technical specifications Sec – vi, Part-B, Bid Doc. no.: CS-4540-001A-2 Sub Sect-A-02 Steam Generator & Auxiliaries including ESP page 55 of 65:	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	Volume III (Mechanial Works)	Ch 1	Steam Generator & Auxiliaries	Sheet 12 of 186	1.13 (b)	b) Induced Draft Fans Two (2) ID fans (2 x 60% BMCR) (Axial type, constant speed, variable pitch controlled, with variable frequency drive) each with drive motor…….	ID Fans offered shall be Axial type, constant speed with variable blade pitch control without Variable frequency drive. Flow regulation in offered Axial ID Fans is only thru variable blade pitch only. Customer is requested to issue suitable amendment in this regard. Refer tender specification from NTPC Talcher 2x660 MW EPC clause 2.13.02, Technical specifications Sec-vi, Part-A Bid document no.: CS-4540-001A-2 Sub Sec-ii A-01 Steam Generator & Auxiliaries including ESP page: 9 of 28:	Bid specifications to be followed.
3	Volume III (Mechanial Works)	Ch 1	Steam Generator & Auxiliaries	Sheet: 17 of 186	1.15.4	1.15.4 Primary Air Fans a) Two (2) numbers of two stage axial PA fans for steam generator, with hydraulic blade pitch control / Radial type with variable speed, with VFD control system each with motor	PA Fans offered shall be Axial type, constant speed with variable blade pitch control without Variable frequency drive. Flow regulation in offered Axial PA Fans is only thru variable blade pitch only. Customer is requested to issue suitable amendment in this regard. Refer tender specification from NTPC Talcher 2x660 MW EPC clause 2.15.04, Technical specifications Sec-vi, Part-A, Bid document no.: CS-4540-001A-2 Sub Sec-ii A-01 Steam Generator & Auxiliaries including ESP page: 13 of 28:	Bid specifications to be followed.
4	Volume III Mechanical Works	Ch 30:	Flue Gas Desulphurisation System	Sheet 35 of 93	1.0 A (4)	The slurry recirculation pumps shall have motor driven knife gate valve at pump suction and discharge side.	In case of any slurry recirculation pump stoppage, the gate needs to be closed quickly without leakage in the slurry lines. In case of knife gate valves, quick closing is not possible. Hence, we provide pneumatic operated butterfly valves at discharge side as per our standard practice. Knife edge gate valve has longer opening time typically 300 to 500 sec. Due to long opening time of valve, slurry might settle in the suction pipeline during the opening operation. Hence, it is recommended to provide quick opening pneumatic butterfly valve at slurry recirculation pump suction for trouble free operation as per our proven practice.	Noted.
5	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	Sheet 56 of 93	3	The limestone slurry pipes shall be sized to minimize erosion and avoid settling of the limestone at part load operation. The slurry pipes shall be lined with replaceable rubber lining of 10 mm thickness. Additional thickness of 2 mm rubber lining shall be provided at bends.	Slurry pipes upto 400NB size shall be provided with FRP material with SiC coating and Slurry pipes above 400NB size shall be provided with replaceable rubber lining of 6 mm thickness. The above MOC & thickness are being accepted by many customers and has been used in most of the currently being executed FGD projects in India. Customer is requested to accept the same.	Clause 5.0 (2) at Sheet 64 of 93 and clause 7.0 (3) at sheet 56 of 93 of Ch-30, Vol-III be read as:- "Slurry pipes of all sizes shall be of FRP material and these pipes shall be coated internally with minimum 2.5 mm SiC coating. Pipes which are coming in contact externally with slurry / treated flue gas shall be coated externally also with minimum 2.5 mm thick SiC coating."
6	Volume III Mechanical Works	Ch 30	Flue Gas Desulphurisation System	Sheet 64 of 93	2	All the pipes handling slurry shall be provided with replaceable rubber lining of proven quality. The Bidder can provide slurry pipes of size lower than 3” made up of FRP material if it has previous experience of providing the same.		

Annexure-31

COAL HANDLING SYSTEM	

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1	Vol-III	Ch:19	EOT Crane	4 of 120	Cl 1.1.8 Sl No 3.		The beside mentioned clauses regarding Quantity of EOT crane are contradictory, Customer to kindly clarify and confirm the Quantity of EOT crane required.	Each Wagon Tippler shall be provided with an indepentant EOT crane.
	Vol-III	Ch:19	EOT Crane	68 of 120	M-15 Sl no 2.1			
2	Vol-III	Ch:19 Coal Handling System	Coal Yard Drainage System	17 of 120	1.5.22	Coal Yard Drainage System: Drainage canal around stockpiles to be constructed ultimately leading to a sump to take all the effluent water from coal stock yard (sprinkling water, rain water). Sump pumps shall be provided to pump the water from sump pit to the guard pond.	1.Bidder understands that the sump pumps marked around the Coal stockpiles are not required since the water from drainage around coal stockpile shall be sent to a Sump from where it will be pumped to Guard pond through sump pumps.Hence bidder shall not provide sump pumps around Coal stockpiles.Customer to kindly confirm. 2.Coal settling pond shall not be provided as water from drainage around coal stockpile shall be sent to a Sump (collection pit of 5 Cu.m) from where it will be pumped to Guard pond through sump pumps. Please confirm.	Effluent from coal stockpile shall be sent to coal settling pond by gravity and further pumped to ETP for treatment complying to zero discharge.
	Vol-VII	-	Flow diagram- Coal handling plant	20 of 120	-			
3	Vol-III	Ch:19 Coal Handling System	Belt Weighers	4 of 120	Cl 1.1.8 Sl No 21.		As per flow diagram only 6 Nos Belt weighers (3BW-1A/1B/2A/2B/3A/3B) are indicated instead of 10 Nos as mentioned in Scope of works, Customer to kindly clarify this contradiction and furnish the quantity of Belt weighers required.	Belt weighers shall be provided as per flow diagram no 111-11-5100.
4	Vol-VII	-	Flow diagram- Limestone Handling Plant	51 of 120	-		Customer to please note that provision of DFDS in Limestone Day silo as shown in Flow diagram is not advisable since Limestone is Hygroscopic material, hence bidder is considering DE system in Limestone day silo as provided in other areas of Limestone handling. Customer to kindly confirm.	Confirmed.
5	Vol-VII	Ch-30 Flue Gas Desulphirisation	Datasheet of Gypsum Conveyors	51 of 120	-		Bidder understands that Guaranteed capacity here is the Design capacity, Customer to kindly confirm	Confirmed.
6	Vol-VII	Ch:19 Coal Handling System	DE system for Coal Bunkers	98 of 120	M-27 1.3 a)		As per general engineering practice bidder shall provide Dry Type Dust extraction system having Pulse Air Jet Type bag Filter Unit, having "ONLINE" cleaning arrangement on Coal bunkers instead of vent filters.Please confirm.	Confirmed.
7	Vol-VI	15	ASH HANDLING SYSTEM	1 of 2	15.2	Following facilities shall be provided near the silo as per Vol. III of specification: iii) Vaccum Pump house. iv) Complete Ash Water recirculation systems. ix) Silo utility building including Blower room	We understand that Complete ash water recirculation system is excluded from the bidder's scope of work. Please confirm. As per Mechanical spec Chapter-21,Fluidizing blowers are located at silo operating floor. Please confirm that Silo utility building including Blower room is excluded from scope of work. Regarding vacuum pump house, We propose to locate vacuum pumps in front of ESP 1st field hoppers in line with practice followed in existing units 1&2. Separate vacuum pump house is not required. Please confirm.	Confirmed Confirmed. Further note that, a sump of capacity 30 cu.m with 2 nos. horizontal pump for wash water shall be provided. The pumps shall be installed in an adequatly sized shed. Confirmed

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
8	Vol-VI	15	ASH HANDLING SYSTEM	1 of 2	15.3		Customer is requested to clarify/identify the requirement of bridges outside the plant boundary on the way to ash dyke for routing slurry pipes.	Bid specifications to be followed, however the issue may be discussed during detailed engineering
9	Vol-III	21	ASH DISPOSAL SYSTEM	5 of 21	21.7.4	Each ash dyke shall be having 3 discharge point for all the three lines.	Location of 3 nos discharge points on each ash dyke shall be finalized based on construction feasibility as connecting approach road from villages to dyke bund are there.	Bid specifications to be followed, however the issue may be discussed during detailed engineering
10	Vol-III	13	Weighbridge	2 of 4	31.1		Please confirm the size of trucks/bulkers to be considered for weighbridge platform.	Bid specifications to be followed, however the issue may be discussed during detailed engineering
11	Vol-III	21	General requirements	9 of 21	21.11.8	Automatic water spraying arrangement for cleaning the ash from loaded vehicles body before going out of the plant shall be provided.	We understand that only water spray header shall be provided at exit point of vehicle at silo unloading floor. Please confirm	Confirmed.
12	Vol-II	9	Mandatory spares	46 of 103	15.00		Please confirm the mandatory spares for transport air compressior in case bidder considers TAC in place of air blowers.	Mandatory spares for air blowers are not applicable as transport air compressors (TACs) shall be used. Mandatory spares for said TACs shall be as under: Rotors: 2 sets Bearings: 3 sets for compressor and 3 sets for motors Shaft: 2 sets Shaft seals: 2 sets Safety Valves: 2 sets Gear Box: 2 sets Intake air filters: 2 sets
13	Vol-II	9	Mandatory spares	46 of 103	15.00		Please clarify the requirement of bearing for CAC and CAC motor	Transport air compressor shall be used and mandatory spares for bearings of same have been mentioned in Sr. no. 12 above. Bearing for Conveying Air Compresspor and its motor stands deleted.
CIVIL AND STRUCTURAL								
1	Volume VII	Tender Drawings	Plot Plan				Space availability for 3JT-5 conveyor is very limited. As per the plot plan drawing approx. 25m space is available between road edge and existing service building, but as per actual only approx. 14m space is available. As per the layout the 3JT-5 is not feasable at the proposed locaiton in the plot plan. Please clarify.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
2	Volume VII	Tender Drawings	Plot Plan				Conveyor from 3JT-4 to 3JT-5 is on the edge of the boundary wall, which is very adjacent to the Locality outside the plant. Pls confirm that the route is acceptable to the Villagers, as this may be a disturbing issue during exectution.	Bid specifications to be followed, however the issue may be discussed during detailed engineering

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
3	Volume VII	Tender Drawings	Plot Plan				Conveyor from 3JT-5 to 3JT-6 has only approx. 4m space availability between road edge and existing service building wall(60m long), as per the space availability the proposed route is not feasable. The road needs to be closed to accommodate 3JT-6 & Conveyor. Pls clarify.	Bid specifications to be followed, however the issue may be discussed during detailed engineering
4	Volume VII	Tender Drawings	Plot Plan				Conveyor from 3JT-4 to 3JT-5 shall foul existing conveyor as the conveyor is starting at a lower level and sufficent clear height shall not be available after road crossing. Feasibility may please be checked. Please clarify.	Bid specifications to be followed, however the issue may be discussed during detailed engineering
5	Volume VII	Tender Drawings	Plot Plan				Space for the Crusher House has been shown in between stock yard and existing road. The space availability is approx. 20m as per the plot plan, as per site approx. 18m is available, further, a fire hydrant line is running along the stock pile at a distance od 10m from the road edge. For the Crusher House and corresponding Conveyor line, re-routing of the fire hydrant line and the road may be required. Please clarify.	For the Crusher House and corresponding Conveyor line, if re-routing of the existing fire hydrant line and the road is required, the same shall be included in the bidder's scope of work.
6	Volume VI	Ch 15: AHP	Civil, Structural & Architectural Works	Sheet | 1 of 2	15.2	iv) Complete Ash Water recirculation systems.	As per Civil specs Complete Ash Water recirculation systems has to be provided. We understand that it is not the recovery water system near the Dyke Area and no additional revecovery water line is required from the Dyke Area. Please clarify.	Ash water recirculation system is not envisaged in the project
7	Volume VI	Ch 15: AHP	Civil, Structural & Architectural Works	Sheet | 2 of 2	15.2	ix) Silo utility building including Blower room	As per Civil specs Utility Building has to be provided which not mentioned in the Mech. specs. We infer that Silo Utility Building is not in the scope. Please clarify.	Silo utility building is required. All water pumps and 30 cu.m water tank shall be part of the silo utility building. Dust conditioner water pumps to be relocated to this sump. 2 makeup water pumps shall be provided in the ash water sump to feed water to this tank. The tank shall be provided with level transmitters.
8	Volume VI	Ch 15: AHP	Civil, Structural & Architectural Works	Sheet | 2 of 2	15.3	Ash pipe from plant area to Ash Dyke will be supported on existing pedestal. Modification and strengthening of existing pedestals (wherever required) is in the scope of Bidder. If required, new pedestal to support ash pipe will also be constructed by the Bidder. Suitable arrangement including constructions of bridges/ culverts to cross the existing roads / drains in entire route of ash pipe is also in the scope of Bidder. Modification / strengthening of existing culverts in ash pipe route will be done by Bidder. Bidder has to perform all the activities complete in all respects including labour, material or any other requirements to the satisfaction of Engineer.	Kindly provide the pedestal and foundation(piling) drgs./details for complete pipe line upto dyke area for considereing the strength requirement. However, taking support on the existing pedestals by strengthening of the existing pipe pedestals is not feasable as per the site conditions. Please confirm the land availability for construction of new pedestals and right of way for - 1) Between road and existing pipe line outside the plant (southwards of existing pipe line), from plant boundary to the Highway. 2) Between existing pipe line and Others property line (northwards of existing pipe line) outside the plant, from plant boundary to the Highway. 3) Toe area of the slope along the periphery of the Ash Dyke (A&B)	Pipes shall be routed above the existing disposal pipe line corridor. The supporting structure for new pipes shall be independently supported on new pedestals from ground. Wherever it is not feasible to route the pipes above the existing pipelines, bidder shall consider routing the pipes adjacent to the existing pipes. Bottom of supporting structure for new pipes shall be kept as 2.0 m from top of existing pipeline. Routing shallbe further decided during detailed engineering based on final route survey.
9	Volume VI	Ch 06: General Requirement of Buildings & Structures	Civil, Structural & Architectural Works	Sheet | 11 of 12	6.18	MISCELLANEOUS REQUIREMENTS : No cable trenches shall be provided in TG hall, Boiler/ESP area, fuel oil pump house, Ash pump houses etc	In Pump Houses, cable trays shall be supported on the walls, however cable slits shall be required for taking the cable upto the equipment. Please clarify.	Noted.

Annexure-32

WATER SYSTEM	

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1	III	18	NDCT	7 of 23	18.4.1 (e)	The hot water distribution shall be by RCC main and …….. through the fill, which shall be film type.	Film type fill as well as splash type fills are specifiied in technical specification. Bidder understands that type of fills shall be considered as " splash/trickle grid/turbo splash or splash type fills like V-bar splash/splash gridper" inline with cl. 18.4.3.1, chapter-18, Vol-III, page 10 of 23. Please confirm.	Confirmed that type of fills shall be in line with Clause 18.4.3.1, Chapter 18, Volume III.
	III	18	NDCT	10 of 23	18.4.3.1	The fill shall be of non-clogging type fills like modular splash/trickle grid/turbo splash or splash type fills like V-bar splash/splash grid and easily installable. The fills shall be adequately supported to prevent sagging and damage. The tower shall be levelled so that water will be uniformly distributed over the fills and does not cause channeling. The splash type fills shall be placed horizontally.		
	VI	13	NDCT	15 of 21	13.9	FILL: PVC splash type bars fill arrangement shall be provided.		
2	III	15	CW & ACW System	3 of 37	15.3	The protection, control and monitoring of the CW & ACW system including the CW & ACW pumps, Butterfly Valves and any other equipment in the system shall be implemented through DCS.	Bidder understands that all the equipment in CW/ACW system viz. CW pumps, ACW pumps, COLTCS, SCS etc. shall be controlled through DCS. One (1) No. Local control panel shall be provided for two sets of SCS and control logic shall be implemented in DCS. Local On/off provision shall be provided in local control panel. PLC panel is not required. Please Confirm. This is as per standard practice followed in all supercritical projects of 660MW/800 MW projects of NTPC/TANGENCO/TSGENCO and other power utilities jobs executed by bidder.	Confirmed.
	III	15	CW & ACW System	28 of 37	15.16.1.6	Instrumentation and Control System: The control system for self-cleaning strainers shall be PLC based with monitoring in DCS.		
	III	15	CW & ACW System	26 of 37	15.16	Self Cleaning Strainer: Each self cleaning strainer shall be complete with following accessories and auxiliaries alongwith common local control panel for both self cleaning strainers.		
3	III	15	CW & ACW System	35 of 37	S. No. 2.7 & 2.8	DATA SHEET FOR AUTOMATIC SELF CLEANING STRAINERS: Free straining area: Four times the diameter of the pipe Screen Opening Area: 6 times of the inlet pipe cross section area	The description mentioned is applicable for manual strainer and not applicable for automatic self cleaning strainers. Further as per standard practice, free flow area of 110 % shall be provided for screen. Kindly review and confirm.	Free flow area of 120 % shall be provided for screen.
4	III	2	Turbine Generator & Auxiliaries	39 of 87	2.3 (o)	2X100% capacity, fully automatic debris filter shall be installed on each condenser inlet line of suitable mesh size for clarified water application.....Debris filter flushing line outlet shall be routed to ash dyke by suitable arrangement.	It is better to discharge debris discharge flushing to CW return header to Cooling tower as the quality of water is clarified water. Ash dyke is far away and there is no sufficient pressure available at debris filter flushing. Please confirm.	Debris filters are not envisaged since filtered water is envisaged.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
5	III	15	CW & ACW System	6 of 37	15.4.10 (ii)	The CW/ACW pump house fore bay shall be sized to receive water from cold-water basin of the cooling tower	Bidder propose to provide separate cooling tower (IDCT) for cooling of ACW system. This will provide following advantage: During boiler light-up and steam-blowing milestones, only ACW is required and with this arrangement ACW will be available to complete the project milestones. Further, CW Pump house and main cooling tower are long lead packages and generally not ready for these milestones. Please confirm.	Bid specification to be followed.
6	VII	Tender drg	Composit water scheme, Drg no: 111-12-3100, Rev-0	21 of 120 (pdf)	Zone J-15	Raw water intake channel to existing RW intake pump house	Please provide following details of raw water intake channel to existing RW pump house: 1. Invert level 2. Minimum water level 3. Maximum water level 4. Top of channel	Details handed over to bidder.
7	VII	Tender drg	Composit water scheme, Drg no: 111-12-3100, Rev-0	21 of 120 (pdf)	Zone J-15	Existing RW intake pump house	Please provide following details of existing Raw Water intake pump house: 1. GA drawing of existing raw water intake pump house 2. GA drawing of existing raw water intake pumps	Details handed over to bidder.
ELECTRICAL								
8	II	chapter-4	415V Switchgears & DC Boards	Sh 3 of 43	13.01.16	Motors less than 90 KW shall be provided with MCCB/ MPCB, contactors and intelligent controllers (IMC) with current & voltage sensing module Intelligent controllers shall be numerical type and shall communicate with DCS through any industry standard open protocol (IEC 61850/Modbus TCP/IP).	Bidder would like to clarify that for Electric Crane/Hoist, without VFD operation motors, the motor feeder inside hoist/crane control panel shall be without Intelligent Motor Controller (IMC). Kindly confirm acceptance.	Confirmed.
9	II	chapter-6	Power Transformers	Sh 31 of 105	1.01.00	Two (2) - Station Transformers with all fittings and accessories, three phase, three (3) windings, oil filled, 400/11.5//11.5 kV, 50 Hz, 130/65/65 MVA, ONAN/ONAF, YN0yn0yn0 connected, outdoor type, with On Load Tap Changer in the range of ±10% in steps of 1.25% will be furnished complete with fittings & accessories; auxiliary equipment	Please note that Sation transormer and other power transformer sizing shall be sizzed based on actual loading and design margin as indiacted in spec. In case caluculated vaule is les than rating indicated in spec, same shall be acceptable to custmer. Please confirm.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
10	II	chapter-19	Cables	SDh 8 of 11	19.06.05	Acceptance Test: i) The following test shall be carried out as Acceptance Test in the presence of HPGCL 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 the Acceptance Tests which shall be carried out at manufacturer's /supplier's cost. a) High Voltage Test b) Conductor Resistance Test c) Tensile / wrapping test. d) Partial discharge test (In screened cables). e) Insulation Resistance/Volume resistivity test f) Measurement of thickness of insulation and sheath and other dimensions g) Tensile strength & elongation at break for insulation & sheath. h) Hot set test on XLPE insulation i) Flammability test as per Swedish standard SS:424-15-75 Class-F-3 (Swedish Chimney test) j) Acid gas generation test as per IEC-754-1. k) Smoke density test as per ASTM-D-2843/1977 l) Oxygen index test as per ASTM-D 2863/1977 m) Temp. index test as per ASTM-2863/77 n) Test for rodent and termite repulsion property	FRLS test & Flammability Test to be conducted on one drum of every size & voltage grade of cables. Other acceptance test Sampling quantity as per appendix –D of IS 7098-2, D2.2. Please confirm the same for HT/ LT power/ Control & instrumentation cables as well.	Confirmed.
11	II	chapter-19	Cabling System	Sh 13 of 22	22.11.03	Laying of cables directly buried in ground is not acceptable	Please note that directly buried cables shall be avided to the extent possible. However for pole lighting directly buried cables may be allowed. Pls confirm.	Cables for street lighting/High Mast shall be buried from the nearest overhead structure.
12	II	chapter-19	Cabling System				Please confirm that cable trays on pedestal may be allowed in inetrplant areas.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
13	II	chapter-24	Dc battery & charger system	Sh 5 of 23	24.04.11	The procedure for estimating battery capacities shall be as per guidelines stipulated in IEEE-485 for Lead acid Battery. While estimating battery capacities, aging factor of 25%, temperature correction factor as per standard, contingency (10%), a design margin of 20% shall be kept. Derating factor for prolonged float charging shall be duly taken into account, as applicable, in estimating battery capacity.	Please note that aging margin is not applicable for lead acid battery as per practice. Pls confirm.	Confirmed.
14	II	chapter-01	ELECTROSTATIC PRECIPITATOR	Sh 165 of 186	1.05.03	Separate ESP & FGD ctrl building	If required ,ESP and FGD control building may be combined. Please confirm.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
15	Vol-III	chapter-22	Fuel Oil Handling System	Sh 2 of 8	22.1.2	It is proposed to tap the LDO required for the proposed 800 MW unit at Unit # 2 day LDO tank inlet header. Necessary booster pumps shall be installed in the existing Unit # 2 day farm area to transfer the LDO from the existing LDO forwarding header to the proposed 800 MW LDO Day tank.	Since existing Unit#2 is away from upcoming unit, please confirm that LT feeders required for booster pumps shall be provided.	No spare feeder is available in existing LT Switchgear. So new Booster pump loacted near Unit-2 LDO tank shall be fed from Unit-3 LT Switchgear.
GENERAL								
16	VII	111-12-3100	Composite Water Scheme			Composite Water Scheme	Bidder understand the Water Balance Diagram included in Tender specification is for reference only. Further Water Balance shall be finalized during detailed engineering after award of contact. Capacity of complete system of ETP RO system shall be selected based upon actual water balance diagram finalized during detailed engineering. Please confirm.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
17	III	11	Effluent Treatment Plant	4 of 23	11.2.5	Cooling tower blow down shall be used for ash slurry disposal system and excess blow down shall be taken to CMB for further utilization.	Bidder understands that Cooling Tower blowdown can be used by bidder in other facilities also like in FGD/Ash Sump etc. However, bidder ensures that overall intent of specification for 'Zero Discharge Concept' will be complied. Please acccept.	Accepted.
18	III	33	Layout Requirements	3 of 11	33.3	The proposed location of main plant block is indicated in the Plot Plan enclosed with the bid documents. However bidder has an option to develop his own layout keeping the location/orientation of the main power block, power evacuation corridor, make-up water corridor, Ash dyke same as indicated in bid document.	Bidder understands that facilities other than Main plant layout can be rearranged / relocated for sequential location and overall simplification of layout wherever necessary. Please confirm.	Confirmed.
19	VII	111-29-0200	Plot Plan			Plot Plan	Free space is available between grids E-1400, E-1600, N-1400 & N-1600, bidder proposes to use the same for locating facilities, if required. Please confirm.	This space is earmrked for existing Units FGD package. Hence the space cannot be utilised.
CIVIL								
20	VI	3	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 1 of 3	24.7	Water inlet in proposed Raw water reservoir shall be through RCC covered channel. This new RCC Channel shall be connected to existing RCC Channel. Length of new RCC Channel shall be as per plot plan/Site condition. Invert level. of the proposed New raw water reservoir shall be fixed considering the invert level of existing RCC Raw water intake channel. All modification work of existing intake RCC channel to connect to proposed RCC channel is in the scope of bidder.	1. As per site visit, the existing channel is made up of brick side wall and top is enclosed with RCC slab. 2. Modification of existing channel from intake pump house to existing Raw water reservoir is not required. 3. The water for poposed Raw water reservoir will be taken from existing channel. 4. Modification of existing channel is required only at the connection of existing to new channel. Please confirm for point no. 1 to 4 above. Please furnish the invert level of the existing channel to connect the proposed RCC channel.	New raw water reservoir stands deleted from the scope of bidder. Accordingly, Chapter-24 of Vol-VI of specifications shall be treated as null and void.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
21	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 4 & 5 of 7	2.6 Point no. 63	Rain water harvesting pond. The Pond shall be located at the lowest contour of the plant as far as feasible so that it can effectively collect all the rain water by gravity. HDPE lining and side stream Boulder pitching is also in the scope of bidder.	1. As per site visit, there is existing earthen Rain water harvesting pond. Please furnish the drawing of the existing Rain water harvesting pond mentioning the capacity, invert level, area with co-ordinates etc. 2. The proposed Rain water harvesting pond is to be constructed for proposed unit of 1X800MW only. Please confirm. 3. For new proposed Rain harvesting pond, please furnish the detailed specification, area, capacity, dead storage, free board, etc. 4. As per site visit, there is existing storm water drain connetcted to existing Rain water harvesting pond. Bidder understands that the rain water discharge from proposed 1X800MW plant shall be connected to this existing storm water drain. Please confirm. 5. Please furnish the rain fall intensity to be considered for 20 days to calculate the capacity of Rain water harvesting pond or furnish the capacity of Rain water harvesting pond. 6. Bidder understands that boulder pitching and HDPE lining is required for side walls as well as bottom of Rain water harvesting pond. Please confirm. 7. Please provide the size and quantity of boulders lying in existing CHP area for use in proposed Rain water harvesting pond by the bidder free of cost.. 8. Thickness of HDPE lining and boulder pitching may please be specified.	New raw water reservoir alongwith rain water harvesting scheme stands deleted from the scope of bidder. However, suitable storm water drainage network of proposed plant shall be connected to existing drain system of the existing plant to dispose off rain water to existing rain water holding pond. Bidder to ensure that ash laden water from fly ash silo area is not led to storm water drain network. It shall be led to ash slurry sump as indicated in vol.-III of specification. Further, water from rain water holding pond shall be pumped to raw water reservoir with 2x100 percent pumps (1W+1S). Suitable shed for pump and pipe network is also in the scope of bidder. Material of construction (MoC) of pumps shall be similar to raw water pumps. **Rain water harvesting scheme stands deleted from the scope of bidder.**
	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	Sheet 5 of 7	2.6 Point no. 76	Rain Water Harvesting should be implemented as per the scheme /design approved. Central ground water Authority / Board or State ground water authority or MoEF authorized agency shall be consulted for finalization of appropriate rain water harvesting technology. The necessary consultancy charges for the above agency for preparing rain water Harvesting method / scheme for the project to be borne by the Bidder.		
	III	13	Mechanical Works	Sheet 2 of 2	13.5	The size of rain water harvesting pond shall be calculated based on the total rain fall runoff (approx. 20 days) and the pond so designed shall be constructed within the existing rain water holding area and shall be provided with HDPE lining. Boulders lying in the existing CHP area shall be explored for side walls and bottom floor pitching. All the storm water drains in the plant boundary shall be led to the rain water harvesting pond.		
22	VI	2	SCOPE OF CIVIL & STRUCTURAL WORKS	1 of 7	2.4	The scope shall also including setting up by the Contractor a complete testing laboratory in the field to carry out all relevant tests as per BIS or other international standards required for the civil works for the project	Please clarify the followings: 1.Testing laboratory is permanent structure or temporary structure. 2.In case of permanent structure, please furnish the detailed specification, finishing schedule etc.	Testing laboratory is temporary structure. But, bidder to handover the same to HPGCL at the end of the project.

Annexure-33

1	I	Sec-II	ITB	19 of 75	10.4 (C)	In case Installation Price (Excluding Civil/Site Fabricated Structural works price) is less than 12.5% of the cumulative total of CIF & Ex-works Price of Main Equipment, the amount by which it is lower shall be retained proportionately from the CIF & Ex-works component of Contract Price while releasing supply payments and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on Final Taking Over of the plant.	Keeping such restriction in pricing will impact the bidder's cashflow and the bidder will be forced to change the price breakup w.r.t. actual expenses. Therefore, we request Owner to kindly remove such restriction and allow bidders to specify the breakup based on Bidder's experience/ estimate.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
2	I	Sec-II	ITB	19 of 75	10.4 (f)	In case Civil/Site Fabricated Structural works price (excluding Installation price) is less than 15% of the cumulative total of CIF & Ex-works Price of Main Equipment, the amount by which it is lower shall be retained proportionately from the CIF & Ex-works component of Contract Price while releasing supply payments and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on Final Taking Over of the plant.		
3	I	Sec-II	ITB	19 of 75	10.4 (g)	In case the Civil/Site Fabricated Structural works price (excluding Installation price) is above 25% of the cumulative total of CIF & Ex-works Price of Main Equipment, the amount by which it is higher shall be retained proportionately while releasing progressive payments, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on Final Taking Over.		
4	I	Sec-II	ITB	38 of 75	34.1	Contract Performance Security: Within thirty (30) days after the date of LOI, the successful Bidder shall furnish contract performance securities for ten percent (10%) of Contract Price for all the contracts and in the form provided in the Annexure-A to GCC.	Owner is requested to reduce the value of performance Security from 10% to 3% of Contract Price in line with Office Memorandum issued by Ministry of Finance (MoF)	Bid specifications to be followed.
5	I	Sec II	ITB	23 of 75	13.1	PERIOD OF VALIDITY OF BIDS (TECHNO-COMMERCIAL BID AND PRICE Bid initially shall remain valid and open for acceptance for one hundred eight (180) days from the date of opening of Price Bid. The bid valid for shorter period shall be rejected by the Owner as being non-responsive.	Since the opening of the Price bid is the decision of the owner and may be dependent on availability of various clearance for the project. Hence, HPGCL is requested to kindly modify the clause as "Bid initially shall remain valid and open for acceptance for one hundred eight (180) days from the date of submission of Part-I (Techno- Commercial Bid) & Part-II (Price Bid)".	In Clause 13.1 at sheet 23 of 75 of ITB / Section-II / Vol-I, the word "one hundred eighty (180) days from the date of opening of Price Bid" be read as, "two hundred twenty five (225) days from the date of opening of Part-I (Techno-commercial) Bid"
6	I	Sec II	ITB	24 of 75	13.3	In exceptional circumstances, the Owner may solicit the Bidder's consent to an extension of the bid validity period. The request and responses there to shall be made in writing by post or by telefax/email followed by post confirmation. If a Bidder accepts to extend the period of bid validity, the validity of bid security shall also be suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required nor permitted to modify its bid.	Bidder may be provided the opportunity to modify its bid in case the Owner desires extension of bid validity period.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
7	I	Sec II	ITB/GCC	21 of 75 (ITB) Annexure K of GCC	10.7 (ITB)	Price Basis Prices quoted by the Bidder shall be subject to adjustment during performance of the Contract to reflect changes in the cost of labour, material, etc. in accordance with the procedures specified in relevant appendix to the Form of Contract Agreement (Price Adjustment). 'Attachment 20: Price Adjustment Data–Details regarding price adjustment as per format. ANNEXURE-K subscript 'o' refers to indices as on 30 days prior to date of opening of Part-II (Price) bids. (Ex works) Subscript '0' refers to indices as on 7 days prior to date set for opening of Part-II (Price) bids.(installation & Civil)	Since the opening of the Price bid is the decision of the owner and may be dependent on availability of various clearance for the project. Annexure K may be modified as under: subscript 'o' refers to indices as on 30 days prior to date of submission of Part-II (Price) bids. (Ex works) Subscript '0' refers to indices as on 7 days prior to date set for submission of Part-II (Price) bids.(installation & Civil)	In Annexure-K at Sheet 63 to 72 of GCC Annexures / Section-IV / Vol-I, the word "Part-II (Price) bids" be read as "Part-I (Techno- Commercial) bid".
8	I	Sec-IV	GCC	23 of 80	14.1	The indigenous portion of the contract price as indicated in Schedule 2 & 4 [Schedule of Prices] excluding price of mandatory and recommended spares shall be subject to adjustment in accordance with the provision of Annexure-K to the GCC.	Since there is a lot of price volatility in the market, we request Owner to kindly consider the Price Adjustment for Mandatory spares/ recommended spares and Transportation also.	Price adjustment for mandatory spares is allowed if the spares are supplied along with the main equipment. Accordingly in Clause 14.0 of GCC at Sheet 23 of 80 in Vol-I, the word "mandatory and" is deleted. In Clause (i) (a) of Annexure-K of Section-IV (GCC) at sheet 63 of 97 in Vol-I, the words "Mandatory Spares manufactrured within the Owner's Country and" stands deleted. In Clause (vi) of Annexure-K of Section-IV (GCC) at sheet 63 of 97 in Vol-I, the word "Mandatory Spares and" stands deleted. Similary, the price adjustment clauses at other places shall be read accordingly.
9	I	Sec-IV	GCC	26 of 80	14.3.2 (v)	In case the Owner refuses to admit that any variation directed by him involved extra work or extra materials entitling the contractor to claim extra payment, the contractor shall, nevertheless if so required by the Owner, carry out the same and the matter in difference shall be decided by Arbitration as provided in the contract.	Claim for additional work as submitted by the contractor shall be mutually discussed and settled between the Owner and the contractor	Bid specifications to be followed.
10	I	Sec-IV	GCC	34 of 80	20.1.2	The total amount of liquidated damages for delay shall be subject to a maximum of ten percent (10%) of the Total Contract price plus GST (as and if applicable)	CBIC vide Circular No. 178/10/2022-GST dt. 03.08.2022 (copy enclosed) has already clarified that the GST is not applicable on LD being in the nature of penalty. Since the matter is no longer res integra, therefore the subject tender clause needs to be modified suitably.	Govt. of India notifications in respect of GST will be followed.
11	I	Sec-IV	GCC	24 of 80	14.2.2	The Owner will deduct GST at source at the applicable rates in case transactions under the contract are liable to GST deduction at source as per the prevailing provisions of GST Law. The Owner shall also deduct TDS as applicable in accordance with IT Act and Labour Cess as applicable in accordance with BOCW Act	Vide notification no. 61/2018- Central Tax, dated 05.11.2018 and notification no. 73/2018-Central Tax, dated 31.12.2018 transactions b/w. Govt. departments, Govt. agencies, local authorities, PSUs (i.e. PSU to PSU also) etc. are exempt from GST TDS. Accordingly, GST TDS provision shall not be applicable in the case of BHEL.	Govt. of India notifications in respect of GST will be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
12	II	CH-8		1 of 57	2.1	The Performance Guarantee Tests shall commence within 45 days after the successful completion of Trial Operation. The PG test shall conclude within 50 months from date of LOI Any extension of time beyond the above time shall be mutually agreed upon.	If for reasons attributable to the Owner, the Performance Guarantee (PG) Test of the Facilities or the relevant part thereof cannot be successfully completed within the period of 03 (Three) month from the date of Completion of Trial Operation, then PG test shall be deemed to be completed.	Bid specifications to be followed.
13	I	Sec II	ITB GCC	36 of 75 (ITB) 44 of 80 (GCC)	30.4 29.0 (GCC)	In the case of successful Bidder, the contracts shall be awarded as follows: - First Contract: For CIF (Indian Port-of-Entry) Supply of all Plant and Equipment (including Type Test Charges) and Mandatory Spares to be supplied from abroad. - Second Contract: For Ex-Works (India) Supply of all Plant and Equipment (including Type Test Charges) and Mandatory Spares to be supplied from within the Owner's country. - Third Contract: For providing all services i.e. port handling, port clearance and port charges for the imported goods, Custom reconciliation, further loading, inland transportation for delivery at site, inland transit insurance, unloading, storage, handling at site, installation, insurance covers other than inland transit insurance, testing, commissioning and conducting Guarantee tests in respect of all the equipments supplied under the 'First Contract' and the 'Second Contract', and all other services including Training Charges as specified in the Contract Documents.	The supply of goods is along with transportation & insurance services, both shall be treated as part of composite supply as defined under illustration to Sec. 2(30) of CGST Act, 2017. Accordingly, Owner is requested to kindly include the scope of Transportation & Insurance services in the supply of goods contract i.e Second Contract	Bid specifications to be followed.
14	I	Sec-II	ITB	21 of 75	10.6	Concessional Custom Duty for Power Projects	Owner may please like to clarify if the project is eligible of any other project based Customs duty concession / benefit.	Bid specifications to be followed.
15	I	Sec- IV	GCC	37 of 80	22.1	Force Majeure Events Force Majeure Events shall include the following events:-	Following to be added e) Any Government or Court order which prevents the work from being carried on by the Contractor/Sub-Contractor.	Bid specifications to be followed.
16	I	Sec- IV	GCC	42 of 80	26.2/26.5	SETTLEMENT OF DISPUTES/ CONCILIATION/ ARBITRATION 26.2 All unsettled dispute(s) or difference(s) arising out of or in connection with the Contract shall be decided by the Engineer whose decision shall be final and binding on the parties. 26.5 If amicable settlement cannot be arrived at, the dispute shall be settled by the arbitration of a Sole Arbitrator to be appointed with mutual consent of both the parties from the panel of Arbitrators to be suggested by HPGCL	Clause No 26.2 and Clause No 26.5 are like alternate remedies. However, at both places use of "shall" makes both mandatory. In View of the above, Clause No 26.2 may be replaced as under: All unsettled dispute(s) or difference(s) arising out of or in connection with the Contract shall be decided by the Engineer in the first instant failing which the matter may be referred to AMRCD.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
17	I	Sec- IV	GCC	42 of 80	26.4 and 26.5	26.4 Subject to other form of settlement hereafter provided, the "Engineer" decision in respect of every dispute or difference so referred shall be final and binding upon the contractor. The said decision shall forthwith be given effect to and contractor shall proceed with the execution of the work with all due diligence	If AMRCD is intended to be followed, the decision of the Engineer cannot be final and binding as mentioned in Clause No 26.4. hence Clause No 26.4 and 26.5 may be deleted	Bid specifications to be followed.
18	I	Sec- IV	GCC	ANNEXURE- I (GCC)	58 of 97	ANNEXURE- I (GCC) INDEMNITY BOND THIS DEED OF INDEMNITY is made on this the day of 2023 BY AND BETWEEN (Name of Contractor), a public company limited by shares and duly incorporated and registered under the Companies Act, 1956 with its Registered Office at (hereinafter alternatively referred to as the " promissory" / /"Contractor") Which includes its heirs, successor and legal assigns AND Haryana Power Generation Corporation Limited, a company incorporated under the provisions of the Companies Act, 1956 with its registered Office at Panchkula, Haryana {hereinafter alternatively referred to as the "Promisee"/ "HPGCL"/"Owner"} Which includes its heirs , successors and legal assigns	Promissory to be replaced with Promisor used in the text of INDEMNITY BOND	Noted.
19	I	Sec- IV	GCC	ANNEXURE- I (GCC)	60 of 97	The promissory hereby irrevocably indemnifies and releases HPGCL, its affiliated companies, officers, Directors, employees, agents, authorized representatives, etc, as also the Government for the State of Haryana and its officers, harmless and free of all liabilities, claims, litigations and expenses and other costs and expenses against any possible claim or litigation arising from a claim by affected party (ies) and/or any financial repercussions arising thereof.	Promisor can indemnify the Promisee but not release the Promisee. Hence ""and releases HPGCL "" may be deleted	Bid specifications to be followed.
20	I	Sec- IV	GCC	21.1.1	35 of 80	CONTRACTOR'S DEFAULT In addition, such action by the Owner as aforesaid shall not relieve the Contractor of his liability to pay liquidated damages for delay in completion of works as defined in clause 20.0 of this Section and shall not entitle the Contractor to reduce the value of the Contract Performance Guarantee nor the time thereof. The Contract Performance Guarantee shall be valid for the full value and for the full period of the Contract guarantee period	The contractor shall not be liable for any defective work being carried out by the other agency which may impact the performance of the equipments or part thereof.	Bid specifications to be followed.
21	I	Sec V	ECC	26.1	12 of 62	EMPLOYMENT OF LABOUR In addition to all local laws and regulations pertaining to the employment of labour to be complied with by the Contractor pursuant to GCC, the Contractor will be expected to employ on the work only his regular skilled employees with experience of the particular work.	Contractor shall also employ contract labour for the project	In Clause 26.1 at Sheet 12 of 62 of ECC / Section-V / Vol-I, the word "regular" stands deleted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
22	I	Sec V	ECC	27	15 of 62	FACILITIES TO BE PROVIDED BY THE OWNER	Owner is requested to provide the Construction power and Construction Water free of cost at one point within the plant boundary. Further Owner is also requested to provide adequate space for labour colony.	(i) HPGCL shall provide water on chargeable basis inside plant boundary at one point. The water supplied shall be metered at the terminal point. The necessary arrangement for metering shall be done by the Bidder. (ii) Construction power shall be arranged by the Bidder, however HPGCL shall facilitate for the same. (iii) Bidder to arrange space for Labour Colony.
23	I	Sec V	ECC	42	35 of 62	UNFAVOURABLE WORKING CONDITIONS The Contractor shall confine all his field operations to those works which can be performed without subjecting the equipment and materials to adverse effects during inclement weather conditions, like monsoon, storms, etc. and during other unfavorable construction conditions. No field activities shall be performed by the Contractor under conditions which might adversely affect the quality and efficiency thereof, unless special precautions or measures are taken by the Contract or in a proper and satisfactory manner in the performance of such Works and with the concurrence of the OWNER. Such unfavorable construction conditions will in no way relieve the Contractor of his responsibility to perform the Works as per the schedule. No extension of time of any account shall be given to the Contractor on account of unfavorable working conditions.	The extension of time due to inclement weather conditions, like monsoon, storms, etc. and during other unfavorable construction conditions shall be mutually discussed between Owner and Contractor	Bid specifications to be followed.
24	I	Sec- IV	GCC	12.4	22 of 80	Assignment and subletting of part of Contract: Contractor shall have to obtain specific approval from the Owner to sublet civil works as well as unloading, storage and erection works of this project.	The subject tender involves placement of order on various subcontractors to meet the completion schedule of the project. In view of the same, Owner is requested to delete the requirement of specific approval to sublet Civil Work as well as unloading, storage and erection works of this project.	Bid specifications to be followed.
25	I	Sec- IV	GCC	12.5	22 of 80	The contractor shall provide to the Owner unpriced copies of all contracts between sub-contractors and themselves. The contractor shall ensure that all such sub-contracts are made in writing.	The subject tender involves placement of order on various subcontractors to meet the completion schedule of the project and it is the responsbility of the Contractor to bring the project on time. In view of the same, submission of unpriced copies of all contracts between sub contractors and themselves is not solicited	Bid specifications to be followed.
26	I	Sec- VI	SCC	9.3	9 of 12	Grant of Extension	The grant of Time extension due to delay not attributable to the Contractor shall be mutually discussed and settled between Owner and the Contractor.	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
27	I	Sec IV	GCC	23 9.3 (SCC)	39 of 80 9 of 12 (SCC)	DELAYS BY OWNER OR HIS AUTHORIZED AGENTS In case the Contractor's performance is delayed due to any act or omission on the part of the Owner or his authorized agents, then the Contractor shall be given due extension of time for the completion of the works to the extent such omission on the part of the Owner has caused delay in the Contractor's performance of his work, for which no compensation will be payable for idle labour, shift and machineries or for any other financial loss. Grant of Extension	The Cost compensation for delay (not attributable to Contractor) will be paid to the Contractor. Same shall be mutually discussed and settled between Contractor and Owner	Bid specifications to be followed.
28	I	Sec V	ECC	19	9 of 62	Contractor's site office Establishment The Contractor shall establish an Office at the Site and keep posted an authorized representative for the purpose of the Contract.	It is requested to confirm whether land (within the plant premises) for temporary site office for contractor use will be provided by owner or not.	Confirmed. Shall be provided by owner.
29	I	Sec V	ECC	28.3	18 of 62	The Contractor shall establish a site office at the site and keep posted an authorized representative for the purpose of the contract, pursuant to GCC.		
30	I	Sec V	ECC	27.7	16 of 62	The fuel (Coal & oil) and limestone as may be required for the initial starting-up/trial run of the plant equipment will be arranged by Owner.	Owner is requested to provide the schedule for availaibility of fuel (Coal & oil) and limestone.	Bid specifications to be followed.
31	I	Sec-IV	GCC	74 of 80	44.6.3.5(A)	Payment terms for Price Adjustment Amount Any addition due to adjustment to the Contract Price shall be payable in the similar manner as provided in the clauses 44.6.3.1 to 44.6.3.5 above. The price adjustment amount corresponding to advance payment shall be clubbed with the first progressive payment of that equipment.	Owner is requested for the following: 90% of the Price adjustment amount (to the Contract Price) along with 100% GST to be paid by the Owner .Balance 10% shall be paid on completion of trial operation and PG test (5% each)	Bid specifications to be followed.
32	VI	Ch 11: Buildings Description	TEMPORARY STRUCTURES FOR EXECUTION	1 of 18	11.1.3	Site office Contractor shall provide about 5 00 sqm of office area with A/C and false ceiling for the use of Owner / Owner's representative in addition to the Contractor's requirement. Additionally an A/C Conference room to accommodate about 70 people shall also be provided in the site office complex for the Owner's use. In addition to these, basic facilities like toilet for gents and ladies, potable water tanks, soak pit and septic tank for sewage disposal shall also be provided. Covered parking area for parking 10 cars shall also be provided for Owner's use.	It is requested to confirm whether land (within the plant premises) for site office for owner use will be provided by owner or not.	Confirmed. Shall be provided by owner.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
33	I	Section VI: SCC	Trial Operation	6 of 12	5.8	Trial Operation A. Notice Of Readiness For The Trial Operation After completion of pre-commissioning activities as detailed above, the contractor shall give 30 days advance notice in writing to the OWNER for the commencement of Trial Operation, after fulfillment of following contractual obligations: (i) (a) Completion of pre-commissioning activities, outstanding works, etc.....	From the mentioned clause bidder understands that only those works without which Trial operation cannot be performed are considered as outstanding works. Kindly Confirm.	Bid specifications to be followed.
34	I	Section I: IFB	Balance of Plant Experience	27 of 76	1.8.1	Apart from meeting the Qualifying requirements, as stipulated under Routes 1 to 5 & 7, as applicable, the Bidder participating in the tender under route 1 to 5 & 7, should have executed on EPC (Engineering, Procurement and Construction) basis, a Contract for the BOP Package comprising at least Coal Handling Plant, Ash Handling Plant, Cooling Towers, Chimney, Water Treatment Plant including associated civil works for the above equipments and systems in their scope of work, either as a standalone EPC package or as a part of EPC package covering (SG and/or STG) and BOP, for a Coal fired power plant with unit size of 250 MW or higher capacity, which is in successful operation for a period of not less than one (1) year prior to the date of techno commercial bid opening.	From the mentioned clause bidder understands that the Qualifying requirements as stipulated is applicable for Balance of Plant including associated civil, Electrical and C&I works. Kindly Confirm.	Confirmed.
35	I	Section V: ECC	Storage Management system	28 of 62	35.12	Sound Storage Management system need to be followed for storage of material. First in First Out method (FIFO) to be adopted to avoid longtime storage. Storage duration of any material at site shall not be more than 3 months. Accordingly supply of material in sequence of erection at site to be ensured.	Owner is requested to kindly withdraw the restriction of maximium 3 months Storage duration of any material at site. However bidder shall ensure supply of material in sequence of erection at site.	Bid specifications to be followed.

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36	IV	Electrical Works	Electrical Scope of Work	12 of 58	1.07.11	1.07.11 * All 11 kV and 6.6kV Switchgears shall preferably be of one make for the entire plant or at the most limited to 2 makes for the entire plant. *All 415V Switchgears (PCC/PMCC/MCC) shall preferably be of one make for the entire plant or at the most limited to 2 makes for the entire plant. *All VFDs shall preferably be of one make for the entire plant or at the most limited to 2 makes for the entire plant. *All Auxiliary Oil transformers (11/6.9 kV) shall preferably be of one make for the entire plant or at the most limited to 2 makes for the entire plant. *All service transformers AN (11/0.433 kV) shall preferably be of one make for the entire plant or at the most limited to 2 makes for the entire plant. * All 220 V DC Battery shall preferably be of one make for the entire plant or at the most limited to 2 makes for the entire plant. * All Battery Charger shall preferably be of one make for the entire plant or at the most limited to 2 makes for the entire plant.	Owner is requested to kindly either withdraw the restriction of maximium 2 makes for the equipments or provide the names of the prefered 2 makes for the equipments mentioned for the entire plant.	Bid specifications to be followed.
37	Volume VI	Ch 17:	Architectural Works	5 of 21	17.6.4.1	Planting Trees Trees of different category and height shall be planted as per prior approval from Owner. In addition to above, Bidder has to develop Green belt by planting around 80,000 of trees in approximate 32 hectares of land ,location as approved by Engineer in charge. Green belt area as mentioned above is approximate. Actual area to be decided as/MoEF&CC guidelines.	It is requested to provide the types of trees to be planted in the green belt area.	At the time of detailed engineering. Maintenance of green belt till commissioning of plant or minimum 1 year after completion of Green belt development whichever is later is also in the scope of bidder. Green belt development shall be done by specialized contractor approved by forest department and HPGCL.
38	I	Sec IV	GCC	37 of 80	22.2	FORCE MAJEURE Notwithstanding the foregoing, none of the following shall constitute an event of Force Majeure hereunder: (A) the failure of any Sub-contractor, supplier or vendor to perform its obligations to Contractor, which failure is not itself caused by Force Majeure with respect to such Sub-contractor, supplier or vendor; (B) financial difficulty suffered by Contractor or any supplier, Sub-contractor, supplier or vendor in performing its obligations; (C) failure of any equipment, system or component related to the Project, which failure is not itself caused by Force Majeure; or (D) strikes or labour disturbances at site or at the Contractor's / Sub-Contractor's works; (E) unforeseen sub-surface conditions as per Clause 1.1.1 of IFB.	The events mentioned under Clause No 22.2 (B,D,E) shall constitute as Force majeure event if such events and circumstances are not within the Affected Party's reasonable control (directly or indirectly) as mentioned in Clause No 22.0	In Clause 22.2 at Sheet 37 of 80 of GCC / Sec. IV / Vol-I, S.No. (D) be read as"strikes or labour disturbances at site (except attributable due to Owner) or at the Contractor's / Sub-Contractor's works;"

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
39	I	Sec IV	GCC	29 of 80	18.0 e)	Third Party Liability Insurance Covering bodily injury or death suffered by third parties (including the Owner's personnel) and loss of or damage to property occurring in connection with the supply and installation of the Facilities.	Owner's personnel are not covered under third party liability cover provided by Insurance policy. Third party liability is extension of MCE policy, As customer is co-insured in MCE Policy, his personnel will not be covered under this policy. Hence " including the Owner's personnel" may please be deleted	Bid specifications to be followed.
40	I	Sec IV	GCC	29 of 80	18.0 g)	Owner's Liability In accordance with the statutory requirements applicable at the place where the Contract is being executed.	As customer is owner of the project. Hence, Owner's liability cannot be taken by Contractor in the MCE Policy. This is in line with the standard policy being followed in all projects	Bid specifications to be followed.
41	I	Sec IV	GCC	29 of 80	18.0 i)	3. Comprehensive General Liability Insurance	As customer is owner of the project. Hence, Comprehensive General Liability Insurance cannot be taken by Contractor in the MCE Policy. This is in line with the standard policy being followed in all projects	Bid specifications to be followed.
42	I	Sec IV	GCC	50 of 80	34.1	Owner - Initiated Changes in Work Said additions, deletions or revisions shall not, in any way, invalidate this Contract and Contractor agrees to accept payment for such changes and changes to other Project Variables according to the procedures outlined herein and as if the altered work has been part of the original Contract. Contractor shall promptly proceed with all such orders upon the receipt thereof.	We request HPGCL to kindly include the clause with respect to Change Order/proposal in line with NTPC Contracts.(relevant Clause attached)	Bid specifications to be followed.
43	II	Ch-1	Scope of the Proposal	1 of 10	1.1 (f)	Complete Civil…….. ,(or Optional New Raw Water Reservoir……..., railway siding and railway tracks	The execution of these works by any contractor involves engagement/clearance from various other agencies which will always be better co-ordinated and controlled directly by Plant Owner. Hence, we request HPGCL to kindly exclude the scope of Optional new raw water reservoir and railway siding & tracks from the scope of EPC bidder	Bid specifications to be followed.
44	VI	Ch-2	Scope of work	5 of 7	65	Proposed site is having trees all over the site. Cutting and removing the trees and clearing the site from all other obstruction is in the scope of bidder. Necessary permission to cut the trees from relevant department must be obtained by bidder himself at his own cost	The said work needs the necessary statutory/ forest department approvals which cannot be undertaken by a bidder. Hence, we request HPGCL to kindly exclude the scope of cutting/removing of trees from bidder's scope	In the scope of bidder. However, HPGCL will facilitate the bidder in this regard.
45	I	Sec II	ITB	41 OF 75	43	ROYALTY The bid price shall be inclusive of any Royalities or Seigniorage fee or cess or other charges payable on the quarried or mined metal, minerals or minor minerals as the case may be, at the rate(s) prevailing as on seven (7) days prior to the date of bid opening.	"prevailing as on seven (7) days prior to the date of bid opening" to be replaced with "seven (7) days prior to the deadline set for Price Bid submission" HPGCL to kindly confirm. Further, we request HPGCL to allow statutory variation on royalty/seigniorage fee to be reimbursed by HPGCL	In Clause 43.0 at Sheet 41 of 75 of ITB / Section-II / Vol-I, the words "date of bid opening " be read as "date of opening of Part-I (Techno- Commercial) bid".
46	I	Sec IV	GCC	61 of 80	44.2	Due Dates for Payment The initial amount of advance payment shall be payable after fulfillment of all the conditions laid down in "Terms of Payment" clause 44.6 and on rceipt of the Contractor's invoice along with all necessary supporting documents for such payment.	We understand that advance payment shall be promptly released (within 7 days) after fulfillment of obligations as mentioned in specification	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
47	I	Sec IV	GCC	21 of 80	12.6	ASSIGNMENT AND SUBLETTING OF PART OF CONTRACT The sub-contractor shall cause all warranties provided to the contractor under any sub-contract to be assignable to the Owner or its designee and shall assign to the Owner the benefit of all unexpired sub-contract warranties (excluding performance or schedule guarantees for which liquidated damages are provided as a remedy) upon the expiration of the warranty period, or earlier, at the Owner request, provided the contractor shall continue to be responsible for all contractual obligations under the contract.	Owner is requested no to insist for assignment of unexpired warranty of the sub contractors to Owner	Bid specifications to be followed.
48	I	Sec IV	GCC	38 of 80	22.5	Consequences of Force Majeure	Following to be added at the end of clause No 22.5 f) If the performance of the Contract is substantially prevented, hindered or delayed for a single period of more than sixty (60) days or an aggregate period of more than one hundred and twenty (120) days on account of one or more events 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 no 26 read in conjunction with deviation/clarification. g) Force Majeure shall not apply to any obligation of the Employer to make payments to the Contractor herein.	Bid specifications to be followed.
49	I	Sec IV	GCC	53 of 80	35.2 (Notes 1)	The contractor shall be liable irrespective of the operation/ generation of power subsequent to the commercial operation declaration of the Unit by the Owner.	Contractor shall not be liable for any damages/repair which is caused due to the normal wear and tear or due to improper operation/maintenance of the plant by the Owner (i.e operation of the plant to be in line with the industry practice/OEM guidelines).	Bid specifications to be followed
50	I	Sec VI	SCC	10/11 of 12	10.1.3	10.1.3 Effect of Final Taking-Over However till the Final Taking-Over occurs:- i. the contractor continue to depute its operating Staff & Engineer for satisfactory operation of unit and shall be fully responsible for safety of all plant & equipment. ii. Continue to extend full Insurance cover as provided in the contract. In case of failure of the contractor to provide any of the Insurance cover, the Owner shall arrange the same at contractor risk & cost and deduct the cost from the contractor along with overheads. iii. Continue to provide all lubricants/ oil/ chemical for satisfactory & safe Operation of the Unit till Final Taking-Over.	We understand Unit will be taken over by HPGCL on completion of Trial Operation/COD of the unit. Bidder/Contractor has not envisaged O&M services in the bid Hence the requirement stipulated in Clause 10.1.3 (I,ii,iii) shall not be applicable for the contractor/Bidder.	Clasue 10.1.3 at Sheet 10/11 of 12 of SCC, Section VI of Vol-I Clarifications regarding provsions at (i), (ii) and (iii) in respect of Final Taking Over (FTO) :- (i) HPGCL shal only deploy its manpower for operation of Unit during trial operation and onwards, however they shall work under the direct supervision of contractor and the contractor shall be responsible in case of any operational defect/fault in the equipments/system or any shortfall in the performance of equipments before FTO. The contractor shall not put onus for such deficiencies/defects etc. to the operational lapses of deployed manpower. Maintenance of plant shall remain in the scope of contractor up to FTO. (ii) Bid specifications to be followed. (iii) Bid specifications to be followed. Note: Regarding 12 months warranty of Unit from FTO. Refer clause 35.0, GCC Sec-IV, Vol-I.
51	I	Sec IV	GCC	57 of 80	43	Spares	Since the list of Mandatory spares is exhaustive. Hence, Bidder has envisaged only supply of Mandatory spares as mentioned in Chapter 9 ;Volume II of Tender Specification No other spares have been envisaged by the bidder	Bid specifications to be followed.

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52	I	Sec IV	GCC	65/69/71 /73 of 80	44.6.3.1 IV 44.6.3.3 III 44.6.3.4 III 44.6.3.5 VI	Release of payment pertaining to Final Take over (FTO)	If for reasons attributable to the Employer, the FTO of the unit cannot be completed within the project completion schedule, the payment linked to same shall be released on submission of Bank guarantee of equivalent amount	Bid specifications to be followed.

Annexure-34

1	Vol - III	Ch- 2	TG & Auxs.	3 of 87	2.1 - 1	HP inner cylinder, IP cylinder and LP cylinder(s) shall be horizontally split as per standard practice of Turbine manufacturer	It is clarified that HP Inner Casing shall be vertically split.	In clause 2.1.1 of Ch-2 at Sheet 3 of 87, Vol-III, the word "horizontally" be read as "horizontally / vertically".
2	Vol - III	Ch- 2	TG & Auxs.	3 of 87	2.1 - 2	removable type steam strainers for start up and normal operation upstream of emergency stop and reheat stop valves	Steam strainers are integral with main steam emergency stop and reheat stop valves. Same shall be used for startup as well as for normal operation.	Noted.
3	Vol - III	Ch- 2	TG & Auxs.	4 of 87	2.2 - 4	Steam turbine control fluid and its purification system along with its conditioning system shall be complete with control fluid tank, control fluid pumps with drive motors, strainers, accumulator, control fluid coolers, waste fluid tank, purification equipment.....	Waste fluid tank in the control fluid system is not envisaged.	In clause 2.2.4 of Ch-2 at Sheet 4 of 87, Vol-III, the word "waste fluid tank" be read as "waste fluid tank (if applicable)".
4	Vol - III	Ch- 2	TG & Auxs.	5 of 87	2.2 - 11	… Steam throw off devices for HP-LP Bypass system,..	Dump tube is envisaged for LP Bypass system.	Noted.
5	Vol - III	Ch- 2	TG & Auxs.	6 of 87	2.2 - 15	The Pressure relief diaphragms shall be designed for the maximum possible steam flow.	The Pressure relief diaphragms shall be designed as per OEM guidelines.	Noted.
6	Vol - III	Ch- 2	TG & Auxs.	9 of 87	12.0 - 10	Operating platform around the deaerator, GSC, flash tanks, lube oil / control oil tanks	Platform around Control Fluid tank is not required and not envisaged.	In clause 12.0.10 of Ch-2 at Sheet 9 of 87, Vol-III, the word "control oil tanks" be read as "control oil tanks (if applicable)".
7	Vol - III	Ch- 2	TG & Auxs.	13 of 87	1.1.6-2	(a) Bidder shall indicate the turbine over pressurisation (under VWO) possible and ensure corresponding continuous output of TG set (if applicable).	The Steam Turbines are designed to accept short term fluctuation in main steam pressure as stipulated in IEC – 45. Sustained overpressure operation is not envisaged as per IEC-45. This is also as per Bidder's standard proven practice.	Noted, however latest edition of IEC45 shall be followed for Design parameters.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
8	Vol - III	Ch- 2	TG & Auxs.	13 of 87	1.1.6-2	(b) Turbine shall be capable of accepting variation in steam temperature and pressure as per IEC 45 in case continuous over pressure operation is possible .	The average steam temperature at any inlet to the turbine over any 12 months of operation shall not exceed the rated temperature. In maintaining this average, Allowable Temperature Variation shall be as under : + 4 °C duration not limited (*) + 10 °C for a maximum of 400 hrs / annum (*) + 24 °C for a maximum of 80 hrs / annum, single event limited to 15 min (*) In no case the temperature shall exceed the rated temperature by more than 24 K. (*) subject to that average steam temperature over any 12 months of operation is not exceeded the rated temperature for Main Steam & Reheat Steam.	Noted, however latest edition of IEC45 shall be followed for Design parameters.
9	Vol - III	Ch- 2	TG & Auxs.	14 of 87	1.1.6.1	Ramp rate : Minimum ± 3% per minute above 30 % load (under sliding pressure operation) Minimum ± 5% per minute (50% to 100% load) (under Constant pressure operation)	As per CEA Gazette of 25.01.23 the ramp rate shall be as under: (i) Above 70% Load : @ 3% per min. (ii) 55% to 70% Load : @ 2% per min. (iii) 40% to 55% Load : @ 1% per min	In clause 1.1.6.1 of Ch-2 at Sheet 14 of 87, Vol-III, Ramp Rate mentioned in second and third row of table shall be reread as per CEA Gazette notification dated 25.01.2023 as under: (i) Above 70% Load : @ 3% per min. (ii) 55% to 70% Load : @ 2% per min. (iii) 40% to 55% Load : @ 1% per min
10	Vol - III	Ch-2 & 3	TG & Auxs.	2 of 4 33 of 87	3.5 1.22 (a)	The plant shall be designed to operate as a base load station. However, continuous operation under two shift and cyclic modes during certain periods is also envisaged. The steam turbine Generator set apart from being capable of operation on base load shall also be suitable for two shift operation and cyclic load variations as the unit is expected to operate in automatic load frequency control system.	We understand that the plant shall be designed to operate as a base load station and the unit is expected to respond to automatic load frequency control. Regular load cycling is not envisaged.	Plant shall be capable of flexible load operation as per latest CEA Gazette Notification dated 25.01.2023 .
11	Vol - III	Ch- 2	TG & Auxs.	15 of 87	1.2	The steam turbine shall be built up using materials which are proven for rated turbine inlet steam parameters.	The steam turbine shall be built up using materials which are proven for rated turbine inlet steam temperature.	Bid specifications to be followed.
12	Vol - III	Ch- 2	TG & Auxs.	17 of 87	1.5 (d)	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.	Bid specifications to be followed.
13	Vol - III	Ch- 2	TG & Auxs.	17 of 87	1.5 (e)	Critical speed of composite rotor and blade assembly shall not be within ±15% of the operating speed.	OEM's in house guidelines specify a margin of +/- 10 % of rated speed. Positive feedback from plants confirms this design approach.	Bid specifications to be followed.
14	Vol - III	Ch- 2	TG & Auxs.	18 of 87	1.5 (f)	Turbine assembly radial seal clearances at rotor blade tip and interstage area shall not be less than 0.8 mm.	Turbine radial seal clearances at rotor blade tip and interstage area shall be as per design guideline.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
15	Vol - III	Ch- 2	TG & Auxs.	18 of 87	1.6 (g)	Ensure independent tuning of at least 3 stages of LPT blades to avoid resonance frequency	The independent tuning of only free standing LPT blades are carried out. LPT blades are designed that there is no frequency in the operating frequency range of 47.5 Hz. to 51.5 Hz.	Noted.
16	Vol - III	Ch- 2	TG & Auxs.	19 of 87	1.9 (d)	Turning Gear: Provide instrumentation and control for local & remote operation (from Unit control room).	Turning Gear: Local operation is not envisaged since the operation concept for the whole turbine is based on remote operation	Noted.
17	Vol - III	Ch- 2	TG & Auxs.	21 of 87	1.11.1 (f)	Provide Temporary and Permanent steam strainers for Emergency stop and Reheat stop valves. In case there is no provision for temporary strainers, one set of strainers 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 (V-II/Ch-1, Cl 2.1). 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.	Bid specifications to be followed.
18	Vol - III	Ch- 2	TG & Auxs.	22 of 87	1.11.1 (n)	*Steam Admission Valves (Emergency Stop & Control Valves, Reheat Stop Valves & Control valves:* Equipped with auxiliary contacts and limit switches for control interlocks and signaling. Additionally position transmitter shall be provided on control valves for remote indication and control.	Position transmitters will be used instead of switches. Indication will be in the HMI of the TCS and in the DCS.	Noted.
19	Vol - III	Ch- 2	TG & Auxs.	22 of 87	1.11.1 (o)	*Steam Admission Valves (Emergency Stop & Control Valves, Reheat Stop Valves & Control valves:* Each valve shall be provided with two additional normally open (NO) potential free direct limit switch contacts in the valve closed position for the use by the owner.	Position Transmitters will be provided, signals can be transferred via the OPC link	Noted.
20	Vol - III	Ch- 2	TG & Auxs.	22 of 87	1.12.1 (b)	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.	Bid specifications to be followed.
21	Vol - III	Ch- 2	TG & Auxs.	22 of 87	1.12.1 (e)	Non Return Valves: Each valve shall be provided with two sets of limit switches for both open and 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.	In clause 1.12.1 (e) of Ch-2 at Sheet 22 of 87, Vol-III, the word "limit switches" be read as "limit switches or Position Transmitter".
22	Vol - III	Ch- 2	TG & Auxs.	22 of 87	1.12.1 (f)	Requirements indicated in the Tender drawings are minimum. However, based on TSR analysis to be carried out by the successful Bidder, any additional requirements shall be met by him.	We understand that requirements indicated in Tender drawings are only indicative and not binding.	Bid specifications to be followed.
23	Vol - III	Ch- 2	TG & Auxs.	23 of 87	1.13	Insulation: The insulated portion of Steam Turbine shall be covered with fabricate steel cover, provided with suitable anti-drumming and sound pressure attenuating material inside.	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.	Noted, however noise level will be limited to 90dB(A).

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
24	Vol - III	Ch- 2	TG & Auxs.	24 of 87 4 of 87	1.14.1 2.2-5	The Steam turbine generator unit shall be equipped with an electro-hydraulic governing system. Steam turbine governing and protection system shall be complete with electro hydraulic governor with suitable backup as per standard practice of manufacturer, electro hydraulic converter, hydraulic converter, tracking devices, *hydraulic speed governor* , ...	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.
25	Vol - III	Ch- 2	TG & Auxs.	24 of 87	1.14.1 (iii)	Adjustable steady state speed regulation shall be provided between +3% to +8% of rated speed.	The droop will be adjusted during commissioning (normal value 5%) and cannot be changed by operators during normal operation	Bid specifications to be followed.
26	Vol - III	Ch- 2	TG & Auxs.	24 of 87	1.14.1 (v)	Speed changer : 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 synchronising 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.
27	Vol - III	Ch- 2	TG & Auxs.	25 of 87	1.14.1 (vi)	Load limiting Device The governing system shall be equipped with a load limiting device capable of being operated both locally as well as remotedly from unit control room ..	Load limiting function is realised in electronic governing system. Local operation is not included since the operation concept for the whole turbine is based on remote operation.	Noted.
28	Vol - III	Ch- 2	TG & Auxs.	25 of 87	1.15 (a)	Emergency Governor Bidder shall provide separately actuated over speed device called emergency governor to trip the Unit at 110% of rated speed in case speed governor fails to limit the turbine overspeed.	The turbine speed control is implemented in the steam turbine controller to prevent overspeed trip. Parallel overspeed protection itself is also implemented in the overspeed protection system. 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.	Bid specifications to be followed.
29	Vol - III	Ch- 2	TG & Auxs.	25 of 87	1.15 (b)	Bidder shall provide emergency hand trip device on Governor pedestal to facilitate manual tripping of the unit along with facility to trip turbine from UCB.	Emergency push button is provided in HPSU. There is also provision of tripping from Control Room. Local panel is not applicable. Local trip push buttons for manual tripping will be provided.	Noted.
30	Vol - III	Ch- 2	TG & Auxs.	25 of 87	1.16 (a)	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.
31	Vol - III	Ch- 2	TG & Auxs.	26 of 87	1.16 (a)	Vacuum Breaker: Provision shall be made for remote operation and manual (both) of vacuum breaker.	Provision shall be for remote operation of vacuum breaker as per Collaborator's standard practice.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
32	Vol - III	Ch- 2	TG & Auxs.	26 of 87	1.18 (a)-1	*Turbine Lube Oil System :* In case of complete power failure including DC supply, Turbine Generator set shall be capable of safe coasting down.	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 the specification & collaborator's standard practice. It is suggested to detele this clause.	Noted, however out of 2x100% AC Motor Driven Main Oil Pumps, one pump shall be connected to the normal cum emergency Bus (DG Set) to cater to the turbine lubrication requirements during safe coasting down of the machine in emergency.
33	Vol - III	Ch- 2	TG & Auxs.	27 of 87	1.18 (a)-9	One AC motor driven emergency oil pump with sufficient capacity for meeting lube oil requirement of bearings during emergency with automatic starting on low lube oil pressure preset value.	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 the specification & collaborator's standard practice.	Noted.
34	Vol - III	Ch- 2	TG & Auxs.	27 of 87	1.18 (a)-10	In addition to local pressure gauge, pressure transducers shall be provided for monitoring jacking oil pressure in each bearing.	For monitoring jacking oil pressure, pressure gauge & pressure transducer is provided in the common header line.	Noted.
35	Vol - III	Ch- 2	TG & Auxs.	29 of 87	1.18 (a)-10	All the piping, fittings, valves, Main Oil Tank and complete strainer including body & element shall be of stainless steel.	All piping, valves, fittings, strainer of lube oil system shall be of stainless steel. Rest items such as bearing housing,bearing pedestal, main oil tank, oil pumps, filter housing etc. of lube oil system shall be of compatible material (carbon steel) as per bidder's proven practice.	Clause 1.18 (a) (10) of Ch-2 at Sheet 29 of 87, Vol-III be rearead as under:- "Main Oil Tank shall be of Carbon Steel/Stainless steel and All the other piping, fittings, valves and complete strainer including body & element shall be of stainless steel".
36	Vol - III	Ch- 2	TG & Auxs.	28 & 4 & of 87	2.2 - 3 1.18 (b) -9	Turbine Lube oil purification System for MOT must have series of filters for maintain the NAS Value as defined by Turbine OEM along with Online NAS counter hooked to DCS with De-hydration System.	Such provisions of online NAS counter hooked to DCS are not envisaged. However Lube oil purity level is maintained through the oil centrifuge.	Noted.
37	Vol - III	Ch- 2	TG & Auxs.	30 & 4 & of 87	2.2 - 4 1.19	Turbine Governing oil purification System for Control Fluid Tank must have series of filters… NAS control filters, TAN Control filters with De-hydration System. NAS counter shall be hooked to DCS.	Such provisions of online NAS / TAN counter hooked to DCS are not envisaged. However purification system is provided in the HPSU for turbine control fluid.	Noted.
38	Vol - III	Ch- 2	TG & Auxs.	29 & of 87	1.19 (a)-4	Ensure surfaces of reservoir in contact with fluid to be stainless steel, with 2x100% vapour extraction fans (if required) alongwith access ladders, platforms railings and manholes with covers on reservoir etc.	Access ladder, platform for control fluid tank is not required and not envisaged	Noted.
39	Vol - III	Ch- 2	TG & Auxs.	33 & 5 of 87	1.21 2.2-5	Turbine drain valve / HP Turbine dump valve ball type valves with Zero passing & Zero bubble leakage as per rated class with pneumatic actuator along manual hand wheel.	For Turbine Drain Valve: Bidder's standard product i.e. Motorised Ange Drain valves, as per relevant ANSI standards shall be offered in place of Ball Valves for Turbine Drain System. For manual override, provision of handwheel is available in these valves.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
40	Vol - III	Ch- 2	TG & Auxs.	33 of 87	1.21	Turbine drain valves upstream & downstream temperature shall be provided in DCS.	Angle drain Valves are extremely leak tight to ensure no passing of steam & these have been working satisfactorily in many past projects also. Hence, as per standard practices, these elements are not envisaged in u/s & d/s of these valves.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
41	Vol - III	Ch- 2	TG & Auxs.	37 of 87	1.23.5	Furnish thermal kit data for plant performance by DDCMIS and true copies of Performance Guarantee test reports for sets rated for 800 MW or above.	TG-PG test report shall be generated as per standard format and will be submitted after TG-PG test.	Bid specifications to be followed.
42	Vol - III	Ch- 2	TG & Auxs.	37 of 87	1.23.6	Furnish turbine clearance diagram indicating values for radial & axial clearances and leakage rate at EMCR & under worst operating conditions	Submission of such data is not envisaged	Bid specifications to be followed.
43	Vol - III	Ch- 2	TG & Auxs.	37 of 87	1.24	Type Test of Metallic expansion bellows	Type Test of Metallic expansion bellows are not envisaged	Valid Type Test reports are also acceptable.
44	Vol - III	Ch- 2	TG & Auxs.	72 of 87	11	Noise level of Steam Turbine Generator	It is clarified that Noise level of Steam Turbine Generator shall be within 90 dBA	Noted, however noise level shall be less than 90 db (A)
45	Vol - III	Ch- 2	TG & Auxs.	72 of 87	13.2	Complete technical data including criteria for thermal stresses, cyclic loading, thermal fatigue, together with values of thermal stresses at critical locations shall be furnished to establish the suitability of design for cyclic and two shift operation.	It is clarified that the machine shall be designed for meeting the specification requirement. However, these internal design properietory information shall not be furnished.	Noted.
46	Vol - II	Part-B				Steam Turbine Data Sheet	Technical data of Steam Turbine required for operation, maintenance and information purpose shall only be furnished. Data / information which are proprietary in nature, shall not be furnished.	Noted.
47	Vol - II	Ch-8		16 of 57	3.5	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, the amount shall be decided by the Owner.	Correction Curves shall be generated after approval of Heat Balance Diagrams and shall be submitted for approval and inclusion in TG-PG test procedure.	Noted.
48	Vol - II	Ch-8		53 of 57	6.3	Corrections to the test results for steam turbine shall be applied as per the correction curves listed in detailed technical specification. When the system is properly isolated for a performance test, the unaccounted for leakages should not be more than 0.1% of the design throttle flow at that load. To achieve the above value of unaccounted for leakages, the Bidder shall prepare the unit during pretest available shutdown. However, during the test, if it is found that the unaccounted for leakage is more than 0.1% of design throttle flow at that load, then heat rate will be increased by an amount equal to half the difference between actual unaccounted for leakage expressed as percentage of design throttle flow at that load and 0.1% (allowed by the code).	"When the system is properly isolated for a perfor-mance test, the unaccounted for the leakage shall not exceed 0.3% of test throttle flow at that Load." "However, during the test, if it is found that the unaccounted for leakage is more than 0.3% of design throt-tle flow at that load, then heat rate will be increased by an amount equal to half the difference between actual unaccounted for leakage expressed as percentage of design throttle at that load and 0.3% ".	Bid specifications to be followed.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
49	Vol - II	Ch-8		53 of 57	6.4	The performance guarantee test will be carried out after successful completion of initial operation. Ageing allowance (beyond three months from the date of completion of initial operation) will be giv-en during evaluation of PG test results and hence guaranteed heat rates shall be increased by the amount calculated as per the formu-la 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.	Aging is a physical phenomenon and once steam en-ters into the cycle the aging of the components start. This is irrespective of whether the machine is in opera-tion or not. Hence the aging period will be considered from the date of first synchronization to the conduct-ance of PG test without any exclusion. Hence last para to be deleted.	Bid specifications to be followed.
50	Vol - II	Ch-2		37 of 87	1.23.3	Correction Curves : e) Variation in power factor, frequency, generator hydrogen pres-sure and voltage.	Hydrogen pressure is maintained constant during operation to ensure operational safety of generator. Hence the correction for generator hydrogen pressure is not applicable.	Bid specifications to be followed.
51	Vol - II	Ch-8		52 of 57	6.2	All the instruments including the flow nozzle shall be calibrated by the contractor before and after the test, in a reputed international institute as approved by the Employer. However, post test calibration of flow nozzle shall not be mandatory	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. In case Post test calibration is insisted upon and delay in submission of report is acceptable, then Post Test Calibration of all the instruments (excluding flow nozzle as per specification), which are affecting the calculation of results (Heat rate) shall be carried out by Bidder.	Noted.
52	Vol IV	Ch - 2		3 of 43 14 of 43	2.03.00 (6) 2.06.00 (4)	Gas Drier Two full capacity Desicant Hydrogen gas driers with on line dew point monitoring system. Driers: Desiccant type with in-situ reactivation facility shall be provided. However, 'bidders' standard and proven system of generator drying arrangement during long shutdown is also acceptable.	2x100% duty refrigeration gas driers shall be supplied to maintain the H2 inside the machine dry with 3-5 deg.C dew point.	Noted.
53	Vol IV	Ch - 2		6 of 43	2.05.00 (3 d)	Fastening elements used in generator shall be non-magnetic & shall be used with proper locking arrangement.	Fastening elements used in generator shall be magnetic/ non-magnetic as per our standard design.	Noted, however bidder to provide details and past performance during detailed engineering.
54	Vol IV	Ch - 2		7 of 43	2.05.00 (5 e)	The terminal connector shall be suitable for termination of at least thirty-two (32) numbers of braided flexible per phase.	The terminal connector shall be suitable for termination of at least twenty four (24) numbers of braided flexible per phase as per our standard design.	Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
55	Vol IV	Ch - 2		8 of 43	2.05.00 (8b)	Locking nuts/snap rings: High strength non-magnetic alloy steel forging shall be provided on the retaining rings to prevent any axial movement.	Snap ring shall be of structural (magnetic) steel material as per our proven and standard design.	Noted, however bidder to provide details and past performance during detailed engineering.
56	Vol IV	Ch - 2		10 of 43	2.05.00 (12A)	Detectors for monitoring water temperature of each winding bar in case of water cooled machine.	For online water temperature monitoring of individual stator winding bars, 1 simplex RTD per bar is provided.	Noted, however bidder to provide details and past performance during detailed engineering.
57	Vol IV	Ch - 2		12 of 43	2.05.00 (16) - 7	Generator and exciter will be provided with sufficient space heater along with necessary interlocking such that heaters get automatically switch on and off when generator is off and on.	Generator & exciter shall be provided with dehumidifiers, which will work when unit will be in shutdown condition. Provision of space heaters is not envisaged, as such.	Noted, however bidder to provide details and past performance during detailed engineering.
58	Vol IV	Ch - 2		14 of 43	2.06.00 (5)	Three-way valve used along with the drier for interconnecting the hydrogen and air line (as applicable) shall preferably have mechanical interlocking such that closing of the hydrogen side port is positively ensured before opening of the air side port.	Three way valve is not applicable for Refrigeration type gas driers, hence not provided.	Noted.
59	Vol IV	Ch - 2		15 of 43	2.06.00 (8)	Alarms in TG MMI and annunciation contacts for … Hydrogen leakage into cooling water	As per our standard design, H2 Flow Transmitter at the discharge manifold into cooling water is not envisaged. Hydrogen leakage into cooling water will reflect an increase in pressure in PW tank. High pressure alarm shall be provided at PW tank, as it indicates hydrogen leaking into stator water system.	Noted.
60	Vol IV	Ch - 2		15 of 43	2.06.00 (9)	Similar as detailed above under clause "Gas Analyzer" shall be provided for supervision of the gas purging operation.	The portable Gas Analyzer shall only detect the percentage of Hydrogen by volume or by ppm as per our standard & proven design suiting the system requirements.	Bid specifications to be followed, however, Sr No. 31 (Portable Hydrogen Purity Meter) of clause no.35.03.00 at page 25 of 31 of Chapter 35 of Vol.IV is deleted.
61	Vol IV	Ch - 2		15 of 43	2.06.00 (10)	H2 Flow Transmitter at the discharge manifold to access the quantity of makeup	Generator Hydrogen leakage shall be approx. 18 m3/day. No. of cylinders shall be provided considering hydrogen leakage of 18 m3/day.	Noted
62	Vol IV	Ch - 2		18 of 43	2.07.00 (k)	Pressure gauges and switches shall be provided at least at the following locations: a. At the inlet and outlet of pumps d. At the oil supply header	The instrumentation in seal oil system shall be as per our standard & proven design suiting the system requirements of seal oil system as detailed below. a. Pressure gauge and switches are not provided at inlet of pumps. However, at outlet of each pump, pressure gauge and pressure transmitter is provided. d. Generator seal oil system is a closed loop system. Oil supply header is not applicable for the offered single flow seal oil system.	Noted

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
63	Vol IV	Ch - 2		18 of 43	2.08.00 (2)	The following minimum instrumentation shall be provided (Stator Water Cooling System) …….	The instrumentation in primary water (Stator cooing water) system shall be provided as per our standard & proven design suiting the system requirements are per below details: Flow transmitters are provided at outlet of stator winding and bushings are hydrogen cooled. Differential pressure transmitter is provided across each filter and pressure gauge is provided at inlet of filter. RTDs are provided before and after generator winding and PW coolers. Bushings are hydrogen cooled. RTD is provided at inlet of coolers and Temperature gauge is provided at outlet of coolers. Level transmitter and level gauge is provided at primary water tank. Further, pH and dissolved oxygen monitoring are not required as per our standard system design hence not envisaged. The stator water system is with alkaline pH, which ensures corrosion free operation. The water quality is monitored by online measurement of conductivity of stator water, which is an indirect indication of pH value of stator water.	Following changes are made in clause 2.08.00 against S.No.-2 of Ch-2 at Sheet 20/21of 43, Vol-IV:- a) In sub clause ii), the word "bushing" be read as "bushing (as applicable)" b) Sub Clause iii) be reread as "Sets of Pressure gauges at the inlet and differential pressure gauge across filter, pressure gauges at the inlet and differential pressure gauge across stator winding, differential pressure switches and pressure transmitters for the filters and stator winding as required." c) In sub clause iv), the word "bushing" be read as "bushing (as applicable)" and its last line stands deleted. d) In sub clause v), the word "& Temperature Element" stands deleted. e) In sub clause vi), the word "level transmitters" be read as "trannsmitters" and "level switches" is deleted. f) Sub clauses vii) & viii) stands deleted.
64	Vol IV	Ch - 2		22 of 43	2.08.00 (6)	Online monitoring system for water quality a) pH monitoring, b) conductivity monitoring	pH and dissolved oxygen monitoring are not required as per our standard system design hence not envisaged. The water quality is monitored by online measurement of conductivity of stator water, which is an indirect indication of pH value of stator water.	Noted, however bidder shall provide details and past performance of the system during detailed engineering.
65	Vol IV	Ch - 2		27 of 43	2.09.06 (i)-j)	Online shaft leakage current / voltage monitoring device.	Provision of earth fault monitoring system is provided.	Noted
66	Vol IV	Ch - 2		29 of 43	2.09.00 (vi)-iv)	Instruments and devices for the measurement of rotor winding temperature.	Instruments and devices for the measurement of generator rotor winding temperature only.	Noted
67	Vol IV	Ch - 2		33 of 43	2.11.04 (i)a) & b)	Brushless excitation system: Type test for which type test reports need to be submitted: (a) Exciter: Temperature rise test at peak rating of excitation system. Considering the test bed constraint, temperature rise test for exciter shall be conducted at 100% of rated excitation. Ceiling duty condition shall also be demonstrated (b) Permanent Magnet Generator Temperature rise test at peak rating of excitation system. Ceiling duty condition shall also be demonstrated (subject to test bed constraint).	Considering the test bed constraints, temperature rise test for exciter shall be conducted at 100% of rated excitation. Ceiling duty condition shall not be demonstrated.	Bid specifications to be followed, however bidder shall demonstrate the Ceiling duty condition at shop or site. In case same is not demonstrated at site or shop bidder shall demonstrate the ceiling duty conditions through design calcultions.
68	Vol IV	Ch - 2		42 of 43	Data Sheet of Generator 5.1.4.2	Degree of protection of PMG enclosure: IP-54	The exciter is an air cooled machine placed in the TG deck. In view of the same, degree of protection of enclosure for Exciter shall be IP: 40. This is as per our standard and proven design of Brushless Exciter.	Noted
69	Vol IV	Ch - 2		43 of 43	Data Sheet of Generator 8.1	The type tests which are specifically asked in this specification are also to be carried out by the bidder. For the balance type tests, the bidder shall submit valid type test certificate where test have been conducted within last five years from date of bid opening.	Type test certificate of earlier similar tested generator shall not be more than ten years from date of bid opening.	Validity of Type Test certificates shall be as per latest guidelines of CEA.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
70	Vol IV	Ch - 2		43 of 43	Data Sheet of Generator 8.2	Running trials shall be conducted in the shop with the generator, exciter and AVR connected up and combined as a unit ''*" on the test bed	AVR, Exciter & generator are manufactured at different geographical locations of BHEL. Hence it is not possible to conduct running trials in shop with the generator, exciter and AVR connected up and combined as a unit considering test bed and location constraints. Running trials shall be conducted in the shop with the generator, exciter and AVR connected up and combined as a unit will be demonstrated at site.	Noted, Tests for individual equipments shall be carried out at vendor's / sub-vendor's shop and tests for combined unit shall be performed at site.
71	Vol-II	Chapter – 11		26 of 103	2.3.10 b) 4)	An over speed test shall be carried out during which the rotor shall withstand an over speed of 120% for five continuous minutes.	Over speed test of Generator rotor shall be carried out at 120% of rated speed for 2 minutes as per IEC 60034.	Test shall be conducted as per latest IEC standard.
72	Vol-II	Ch.11/ Section - M10		Sheet 72 of 103	-	Attributes/ Characteristics of cathodic protection items	It is understod that cathodic protection for pipes is not envisaged for this project. Please confirm.	Confirmed.
73	Vol - III	Ch - 2		28 of 87	1.18 (c)	Turbine lube oil system must have duplex filter with manual isolation valve.	No Isolation Valve is not envisaged	Noted.
74	Vol -V	Ch - 4		12 of 19	4.15.01 2 f)	Axial shift of the rotor, (minimum four sensors).	There is no additional provision for mounting of 4th Axial Shift Sensor in existing bracket (only 3 sensors can be mounted) as per OEM design.	Noted.
75	Vol -V	Ch - 4		12 of 19	4.15.01 2 f)	(c) Differential expansion of rotor and cylinder for HPT, IPT and LPT. (d) Overall expansion of HPT and IPT.	No expansion measurement in IPT	Noted.
Annexure-35								
1	II	9	Mandatory Spares /Protection system for Generator, GT, UT, ST & Synchronisation Scheme	Pg 67	1	Generator Integrated Protection relay (G1)		Separate relay to be provided
					2	Generator 100% stator earth fault relay (64G)	Built-in part of relay at Sl no. 1, hence separate relay is not required, Please confirm.	Separate relay to be provided
					3	Generator out of step protection relay (78 G)		Separate relay not required if Built-in part of relay at Sl no. 1,
					4	Generator back up Impedance relay (If not covered in Generator Integrated protection relay (21G)		Separate relay to be provided
					5	Generator rotor earth fault relay (64 F)		Separate relay not required if Built-in part of relay at Sl no. 1,
					8	Generator Transformer V/H protection relay (61 G)		Separate relay not required if Built-in part of relay at Sl no. 1,

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
					9	Synchronising check relay (25)	Built-in part of relay at Sl no. 1, if separate relay is required else it will be part of C& I system, please confirm.	Separate relay to be provided.
2	II	9	Mandatory Spares /Protection system for Generator, GT, UT, ST & Synchronisation Scheme	Pg 68	11	Generator transformer H.V. side restricted e/f relay (64 GT)	Built-in part of Sl no. 10 above, hence separate relay is not required, Please confirm.	Confirmed.
					12	Generator transformer H.V. side back up IDMT relay (51 NGT)	Built-in part of Sl no. 6 above, hence separate relay is not required, Please confirm.	Confirmed.
					13	Generator transformer H.V. side back up over current relay (51 GT)	Built-in part of Sl no. 10 above, hence separate relay is not required, Please confirm.	Confirmed.
					15	Unit transformer H.V. side over current relay with high set unit.	Built-in part of SL no 14 above, hence separate relay is not required, Please confirm.	Confirmed.
					16	Local breaker back up protection relay For Generator transformer breaker	Built-in busbar protection relay as per tender specification, Please confirm	Confirmed.
					17	Under voltage relays to be used in loss of excitation scheme (27 G) (If not provided in Generator integrated protection relay G1)	Built-in part of relay at Sl no. 1, hence separate relay is not required, Please confirm.	Confirmed.
					18	Pole discrepancy relay		Confirmed.
					21	Timer used in the scheme each type	Not applicable as timers are built-in part of numerical relays, Please confirm.	confirmed
3	II	9	Mandatory Spares	Pg 78	SAS Including GRPs	Additional requirement:-		
						c. Numerical Relays comprising GRP - One (1) No. of each type	If this is applicable then spares covered above under head "PROTECTION SYSTEM FOR GENERATOR, GT, UT, ST and SYNCHRONISING SCHEME" are not applicable. Please confirm	Relays which are not covered under head "PROTECTION SYSTEM FOR GENERATOR, GT, UT, ST and SYNCHRONISING SCHEME" but provided in GRP panel, shall be provided as spare (one of each type).
						d. Switchgear control unit - two (2) no of each.	Not required as per tender specificaiton, please confirm.	Confirmed
						e. Merging unit – two (2) no of each type.		Confirmed
4	II	9	Mandatory Spares /Fire detection AND Protection system	Pg 34	6.2	Nozzles of water monitors	Nozzles of water monitors are not applicable under the heading of "BRANCH PIPES WITH NOZZLES". Hence same is not considered.	Noted.
					10.3	Spot /Heat detectors(for boiler burner front area and Battery room)	QBD Shall be provided for boiler burner front and the same is considered in Sl.no 10.2,hence not needed here. Heat detectors shall be given for battery rooms	Noted.
					11.4	Water monitor sets with nozzle branch pipe etc.	Branch Pipe in water monitor is not applicable Only Water monitor set shall be provided.	Noted.
5	II	9	Mandatory Spares /Fire detection AND Protection system	Pg 35	12.1	Photo-electric type detector(Addressable)	Multisensor Detectors shall be provided	Noted.
					12.2	Ionisation type detectors(Addressable)		Noted.

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
6	II	9	Mandatory Spares /FIRE ALARM CONTROL/ANNUNCIATION PANELS (Addressable)	Pg 35				
					16.1	Fuses	Not applicable as per System offered	Noted.
					16.2	Indicating lamps		Noted.
					16.3	Lamp holders		Noted.
					16.4	Push Buttons		Noted.
					16.5	Selector Control Switches		Noted.
					16.6	Auxiliary relays/Contractors		Noted.
					16.7	Annunciation window lamps		Noted.
					16.8	Control cards for annunciation facia, fire detection system, gas extinguishing etc of each type		Noted.
					16.9	All PCB assmebly cards, loop cards in cluding mother boards etc		Noted.
					16.10	LCD display units of panels		Noted.
					16.11	Interface units/ modules for noon-addressable devices, output relay modules, supervisory control modules etc		Noted.
					16.12	LED's if applicable		Noted.
7	II	9	Mandatory Spares /FIELD DEVICES	Pg 36	17.2	Temprature gauges	Temperature gauge not applicable in Main Items of FDPS. Hence same is not considered.	Bidders to comply as per tender specifications. The issue can be disccused during detailed Engineering.
8	II	9	Mandatory Spares	Pg 25	L	DUST SUPRESSION, SERVICE WATER, POTABLE WATER, COOLING WATER	Mandatory spares for Dust extraction system is separately listed at Serial No M at page 26 of 103. Hence Mandatory spares for the same will be considered as per Serial No M only. Please confirm.	Confirmed
						(for hydraulic coupling or any other purpose), Dust		
						Extraction System		
9	II	9	Mandatory Spares/ ASH HANDLING SYSTEM	Pg 44	5.a)	Pipe line fittings	Customer to confirm Whether it is 5% per size and type or only size	It shall be 5% per size and type
				Pg 45	6. b)	Valve flaps/slides	Type of Ash extraction valves shall be per AHP vendor's design. Total qty 15 Nos which includes all required sizes. Customer to kindly confirm.	15 No. of each type and design
				Pg 45	13	Ash inlet valves	Ash inlet valves at sl.no.13 at page 45 and ash extraction valves at sl.no. 6 at page 45 are same. Which one to be followed. Customer to kindly confirm.	S.No. 13 at Sheet 45 of 103 (Chapter-9) in Vol-II be read as "Air inlet valves" instead of ''Ash inlet valves"
10	II	9	Mandatory Spares/ ASH HANDLING SYSTEM	Pg 47	25	Bearings of each type and size for following motors and pumps	Mandatory spares at Sl. No. 19 e&f for Mechanical exhauster are same as these vacuum pumps. Which one to be followed. Customer to confirm. Mandatory spares at Sl. No. 23 C for ash disposal pumps are same. Which one to be followed. Customer to confirm.	S.No. 19 (e) & 19 (f) at Sheet 47 of 103 in Ch-9, Vol-II stands deleted. Requirement of bearings of each type and size of Ash Disposal Pump (3 Sets) and Ash Disposal Pump Motor (3 sets) mentioned at S.No. 25 at Sheet 47 of 103, Ch-9, Vol-II also stands deleted.
						Ø Vacuum pumps		

SL No.	Vol	Chapter/ Section	Title	Page	Clause	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
						Ø Vacuum pump Motor		
						Ø Ash disposal pump		
						Ø Ash disposal pump motor		
11	II	9	Mandatory Spares	Pg 57	h)	LIME SAMPLER	We understand that this is primary Lime sampler, please confirm.	Confirmed.
12	II	9	Mandatory Spares/ DIESEL GENERATORS	pg 74	Alternator	1) sets of carbon brushes for Generator, and self-starter motor	NOT APPLICABLE AS PER OFFERED SYSTEM	Spares as applicable for the offered system to be supplied.
						3) set of instruments of each range		
						4) set of relays of each type		
						5) set of timers		
						6) sets of indicating light		
						7) sets of fuses of each rating		
						9) set of cubicle illuminating lights		
						10) set of terminal blocks		
					Diesel Engine	12) Bidder shall furnish suitable nozzle tester, barring bar, slings, eyebolts and other special equipment necessary for servicing the engine.		
						21) Voltage transformers		

1 X 800 MW SUPER CRITICAL EXPANSION UNIT DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR							
BIDDING DOCUMENT NO. 03/HPGCL/DCRTPP/EPC/800 MW							
Pre- Bid Queries of L&T and HPGCL Responses							
Sr. No.	**Volume/ Section**	**Chapter / Drawing No.**	**Page no.**	**Clause No.**	**Bid Specification Stipulation**	**Statement of clarification sought**	**HPGCL Response**
1	Volume I	Section – III, BDS	50 of 60	12.2	Adjustment Factors For Bid Evaluation The value of adjustment factors for various parameters shall be as follows: a) Turbine cycle Heat rate b) Steam Generator Efficiency ..... h) Transformer losses	Bidder requests Owner to fix the performance guarantee parameters & should not keep any evaluation loading on the performance parameters. In order to become L1 in the bidding process, some bidders quote very aggressive numbers which are unachievable & thus during operation of the plant these parameters will not be achieved & which will be a permanent loss to Owner. Keeping this aspect in view, NTPC is fixing the values of Performance guarantee parameters in all their recent tenders. Our request is inline with all recent NTPC tenders.	Bid specifications to be followed.
2	Vol-II	Chapter-8 (FG & LD)	1 of 57	2.1 (2.)	The guaranteed performance parameters furnished by the Bidder in his offer, shall be without any tolerance values whatsoever and all margins required for instrument inaccuracies and other uncertainties shall be deemed to have been included in the guaranteed figures.	The performance test will be as per the test conditions, measurement tolerances, uncertainties laid down by latest edition of ASME PTC / HEI etc. Please confirm acceptance.	Bid specifications to be followed.
3	Vol-II	Chapter-8 (FG & LD)	2 of 57	2.1 (9.)	Tools and tackles, thermowells (both screwed and welded) instruments/devices including flow devices, matching flanges, impulse piping & valves etc. and any special equipment, required for the successful completion of the tests, shall be provided by the Bidder **free of cost**.	Tools and tackles, thermowells (both screwed and welded) instruments/devices including flow devices, matching flanges, impulse piping & valves etc. and any special equipment, required for the successful completion of the tests, shall be provided by the Bidder **on returnable basis and shall be taken back after the test**. Please confirm acceptance.	The instruments/ equipment listed in this clause is for conducting PG test and the same shall be supplied by the bidder, on returnable basis.
4	Vol-II	Chapter-8 (FG & LD)	2 of 57	2.1 (10.)	The Performance test shall be carried out as per the agreed procedure. The PG test procedure including demonstration tests shall be submitted within 90 days from the date of letter of intent and finalization of the PG test procedure shall be done within 180 days from the date of Letter of Intent.	Bidder proposes for submission of PG test procedures after finalization of detailed engineering documents. Please confirm acceptance.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
5	Vol-II	Chapter-8 (FG & LD)	4 of 57	3.1 (i), a)	Guarantees Under Category-I : Turbine Cycle heat rate in kcal/kWhr under **rated steam conditions** at **guaranteed condenser pressure** with zero make up at 440 MW unit load (i.e. 55% of rated load).	It is not possible to achieve rated steam pressure at 55% load. Bidder proposes to consider steam pressure of 150 Kg/cm2 (a) at Turbine inlet for 55% TMCR load conditions inline with recent 800 MW tenders. Also condenser pressure at 55% TMCR condition will be usually better than the guaranteed condenser pressure. Bidder proposes to consider actual condenser pressure as derived from the condenser performance curves for the 55% TMCR operating condition. Accordingly Bidder request Owner to modify the clause as below. "Turbine Cycle heat rate in kcal/kWhr under turbine **throttle main steam pressure of 150 Kg/cm2 (abs) and rated Main Steam and Reheat Steam temperature** at **optimized condenser pressure** with zero make up at 440 MW unit load (i.e. 55% of rated load)".	Bidder understanding is correct.
6	Vol-II	Chapter-8 (FG & LD)	4 of 57	3.1 (i & iv)	Guarantees Under Category-I : i) Turbine Cycle Heat Rate iv) Condenser pressure in mm Hg (abs)	Turbine cycle heat rate with optimized condenser pressure is already guaranteed by bidder. Hence in order to avoid double loading, separate guarantee & LD on condenser pressure should be deleted. Please confirm acceptance.	Bid specifications to be followed.
7	Attachment 6(P)	-	-	f	Guaranteed parameters : Condenser pressure in mm Hg (abs) measured at 300 mm above top row of condenser tube at **840 MW unit load**, 1% MU, Design CW inlet temperature & design CW flow as specified elsewhere	There is discrepancy in the condenser pressure guarantee point in the referred clauses. Please clarify which clause to be followed for condenser pressure guarantee.	In Clause no 1.1.2 (viii) of Chapter 2 at Sheet 11 of 87 in Voume III, the figure "32.5 deg C" be read as 33 deg C.
8	Volume-I, Book-1	ATTACHMENT-11	1 of 2	6	Guaranteed Parameters : Condenser Pressure in mm Hg (abs) at rated output of **100% TMCR (800MW)**		
9	Volume III	Ch 2: Turbine Generator & Auxiliaries	11 of 87	1.1.2 (viii)	Condenser design pressure : As optimized by bidder at 1% make-up and 32.50C CW temperature for **VWO condition** but not exceeding 70 mmHg (abs)		
10	Volume II	Ch 8: FG & LD	5 of 57	3.1 iv.	Condenser pressure in mm Hg (abs) : Condenser Pressure in mm Hg (abs) measured at 300mm above the top row of condenser tubes at **800 MW unit Load**, 1% make up, design CW inlet temperature and design CW flow		
11	Volume II	Ch 8: FG & LD	9 of 57	3.2 iii.	For deficiency in Turbine Generator Output of 800 MW (100% rated load) under rated steam conditions, **70 mm Hg (abs) condenser pressure** with 0% makeup.	There is discrepancy in the condenser pressure to be considered for Turbine generator output guarantee case. Bidder understands that 70 mm Hg (abs) is an typographical error & guaranteed condenser pressure to be considered for Turbine generator output guarantee case. Please confirm acceptance.	In second coulmn of S.No. iii) of table under Clause 3.2 of Ch-8 at Sheet 9 of 57 in Vol-II, the words / figures, "70 mm Hg (abs)" be read as "guaranteed".
12	Volume II	Ch 8: FG & LD	5 of 57	3.1 iii.	Turbine Generator Output : Continuous TG output of 800 MW unit load (i.e. 100% of rated load) under rated steam conditions at **guaranteed condenser pressure** with 0% make-up.		

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
13	Volume II	Ch 8: FG & LD	11 of 57	3.2 xi.	Shortfall in Catalyst Life : Rate of Liquidation Damage (LD) : INR 3,1**61,000**/- (INR Three Million **One Hundred One Thousand only**) (or equivalent foreign currency) for every 100 hours shortfall in catalyst life from the guaranteed value	There is discrepancy in the LD value mentioned in Numbers & wordings. Please clarify which one to be followed.	In third coulmn of S.No. xi) of table under Clause 3.2 of Ch-8 at Sheet 11 of 57 in Vol-II, the amount in words be read as "(INR Three Million One Hundred Sixty One Thousand only)".
14	Volume II	Ch 8: FG & LD	14 of 57	NOTE: e)	The LD values and acceptable shortfall limits are applicable except for the value indicated for auxillary power consumption for station auxillaries, which is on station basis.	Since there is single auxiliary power consumption guarantee including unit & station auxiliaries, accordingly bidder requests owner to delete the referred clause as the same is not applicable for this project.	Note (e) at Sheet 14 of 57 of Ch-8 in Vol-II stands deleted.
15	Volume II	Ch 8: FG & LD	16 of 57	3.5 (i)	Corrections Applicable for Turbine Cycle Heat rate & Turbine Generator Output tests Based on cycle condition & covering entire range of operation for Turbine following correction curves for variation in **Turbine Cycle Heat rate & Turbine Generator output (55% & 100%)** to be furnished	For better clarity Bidder requests Owner to modify the referred clause as below. Corrections Applicable for Turbine Cycle Heat rate & Turbine Generator Output tests Based on cycle condition & covering entire range of operation for Turbine following correction curves for variation in Turbine Cycle Heat rate **(55% & 100% TMCR)** & Turbine Generator output **(100% TMCR)** to be furnished	Bid specifications to be followed.
16	Vol. II : PART A Vol. III	CHAPTER - 8 CHAPTER - 2: SECTION – 2 : DESIGN BASIS	16 of 57 37 of 87	3.5 - 2 (ii) 1.23.3	Corrections Applicable for Condenser pressure Guarantee (a) Variation in Ambient Wet Bulb Temperature (WBT). (b) Variation in Ambient Relative Humidity (RH). Following condenser pressure variation curves for main condenser for change in CW inlet temperature, Heat load & quantity in condenser to be furnished (i) Change in CW inlet temperature (ii) Change in CW- quantity.	There is a discrepancy in two different clauses of correction curves for Condenser. Bidder recommends below corrections to determine condenser performance inline with recent tenders of NTPC: 1) Cooling water flow 2) Cooling water inlet temperature 3) Heat load on condenser Please confirm acceptance.	Confirmed
17	Volume II	Ch 8: FG & LD	53 of 57	6.6 (iii)	Guarantee Output test of **840 MW** (105% rated load) corresponding to the heat balance diagram specified in the tender specification	There is discrepancy in the Guarantee Output test operating condition. Bidder understand that Continuous TG output of **800 MW** unit load (i.e. 100% of rated load) to be considered for Turbine generator output guarantee case. Please confirm acceptance.	In clause 6.6 (iii) of Ch-8 at Sheet 53 of 57 in Vol-II, the words / figures, "840 MW (105% rated load)" be read as "800 MW (100% rated load)"
18	Volume II	Ch 8: FG & LD	5 of 57	3.1 iii.	Turbine Generator Output : Continuous TG output of **800 MW unit load** (i.e. 100% of rated load) under rated steam conditions at guaranteed condenser pressure with 0% make-up.		
19	Volume II	Ch 8: FG & LD	53 of 57	6.6 (viii)	During Performance/ Acceptance test, following tests shall be carried out for T.G. set with test grade instruments as per ASME code. Auxiliary power consumption tests at 100% load on the unit/s at rated steam condition, **3% make-up** and designed condenser pressure.	Bidder understands that Auxiliary power consumption tests at 100% load will be done with 0% make-up. Accordingly request Owner to modify the referred clause as below. Auxiliary power consumption tests at 100% load on the unit/s at rated steam condition, ~~3%~~ **0%** make-up and designed condenser pressure.	Clause 6.6 (viii) of Ch-8 at Sheet 54 of 57 in Vol-II stands deleted as it is covered in Clause 3.0 (vii) at Sheet 6 of 57.
20	Vol-II	Chapter-8 (FG & LD)	53 of 57	6.3	Corrections to the test results for steam turbine shall be applied as per the correction curves listed in detailed technical specification. When the system is properly isolated for a performance test, the unaccounted for leakages should not be more than 0.1% of the design throttle flow at that load. To achieve the above value of unaccounted for leakages, the Bidder shall prepare the unit during pretest available shutdown. However, during the test, if it is found that the unaccounted for leakage is more than 0.1% of design throttle flow at that load, then heat rate will be increased by an amount equal to half the difference between actual unaccounted for leakage expressed as percentage of design throttle flow at that load and 0.1% (allowed by the code).	During Performance Test, Make up water will be isolated and the correction for change in system water storage will be applied as unaccounted for leakage. Please confirm acceptance.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
21	Vol-II	Chapter-8 (FG & LD)	22 of 57	3.9.1 (xxi)	Motor Driven Boiler Feed Pump (For this purpose only 15% of the deemed power consumed by the MDBFP at 100% TMCR unit load shall be considered).	For this purpose only 15% of the power consumed by the MDBFP (Main Pump) and MDBP (Booster Pump) at 100%TMCR load as determined during shop test shall be considered. Please confirm acceptance.	Bid specifications to be followed.
22	Vol-II	Chapter-8 (FG & LD)	22 of 57	3.9.1 (ix)	Debris filter flushing pumps (if envisaged)	Bidder understands that Debris filter is not envisaged in tender for this project. Please confirm Bidder's understanding.	Clause 3.9.1 (ix) of Ch-8 at Sheet 22 of 57 in Vol-II stands deleted.

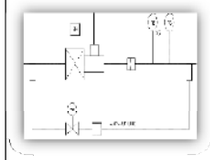
Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
23	Vol-II	Chapter-8 (FG & LD)	23 of 57	3.9.1 (xxxix)	Power consumption of any other continuously operating BOP Packages viz., SCR, FGD, coal handling system, ash handling system, raw water system, water treatment plant, DM Plant, ETP, etc., for unit operation at 100% TMCR.	Request owner to provide clarity to the following points. 1. FGD : List of auxiliaries to be considered for the calculation of guaranteed auxiliary power consumption for FGD package 2. coal handling system, ash handling system, raw water system, water treatment plant, DM Plant, ETP, etc. are already covered under cl.no. 3.9.2 Station auxiliary power consumption. Accordingly request Owner to delete the referred clause from 3.9.1.	1. Following auxiliaries are to be considered for the calculation of guaranteed auxiliary power consumption for FGD package: i. Absorber Recirculation Pump(s) ii. Absorber Oxidation Air Blower(s)/Compressor(s) iii. Absorber Oxidation Tank Agitators iv. Gypsum Bleed Pumps v. Limestone Slurry Pump(s) vi. Process water pump(s) vii. Mist Eliminator Wash Water pump(s)Consumption: viii. Limestone Gravimetric feeder, Wet ball mill and their integral Auxiliaries ix. Vacuum Belt Filter, Vacuum Pump and its integral auxiliaries x. Booster water pump xi. Waste water pump xii. Limestone Slurry Tank Agitators xiii. Filtrate Pump(s) xiv. Belt Filter Wash Water Pump xv. Hydro-cyclone Waste Water Sump Pump and Waste Water Pump xvi. All other continuous running Agitators 2. Clause 3.9.1 (xxxix) be read as below: "Power consumption of any other continuously operating auxiliary for unit operation at 100% TMCR with Design Coal".
24	Vol-II	Chapter-8 (FG & LD)	23 of 57	3.9.1 ((xli)	Air conditioning and ventilation system	Air conditioning and ventilation system is already covered under cl.no. 3.9.2 Station auxiliary power consumption. Accordingly request Owner to delete the referred clause from 3.9.1.	Being single unit, the Unit auxiliary power consumption and Station auxiliary power consumption will be same.
25	Vol-II	Chapter-8 (FG & LD)	28 of 57	3.9.2 (h)	SCR and FGD Packages ☐ All operating equipment, blowers, compressors and pumps. Duty factor: 1.0	SCR & FGD packages are already covered under cl.no. 3.9.1 (xxxix) Unit auxiliary power consumption. Accordingly request Owner to delete the referred clause from 3.9.2.	Clause 3.9.1 (xxxix) be read as below: "Power consumption of any other continuously operating auxiliary for unit operation at 100% TMCR with Design Coal".
26	Vol-II	Chapter-11 (QAP)	47 of 103	14.0 BOILER FEED PUMPS & DRIVE TURBINE	4. Dry running withstand capability shall be demonstrated and established on one Boiler Feed Pump and its corresponding booster pump. Feed pump shall be capable of accepting complete loss of water and must be capable of being shut down in a controlled manner and brought down to rest after being tripped from design condition with simultaneous closure of suction valve. To demonstrate the capability during shop testing, suction valve actuation should be fast in order to ensure operation during vapour phase. Pump shall then be restarted and bring it back to design condition.	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.	Alternatively, Bidder may furnish the latest test reports (not more than 5 years old) and performance report instead of carrying out the demonstration test of BFP.
27	Vol-II	Chapter-11 (QAP)	47 of 103	14.0 BOILER FEED PUMPS & DRIVE TURBINE	6. String Test:- Operational Test of One Motor Driven Boiler Feed Pump assembly using contract Booster Pump, Drive Motor, Hydraulic Coupling and Main Boiler Feed Pump to include test as specified at 1 & 3 (a) & (b). Dry Run Test shall preferably be carried out during String Test.	Bidder requests Owner to delete the String test requirements as per OEM recommendations. Further, all OEMs have confirmed that they do not have the test bed facility to conduct the string test. This has been accepted in all supercritical projects of NTPC & other state electricity board projects. Please confirm acceptance.	Noted.
28	Vol-III	Ch 2: Turbine Generator & Auxiliaries	34, 35 of 87	1.23.1	Heat Balance Diagrams: a) 840 MW VWO output (i.e. 105% TMCR) under rated steam condition at design condenser pressure with zero make up (GUARANTEED POWER OUTPUT). b) 840 MW VWO output (i.e. 105% TMCR) under rated steam condition at design condenser pressure with zero make up (GUARANTEED HEAT RATE) i) VWO output under rated steam conditions at design condenser pressure with 1% makeup. j) **VWO output** under rated steam conditions at worst condenser pressure with 1% make-up l) VWO with over pressurization corresponding to boiler capability at design condenser pressure with 1% make-up (If applicable).	Bidder understands that VWO output in the referred clauses means output corresponding to VWO flow. Please confirm bidders understanding.	In Clause 1.23.1(j) of Chapter-2 at Sheet 35 of 87 of Vol-II, the word "VWO output" be read as "VWO flow".
29	Volume III	Ch 2: Turbine Generator & Auxiliaries	11 of 87	1.1.2 (xii)	Final feed water temp. for Heat Rate guarantee point & EMCR condition : As optimized by bidder but not less than 293 deg.C.	For better clarity bidder request owner to modify the referred clause as below. Final feed water temp. for **100% TMCR** Heat Rate guarantee point & EMCR condition : As optimized by bidder but not less than 293 deg.C.	Please refer S.No.-8 of Clause 15.0 of chapter 2 at Sheet 74 of 87 in Vol- III.
30	Vol-III	Ch 2: Turbine Generator & Auxiliaries	35 of 87	1.23.1	**Heat Balance Diagrams:** u) Steam Generator output corresponding to BMCR flow under rated steam condition, turbine under VWO operation, **worst condenser pressure** with 0% and 1% make up. Difference of BMCR flow and VWO steam flow through turbine shall be assumed to be drawn off from Main steam line. Same quantity of flow is to be added to condenser as additional make up.(GUARANTEED STEAM GENERATOR CAPACITY)	Condenser pressure at BMCR condition will be design condenser pressure instead of worst condenser pressure. Please confirm bidders understanding.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
31	Vol-III	Ch 2: Turbine Generator & Auxiliaries	34 of 87	1.23.1	Heat Balance Diagrams a) 840 MW VWO output (i.e. 105% TMCR) under rated steam condition at design condenser pressure with zero make up (GUARANTEED POWER OUTPUT) b) **840 MW VWO output (i.e. 105% TMCR)** under rated steam condition at design condenser pressure with zero make up **(GUARANTEED HEAT RATE)**	Bidder understand that as per Cl. No. 3.1 of Chapter-8 (FG & LD), these guarantees are not applicable. Owner is requested to amend the clauses accordingly.	In Clause 1.23.1 (a) & (b) of Ch-2 at Sheet 34 of 87 in Vol-III, the words, "GUARANTEED" stands deleted. Further, following new clause is added at 1.23.1 (z) at Sheet 36 of 87 in Vol-III:- "320 MW output (without oil support) under turbine throttle inlet steam conditions corresponding to sliding pressure operation at design condensor pressure 0% & 1% make up."
32	Volume III Mechanical Works	Ch 2: Turbine Generator & Auxiliaries	53 of 87	6.0 (t)	Provide pass partition plates to facilitate easy removal and access to tube sheet.	We understand that Pass partition plates shall be provided with removable bolted cover to facilitate easy access to tubesheet. Please confirm acceptance.	Bid specifications to be followed.
33	Volume III Mechanical Works	Ch 2: Turbine Generator & Auxiliaries	54 of 87	6.1 (a)	LP heater tubes shall be SS seamless (ASTM A-213-TP304).	We request to allow option of using SS welded ASTM A-688-TP304 material of tubes for LP heaters. This has been accepted in past executed supercritical projects of NTPC. Please confirm acceptance.	Last line of Clause 6.1(a) of Chapter-2 at Sheet 54 of 87 in Vol-III be read as "LP heater tubes shall be SA 688 TP304."
34	Vol-III Vol-III	Ch 2: Turbine Generator & Auxiliaries Ch 2: Turbine Generator & Auxiliaries	53 of 87 6 of 87	6.0 3.0	FEED WATER HEATING PLANT i) Tube material stainless steel as per ASTMA 688 Gr.TP304 for welded tubes. Maximum content of carbon shall be limited to 0.05%. FEED WATER HEATING PLANT HP/LP Heaters & GSC Condensate / Feed Water Tube shall be seamless Stainless Steel (ASTM A-213-TP304).	Bidder alternately requests to allow option of using TP304N tubes for feed water heaters. This has been accepted in supercritical projects of NTPC & other state electricity board projects. Please confirm acceptance.	MOC of HP Heater Tubes shall be seamless Stainless Steel (SA 213 TP304 / 304N) and MOC of LP Heater tubes shall be SA 688 TP304.
35	Vol-III	Ch 2: Turbine Generator & Auxiliaries	53 of 87	6.0 FEED WATER HEATING PLANT	Tube sheet material shall be carbon steel as per ASTM. A516 Grade 70 or SA 350 LF-2 and shall be welded to shell and water box. Tube support plates of common quality steel of 16mm (min) thickness	Alternately A266 Gr.2 tube sheet material should be also accepted for LP heaters. Please confirm acceptance.	Bid specifications to be followed.
36	Vol-III	Ch 2: Turbine Generator & Auxiliaries	55 of 87	6.2 Deaerator	(h) All water spray valves, splash plates, trays, vent condenser and other elements in contact with undeaerated water or non-condensable gases shall be of stainless steel SS-304 or SS410.	For STORK type / spray type or equivalent deaerator only the sprayer will be made from Stainless steel as per the OEM standard & proven practice. Please confirm acceptance.	Bid specifications to be followed, however for other elements in contact with undeaerated water or non-condensable gases, SS-304 lining material may also be used.
37	Vol-III	Ch 2: Turbine Generator & Auxiliaries	60 of 87	7.1	**(o) MDBFP lube oil system** Common lubricating oil system for BFP, booster pump, motor and hydraulic coupling complete with shaft driven lube oil pump, 2 x100% AC motor driven auxiliary oil pump, two full capacity each of working oil cooler / lube oil cooler / oil filters / strainers, valves, fittings, instruments etc.	As per proven and standard practice of Bidder and OEM, 1×100% AC motor driven auxiliary oil pump and 1×100% shaft driven oil pump is envisaged for MDBFP. Bidder further proposes to consider 1×100% lube oil cooler, 1×100% working oil cooler, as the MDBFP is a stand-by equipment. Also, Bidder would like to highlight that this is the standard configuration offered by the reputed OEM of hydraulic coupling i.e., Voith. Please confirm acceptance	Bid specifications to be followed.
38	Vol-III	Ch 2: Turbine Generator & Auxiliaries	69 of 87	7.8.9	**Codes** Design of drive turbines generally in accordance with API 612 & 614 except as modified herein and proven practice of manufacturer and also generally followed in thermal power plants and testing in accordance with ASME PTC-6.	Bidder proposes to design BFP drive turbine as per IEC 45 / API 612 & 614 and as per the OEM standard proven practice. Please confirm acceptance. Further, Bidder would like to inform that a separate PG test as per PTC-6 is not envisaged exclusively for BFP drive turbine as the same is part of overall PG test done for the STG. Owner is requested to confirm the acceptance.	In clause 7.8.9 of Ch-2 at Sheet 69 of 87 in Vol-III, the words / figures, "API 612 & 614" be read as "API 612 & 614 or latest edition of IEC 45".
39	Vol-III	Ch 2: Turbine Generator & Auxiliaries	71 of 87	7.11	**Location of TDBFPs & MDBFP** TDBFPs will be located on operating floor. And MDBFP to be located either on zero (+0.00M) meter floor or any intermediate TG floor (not on operating floor)	Being an EPC tender location of TDBFP & MDBFP shall be as per standard practice of the bidder. Please confirm acceptance.	Noted.
40	Vol-III Vol-III Vol-III	Ch 2: Turbine Generator & Auxiliaries Ch 1: Steam Generator & Auxiliaries Ch 2: Turbine Generator & Auxiliaries	31 of 87 113 of 186 55 of 87	1.20 16.2 6.2	(f) Ensure HP bypass designed to accept continuous spray water at temp. corresponding to all HP heaters out of service and deaerator pegged at 1.5 ata. During cold startup the deaerator pressure shall be maintained at 1.5 ata with steam from auxiliary steam header. During hot and warm startup deaerator pressure shall be maintained at 3.5 ata. However, in case startup drain circulation pumps are not in service and startup drains are routed through condenser, deaerator pressure shall be maintained 1.5 ata. Steam supply shall be from auxiliary steam header. k) Deaerator operation will be floating pressure type. Pegging pressure at 3.5 ata during HP LP bypass operation, major load rejection, turbine trip and low loads when extraction steam pressure is less than 3.5 ata. During cold start-up the deaerator pressure shall be maintained at 1.5 ata with steam from auxiliary steam header. During hot and warm startup, if boiler startup drain circulation pumps are in service, deaerator pressure shall be maintained at 3.5 ata. In case startup drain circulation pumps are not in service and startup drains are routed through condenser, deaerator pressure shall be maintained 1.5 ata. Steam supply shall be from auxiliary steam header. Deaerator pressure shall vary with load when it gets steam from turbine extraction. Design pressure & temp. shall not be less than extraction pressure or worst operating condition with sufficient margins above the same.	Deaerator pressure during cold / warm / hot startup and during HP-LP bypass shall be decided by Bidder based on minimum feedwater temperature required by Boiler at Economizer inlet as per Boiler OEM design/standard practice. Please confirm acceptance.	Bid specification to be followed, however the issue can be discussed during detailed engineering.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
41	Vol-III	Ch 2: Turbine Generator & Auxiliaries	6 of 87	3.0	**FEED WATER HEATING PLANT** Complete regenerative feed heating system including **full capacity drain cooler**, minimum four (4) low pressure heaters, one (1) deaerator and feed storage tank, minimum three (3) high pressure heaters (HP), all accessories, associated piping, valves, Nitrogen gas and filling arrangement, instrumentation and controls etc. shall be provided. However, bidder is free to optimize the number of heaters, maintaining the minimum number of heaters as specified here.	i) Bidder shall be allowed select / design the LP heaters with integral drain cooler or with drain cooler installed outside. ii) If LP Heater drain pumps are provided, then there will be no drain cooler for that particular heater as no drain cooling zone is envisaged for that heater. Please confirm acceptance.	Bid specification to be followed, however the issue can be discussed during detailed engineering.
42	Vol-III Vol-III	Ch 2: Turbine Generator & Auxiliaries Ch 2: Turbine Generator &	40 of 87 73 of 87	2.2 15.0	1. Condenser Design Parameters: f) Design Condenser Pressure : As optimized by the bidder at 1% make-up and 32.5°C CW temperature at VWO Condition but not exceeding **70 mmHg (abs)**. Other conditions for computing heat balance diagrams: 5. Design Condenser Pressure : As optimized by the bidder at 1 % make-up and 32.5°C CW temperature at VWO condition (not more than **77 mm of Hg (abs)**.	There is contradiction between referred clauses regarding not to exceed value of condenser pressure mentioned. Owner to confirm the clause which is to be considered.	For condenser design pressure, please follow Clause 2.2 - 1 (f) at Sheet 40 of 87 of Chapter 2 in Volume III instead of Clause 15.0 at Sheet 73 of 87.
43	Vol. II : PART A Vol. III :	CHAPTER – 8 CHAPTER - 2: SECTION – 2 : DESIGN BASIS	30 of 57 38 of 87	5.9 : Steam condensing plant 2.0 CONDENSING PLANT	ii. Oxygen content in condensate at hot well outlet shall not exceed 0.015 cc/litre over 50-100 % load range and shall be determined according to calorimetric Indigo-Carmine method. (g) Maximum oxygen content of condensate leaving the condenser shall be 0.015 CC per litre over the entire load range.	There is a discrepancy in different clauses regarding O2 content in Condensate. Bidder understands that clause "Oxygen content in condensate at hot well outlet shall not exceed 0.015 cc/litre over 50-100 % load range and shall be determined according to calorimetric Indigo-Carmine method." is required to be met. Bidder shall meet the same.	Please follow Clause 2.0 (g) at Sheet 38 of 87 of Chapter 2 in Volume III.
44	Vol-III	Ch 2: Turbine Generator & Auxiliaries	40 of 87	2.2	1. Condenser Design Parameters: h) Temperature rise in circulation water across the condenser : Not more than 8.5 Deg C	Specified temperature rise across condenser is very stringent for 800 MW unit projects & it will not be possible to accommodate the condenser below the TG deck. Request Owner to increase the temperature rise across condenser to 10 Deg.c. Similar temperature rise across condenser is specified in recent tenders of NTPC for 660 MW & 800 MW supercritical power projects. Also we understand the specified maximum CW temperature rise across condenser is for normal operating conditions except HP-LP Bypass operation. Please confirm acceptance.	In third coulmn of table against S.No. (h) at Sheet 40 of 87 of Ch-2 in Vol-III, the figure "8.5" be read as "10".
45	Vol-III	Ch 2: Turbine Generator & Auxiliaries	41 of 87	2.2	3. Water box test pressure : 1.5 times the design pressure	As per HEI for surface Condenser- 12th Edition, Clause 8.1.4.2.1, Waterbox is required to be hydrotest only at 1.3 times of design pressure. Please confirm acceptance.	Latest edition of HEI shall be followed
46	Vol-III	Ch 2: Turbine Generator & Auxiliaries	44 of 87	2.6	h) Hogging operation(at 10 inch(254 mm) of Hg(abs) condenser pressure : 500 SCFM(850 m3/hr) under standard conditions i.e. 760 mmHg(abs and 21.1°C)	Hogging capacity shall be as per HEI for Surface Condenser. Please confirm acceptance.	Latest edition of HEI shall be followed
47	Volume III Mechanical Works	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	47 of 59	26.6.46	However the material as per ASTM A 516 Gr. B shall be acceptable subject to the relevant codes / standards permitting so for the design parameters of various flash tanks.	We presume that specified material is ASTM A 516 Gr. 70. Please confirm.	Confirmed.
48	Vol. II : PART A Vol. II : PART B Vol. III	CHAPTER - 8 Sch. B : Technical Particulars CHAPTER - 2: SECTION – 2 : DESIGN BASIS	5 of 57 50 of 64 41 of 87	3.1 CONDENSER & AIR EXTRACTION SYSTEM 2.2 - TABLE - 1. Condenser Design Parameters	The tube plug margin of 5%, as per design condition, shall be considered for condenser performance calculation at design condition. 1.1.3 : (k) Water velocity when 10% tubes are in plugged condition k) Tube plugging Margin = 5%	There is a discrepancy in different clauses of Tube plugging margin for Condenser. Bidder proposes to considering 5% Plugging margin for design of condenser. Please confirm acceptance.	Noted
49	Vol. II : PART A	CHAPTER - 11 : SECTION M2	40 of 103	11.2. Condenser Assembly : (C)	All welds between condenser neck and LP turbine shall be subjected to 100% radiographic and magnetic particle examination.	The joint between the Turbine & Condenser is through landing Bar to take care of site mis-alignments. The joint is not a butt-weld & hence RT not possible. MPT will be carried out. Water fill up test shall be done to check any possible leakage on this joint at site. Please confirm acceptance.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
50	Vol. II : PART B Vol. III	Sch. B : Technical Particulars CHAPTER - 2: SECTION – 2 : DESIGN BASIS	49 of 64 41 of 87	CONDENSER & AIR EXTRACTION SYSTEM 2.2 - TABLE - 1. Condenser Design Parameters	1.1.3 : 85% Tube Cleanliness j) Cleanliness factor = 0.9	There is a discrepancy in different clauses of Tube cleanliness factor for Condenser. Bidder proposes to consider cleanliness factor as 0.9 as followed in other supercritical power projects of NTPC & state utilities. Please confirm acceptance.	Noted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
51	Vol. III	CHAPTER - 2: SECTION – 2 : DESIGN BASIS	38 of 87	2.1 (d)	Provide suitable impingement guards or baffles on top row tubes. Similar guards for any steam or water connection to condenser. Other alternate arrangements to the satisfactory protection of top row of tubes shall also be considered.	Top rows of tubes shall be provided with extra thick tubes instead of impingement guards or baffles. Please confirm acceptance.	Bid specifications to be followed.
52	Vol. III	CHAPTER - 2: SECTION – 2 : DESIGN BASIS	38 of 87	2.1 (f)	Adequate cathodic protection shall be made for the water box and other water components in the condenser.	Sacrificial anodes shall be provided in Water box. Please confirm acceptance.	Bid specifications to be followed.
53	Vol. III	CHAPTER - 2: SECTION – 2 : DESIGN BASIS	38 of 87 39 of 87	2.1 (g) 2.1 (q)	Tubes shall be welded type stainless steel as per ASTM A-249-TP304 The condenser tube must be SS seamless tubes (ASTM A-213-TP304).	There is a discrepancy in Condenser tube material mentioned in both clauses. Bidder proposes to consider condenser Tube material of ASTM A-249-TP304 inline with other supercritical power projects of NTPC & other state electricity utilities. Please confirm acceptance.	Condenser tubes shall be Welded Tubes as per ASTM A-249-TP304 OR SS Seamless tubes as per ASTM A-213-TP304.
54	Vol. III	CHAPTER - 2: SECTION – 2 : DESIGN BASIS	38 of 87	2.1 (h)	Water box, tube plates and support plates material carbon steel as per ASTMA-285 Gr.C or equivalent and suitable for intended duty.	The Waterbox & tube supports will directly face the pressure of Cooling water. Therefore, Bidder proposes to use superior material of ASTM A 516 Gr. 70 for Tube plates (Tubesheet) & Waterbox, which is also a boiler quality material. Please confirm acceptance.	Noted.
55	Vol. III	CHAPTER - 2: SECTION – 2 : DESIGN BASIS	38 of 87	2.1 (h)	Titanium cladding of required thickness (5 mm minimum) shall be provided on water side of tube sheet plate.	SS tubes are required to be supplied as per specifications & therefore Titanium cladding on tubesheet is not applicable. Depending upon the cooling water quality, Owner is requested to confirm from below options with respect to SS Tubes: 1. Carbon steel tubesheet without any cladding - Tube to tubesheet shall be mechanically expanded. 2. Carbon steel tubesheet with SS Cladding - Tube to tubesheeet shall be mechanically expanded + welded.	Noted.
56	Vol. III	CHAPTER - 2: SECTION – 2 : DESIGN BASIS	39 of 87	2.1 (j)	All extraction pipes routed through the condenser shall be provided with stainless steel shroud to prevent erosion.	Bidder proposes to consider 1.6 mm corrosion allowance on extraction pipes instead of providing SS shroud / cladding. Please confirm acceptance.	Bid specifications to be followed.
57	Vol-III	Ch 2: Turbine Generator & Auxiliaries	54 of 87	6.0	v) Provide sentinel relief valve on tube side. Relief valve on shell side sized to pass flow from two ruptured tubes (four open ends) or 10% of water flow corresponding to VWO condition with 1% make up and design condenser pressure at 10% accumulation, whichever is higher and set to open at heater shell design pressure.	Bidder wishes to clarify that for arriving feedwater heater shell side relief valve capacity as per HEI requirement, shell side relief 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.	Bid specifications to be followed.
58	Vol-III	Ch 2: Turbine Generator & Auxiliaries	59 of 87	7.1 (f)	(f) Pump Sizing (i) TDBFP (4) **Emergency point:** Two Turbine driven feed pumps to be capable of generating the discharge pressure not less than steam generator highest safety valve set pressure corresponding to 105% of boiler maximum continuous rating.	As per Interpretation to PG-61.5, Feed Water Supply for a Steam Generator With No Fixed Water Level (This was published in ASME website in July 2014), it is not required to size the BFP for emergency point mentioned in tender. Hence, Bidder would like to consider the emergency point for BFP capability as **flow corresponding to BMCR condition and head corresponding to maximum expected pressure at economizer inlet** (design pressure). Please confirm acceptance.	Noted.
59	Vol-III	Ch 2: Turbine Generator & Auxiliaries	61 of 87	7.1 (w)	TDH per stage : Not to exceed 670 m at design point.	TDH per stage shall be as per OEM design. Please confirm acceptance.	Clause 7.1(w) of Chapter-2 at Sheet 61 of 87 / Vol-III stands deleted.
60	Vol-III	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	2 of 59	26.2.1	**Velocity limits for steam:** (iii) Wet Steam/ Exhaust Steam : 30 m/s	Velocity limit in the BFPT exhaust duct line shall be 125 m/s as per past executed and present practices projects. Please confirm acceptance.	Velocity limit in the BFPT exhaust duct line as 60-120 m/s is acceptable.
61	Vol-III	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	2 of 59	26.2.1	WILLIAM & HAZEN formula shall be used for calculating the friction loss in piping systems with the following "C" value.	The Hazen-Williams equation has narrow applicable ranges for Reynolds numbers and pipe sizes. The equation is generally valid for pipe sizes 75 mm and larger, for water flowing at temperatures of between 21° to 24°C and pressures up to 1.2 MPa. The level of error when the Hazen-Williams equation is used outside its data ranges is signifcant. In this case, the D'Arcy-Weisbach formula must be used. In view of the above, Bidder propose to use D'Arcy Weisbach formula to calculate friction loss for power cycle piping and LP piping as well. For large diameter piping systems like CW, slurry systems, Hazen-William equation will be followed. Further, "C" values shall be inline with draft Bureau of Indian Standard IS 2951 Part 1 (2021 Edition). Please confirm the acceptance.	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
62	Vol-III	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	9 of 59	26.6.1.1	(e) The design pressure of boiler feed discharge piping at downstream of FRS shall be 105% of pressure corresponding to the emergency point of BFP operation. However pressure relief valve across the HP heaters shall be provided so that piping & valves beyond feed regulating station are not subjected to shut off head condition.	Piping downstream of FRS will not be subjected to BFP emergency point. FRS downstream piping design pressure shall be same as HP heaters tube side design pressure considering BFP discharge pressure corresponding to lowest safety valve set pressure. IBR reg 520 requirement will be complied. Hence, FRS downstream piping can be designed based on BFP discharge pressure corresponding to Boiler lowest safety valve set pressure. Please confirm acceptance.	Noted
63	Vol-VII	Tender Drawings	5 of 120	Note	Bidder to note that equipment / valves / instruments / analysers indicated in P&ID / flow schemes is **minimum**.	Bidder understand that equipment / valves / instruments / analysers indicated in P&ID / flow schemes is indicative only. The finalization of these items shall be as per the system O&M, control & layout requirement. Please confirm acceptance.	Noted
64	Vol-VII	Tender Drawings	5 of 120	Note	However any other additional requirements regarding quantities & type of equipment / valves / instruments / analysers shall be finalized by Owner / Consultant during detailed engineering as per process & redundancy requirements as stipulated in NIT/Technical specification.	Instrumentation shall be provided as per system operational & control requirement as per BIDDER latest engineering practice being followed in supercritical plants. Please confirm the acceptance.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
65	Vol-VII	Tender Drawings 111-11-0500 Flow Scheme - Heater vent and drain	11 of 120		In tender drawing for heater vent and drain, Heaters Vents lines are connected to Flash Tanks.	Bidder envisage to connect heaters vents to Deaerator / Condenser as per Bidder's practice. Please confirm acceptance.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
66	Vol-VII	Tender Drawings 111-11-0600 Flow Scheme - Condensate System	13 of 120		In tender drawing for condensate system, individual CEP recirculation line is routed to the condenser.	Bidder envisage to use common recirculation line for all three pumps after gland Steam Condenser and will be sized considering minimum recirculation requirement of both GSC as well as CEPs. Please confirm acceptance.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
67	Vol-VII Vol-III	Tender Drawings 111-11-0600 Flow Scheme - Condensate System Ch 2: Turbine Generator &	13 of 120 6 of 87	 6.0	Deaerator Level Control Station: Deaerator level control station for condensate water flow control, consisting of the following: i. 2 x 100% capacity pneumatically operated condensate control valve. ii. One motor operated gate valve on upstream and one manual operated gate valve on downstream of each condensate control valve. iii. One motor operated inching valve in bypass line of above condensate control station.	There is contradiction between Deaerator Level Control Station Configuration specified in Specification and Condensate System flow diagram. As indicated in the flow diagram, many MOVs are not required (like MOVs on upstream and downstream of bypass MOV and MOV on the downstream of Control Valve). Bidder will follow Deaerator Level Control station Configuration as per Cl. No. 6.0 of Vol-III, Ch-2, Sec-1. Please confirm acceptance.	Clause 6.0, Chapter 2, Sheet 6, Volume III specification be followed.
68	Vol-VII Vol-III	Tender Drawings 111-11-0700 Flow Scheme - Feed Water system Ch 2: Turbine Generator &	14 of 120 59 of 87	- 7.1 (f) (ii)	Configuration of feed control valve (1) **1x50% MDBFP** shall meet all the above conditions (i.e. (i) (1) to (5) above). The head developed by MDBFP shall be calculated in the same way as done for TDBFPs for all the above conditions so that TDBFPs and MDBFP can be operated in parallel. The MDBFP to be located either on Zero (+0.00M) meter floor or on any intermediate TG floor (not on operating floor).	Bidder proposes to offer **1x30%** MDBFP instead of 1x50% MDBFP. Also as per tender flow diagram, capacity of feedwater control valve is 30%. Hence, Bidder understand that configuration of MDBFP shall be **1×30%** instead of 1×50%. Owner is requested to amend the referred clause accordingly. Further, as per Bidder's practice, Motor Operated integral bypass valves for 2×50% isolation valves (parallel to 30% FCV in Flow Control Station) are not required. Please confirm acceptance.	Bid specifications to be followed.
69	Vol-VII	Tender Drawings 111-11-0700 Flow Scheme - Feed Water system	14 of 120		Discharge of thermal relief valve across boiler feed pump suction MOV	As per tender flow diagram, discharge of thermal relief valve provided across boiler feed pump suction MOV is connected to BFP suction line upstream of MOV. Bidder proposes to connect the discharge to nearest floor drain. Please confirm acceptance.	Drawing shown is indicative, however, the issue may be discussed during detailed engineering.
70	Vol-VII	Tender Drawings 111-11-0700 Flow Scheme - Feed Water system	14 of 120		-	As per tender flow diagram for feedwater system, for HP heater train bypass, spring loaded relief valves have been indicated in addition to two (2) nos. of 50% motor operated feedwater heater bypass valves. However, Bidder proposes to follow 3-Way valve arrangement instead of combination of spring loaded relief valves and bypass MOVs for heater train bypass as per Bidder's standard practice followed in past executed projects including NTPC projects. Please confirm acceptance.	Noted.
71	Vol-VII	Tender Drawings 111-11-0401 Flow Scheme - Extraction Steam for BFP Turbine	10 of 120	-	111-11-0400 : Flow Scheme - Extraction Steam & 111-11-0401 : Flow Scheme - Extraction Steam for BFP Turbine	As per tender flow diagram, double admission BFPT is indicated. Bidder requests Owner to also share scheme with single admission BFPT for extraction system for single admission BFPT.	Drawing shown is indicative, however, the issue may be discussed during detailed engineering.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
72	Vol-VII	Tender Drawings 111-11-0401 Flow Scheme - Extraction Steam for BFP Turbine	10 of 120	-		Bidder understand the steam blowing process is one time activity during commissioning stage. Therefore, providing permanent steam blowing line and associated hardware becomes of no use. Owner is requested to re-look the requirement and amend accordingly.	Drawing shown is indicative, however, the issue may be discussed during detailed engineering.
73	Vol-VII	111-11-0400 : Flow Scheme - Extraction Steam & 111-11-0401 : Flow Scheme - Extraction Steam for BFP Turbine	10 of 120	-		Bidder understand that total two nos. of QCNRV shall be provided in extraction steam line to BFPT and deaerator. Bidder confirms the requirement of two (2) nos. of QCNRVs in these lines. However, location of the same shall be as follows: As per Bidder's past project experience inline with turbine OEM recommendation, one (1) QCNRV will be provided in a common line to BFPT & Deaerator, which suffice the requirement for the QCNRV in BFPT common line. Further, one (1) additional QCNRV will be provided in extraction line to Deaerator (After BFPT tapping from IP extraction). The same arrangement is being followed in all our executed projects including NTPC projects. Please confirm acceptance.	Drawing shown is indicative, however, the issue may be discussed during detailed engineering.
74	Vol-VII	Tender Drawings 111-11-0301 Flow Diagram - HP and LP Bypass System	8 of 120		Bypass valve warm-up scheme 	Bidder understand that warm-up arrangement shown for bypass valves are indicative. The same shall be inline with Bypass valve OEM recommendation during detail engineering.	Drawing shown is indicative, however, the issue may be discussed during detailed engineering.
75	Vol-III	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	46 of 59	26.6.45.2	**Number and sizing** Flash tank shall be provided into which all recoverable drains from turbine casing extraction lines, valves, strainers, main steam, CRH and HRH line drains, cascaded drains from heaters etc. shall be led. Number of flash tanks shall be as per tender drg. Requirement/details of various flash tanks are given below. (a) High pressure HP flash tank for accommodating high pressure (above and including hot reheat design pressure) steam drain and HP heater emergency drains, as included in the tender drawing. (b) Low pressure LP flash tank for accommodating low pressure (below hot reheat design pressure) steam drain and LP heater emergency drains, as included in the tender drawing. (c) Atmospheric flash tank to accommodate alternate drains of steam lines, feed water safety valve discharge and aux. steam line drains, as indicated in the tender drawing.	Bidder noted the requirement of total nos. of flash tanks. However, drain segregation philosophy shall be decided based on layout feasibility and system engineering requirement inline with Bidder's practice as followed in past executed NTPC projects. Please confirm acceptance.	Bid specifications to be followed, however, issue may be discussed during detailed engineering.
76	Volume I	Section – II, ITB	41 of 75	44	"RESTRICTIONS ON PROCUREMENT FROM A BIDDER OF A COUNTRY WHICH SHARES A LAND BORDER WITH INDIA"	Latest Government of India circulars related to "Restrictions on procurement from a Bidder of a country which shares a land border with India" will be followed. Please confirm acceptance.	Confirmed
77	Volume I, Book 2	Schedule-8A & 8B: Break up of Type Test Charges	26 & 32 of 33	17	Visual Cavitation Test on One BFP	Visual cavitation test on BFP is not envisaged. This test requirement is deleted in all recent tenders of NTPC also. Please confirm acceptance.	Noted
78	Volume II	Ch 4: Provenness	3 of 42	4.3.1 (h)	Condenser : Condenser of type as specified : Condenser of **800 MW** or higher size unit.	Bidder requests owner to modify the Provenness requirement for condenser as per below inline with other supercritical power projects including those of NTPC. Condenser : Condenser of type as specified : Condenser of **500 MW** or higher size unit.	In last column of table against S.No.-(h) at Sheet 3 of 42, Ch-4, Vol-II, the figure "800 MW" be read as "500 MW"
79	Volume II	Ch 4: Provenness	3 of 42	4.3.1 (i)	Condensate Extraction Pumps (CEP) : Vertical, canister with double suction first stage impeller for steam turbine generator sets : **Capacity not less than 1025 Ton/Hr and total developed Head not less than 30 kg/cm2**.	Bidder requests owner to modify the Provenness requirement for CEP as per below inline with other supercritical power projects including those of NTPC. Condensate Extraction Pumps (CEP) : Vertical, canister with double suction first stage impeller for steam turbine generator sets : **Condensate Extraction Pump (CEP) rating not less than that supplied for minimum 660 MW size Steam Turbine Generator Unit.**	Last column of table against S.No.-(i) at Sheet 3 of 42, Ch-4, Vol-II, be read as "Condensate Extraction Pump (CEP) rating not less than that supplied for minimum 660 MW size Steam Turbine Generator Unit".
80	Volume II	Ch 4: Provenness	3 of 42	4.3.1 (k)	Feed Water Low Pressure Heaters : Horizontal, U-tube type having condensing and drain cooling zones for steam turbine generator sets : Feed Water Low Pressure Heater of **660 MW** or higher size unit	Bidder requests owner to modify the Provenness requirement for Feed water Low pressure Heaters as per below inline with other supercritical power projects including those of NTPC. Feed Water Low Pressure Heaters : Horizontal, U-tube type having condensing and drain cooling zones for steam turbine generator sets : Feed Water Low Pressure Heater of **500 MW** or higher size unit	In last column of table against S.No.-(k) at Sheet 3 of 42, Ch-4, Vol-II, the figure "660 MW" be read as "500 MW"

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81	Volume II	Ch 4: Provenness	4 of 42	4.3.1 (l)	Feed Water High Pressure Heaters : Horizontal, U-tube type, having integral de-super heating, condensing and drain cooling zones for steam turbine generator sets : Feed Water **High Pressure** Heater of **800 MW** or higher size unit	Bidder requests owner to modify the Provenness requirement for Feed water High pressure Heaters as per below inline with other supercritical power projects including those of NTPC. Feed Water High Pressure Heaters : Horizontal, U-tube type, having integral de-super heating, condensing and drain cooling zones for steam turbine generator sets : Feed Water **High Pressure** Heater of **500 MW** or higher size unit	In last column of table against S.No.-(l) at Sheet 4 of 42, Ch-4, Vol-II, the figure "800 MW" be read as "500 MW"
82	Volume II	Ch 4: Provenness	4 of 42	4.3.1 (m)	Deaerator : Horizontal/ Vertical, direct contact, spray or spray cum tray design for steam turbine generator sets : Deaerator of **800 MW** or higher size unit.	Bidder requests owner to modify the Provenness requirement for Deaerator as per below inline with other supercritical power projects including those of NTPC. Deaerator : Horizontal/ Vertical, direct contact, spray or spray cum tray design for steam turbine generator sets : Deaerator of **500 MW** or higher size unit.	In last column of table against S.No.-(m) at Sheet 4 of 42, Ch-4, Vol-II, the figure "800 MW" be read as "500 MW".
83	Volume II	Ch 4: Provenness	4 of 42	4.3.1 (n)	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 1250 Ton/hr and total developed Head not less than 320 Kg/cm2.**	Bidder requests owner to modify the Provenness requirement for BFP as per below inline with other supercritical power projects including those of NTPC. Boiler Feed Pumps (BFP) : Horizontal, centrifugal, multistage, outer casing barrel type with end rotor removal for supercritical steam turbine generator sets : **Boiler Feed Pump (BFP) rating not less than that supplied for minimum 660 MW size Steam Turbine Generator Unit.**	Last column of table against S.No.-(n) at Sheet 4 of 42, Ch-4, Vol-II, be read as "Boiler Feed Pump (BFP) rating not less than that supplied for minimum 660 MW size Super-critical Steam Turbine Generator Unit."
84	Volume II	Ch 4: Provenness	4 of 42	4.3.1 (o)	HP Bypass system : HP Bypass system for **supercritical** steam turbine generator sets : **Capacity of each valve not less than 750 Ton/hr at rated steam parameters (i.e. pressure & temperature).**	Very limited vendors get qualified based on the provenness criteria specified for HP Bypass system. Hence in order to have larger vendor pool, request owner to modify the provenness criteria for HP bypass system as per below. HP Bypass system : HP Bypass system for ~~supercritical~~ steam turbine generator sets : **HP Bypass system of 500 MW or higher size unit.**	Last column of table against S.No.-(o) at Sheet 4 of 42, Ch-4, Vol-II, be read as "'HP bypass system of 500 MW or higher size unit'."
85	Volume II	Ch 4: Provenness	4 of 42	4.3.1 (o)	LP Bypass system : LP Bypass system for steam turbine generator sets : **Capacity of each valve not less than 750 Ton/hr at rated steam parameters (i.e. pressure & temperature).**	Very limited vendors get qualified based on the provenness criteria specified for LP Bypass system. Hence in order to have larger vendor pool, request owner to modify the provenness criteria for LP bypass system as per below. LP Bypass system : LP Bypass system for steam turbine generator sets : **LP Bypass system of 500 MW or higher size unit.**	Last column of table against S.No.-(q) at Sheet 4 of 42, Ch-4, Vol-II, be read as "'LP bypass system of 500 MW or higher size unit'."
86	Volume II	Ch 4: Provenness	5 of 42	4.3.3	In addition, the sub-vendor along with the Indian Joint Venture Company/ Subsidiary Company, qualified equipment manufacturers and its holding/ subsidiary Company, as applicable, shall furnish **DJU** in which executant of the DJU shall be jointly and severally liable for the successful performance of the equipment as per the format in the bidding document. The DJU shall be submitted prior to the placement of order on the approved sub-vendor for a particular equipment. In case of award, each executant of the **DJU be required to furnish a non demand bank guarantee for INR 1.5 Million (Rupees One and Half Million) for each equipment.**	Many suppliers getting qualified under route 4.3.3 are reluctant to provide DJU & Bank guarantee of INR 1.5 Million. Hence bidder proposes to furnish **a letter of support from Collaborator(s) / Licensor / Technology provider for successful performance of respective equipment(s) valid up to the end of defect liability period of the contract**. Above suggested change is inline with the recent tenders of NTPC for supercritical power projects.	Bid specifications to be followed.
CW,ACW,DMCW,RW, Intake							
87	Volume-VII Flow diagram-Service water distribution system	Ch 6: Filtered Water System 111-12-3500	2 of 5	6.2.2	Two (2) (1W+1S) vertical Mist Eliminator wash pumps Two (2) (1W+1S) vertical AHP seal water pumps	Owner to please note Two (1W+1S) vertical FGD process water pumps are considered in the tender drawing, request owner to please clarify reason to provide two (1W+1S) vertical mist eliminator wash pumps. We propose to provide only FGD process water pumps that will cater water requirement of mist eliminator (if required), Also note both pumps are installed on pump house and supplies same quality water to FGD area. Hence bidder intend to eliminate separate mist eliminator wash pumps. Owner to please give acceptance. Also note AHP makeup water is supplied through AHP makeup pumps installed on raw water pump house and CW blowdown side. Then separate AHP seal water pumps are not required. Owner to please check and give acceptance.	Noted Noted AHP seal water makeup pumps shall be provided to supply water to seal water tank located near ash water sump. Alternatively, seal water may be supplied from service water system, in this case, AHP seal water makeup pumps are not provided. This seal water (filtered water) is used for Ash Disposal Pump Sealing.
88	Volume-VII Flow diagram-Service water distribution system	111-12-3304	23 of 120			Discrepancy found between composite flow scheme, Flow diagram of Filter water system and Flow diagram of service water distribution system In flow diagram of service water system HVAC makeup pump, CHP makeup pump and service water pumps takes suction from 50 m3 overhead bunker roof tank. In flow diagram of filter water system HVAC makeup, Service water pumps suctions are connected with filter water tank. Owner to please update flow diagram of service water system.	There is no discrepancy. As per composite flow scheme, service water pump is supplying water to 50 cu.m service water O/H tank from filtered water storage tank. In flow diagram of filtered water system, suction of service water pump is from filtered water storage tank and discharge is to service water distribution. In flow diagram of service water distribution system, service water pumps are supplying water to 50 m3 overhead bunker roof tank. Suction of HVAC makeup pump, CHP makeup pump is from said tank .

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
89	Volume-VII Flow diagram-Service water distribution system	111-12-3304	23 of 120		Two (2) (1W+1S) HVAC Make up Pumps taking suction from service water tank located on bunker building roof Two (2) (1W+1S) CHP Make up Pumps taking suction from service water tank located on bunker building roof	As per flow diagram it is observed that HVAC makeup is considered from service water system. We propose to eliminate HVAC makeup and CHP makeup pumps, We will select service water pump capacity and head to cater HVAC and CHP requirement. Owner to please give acceptance to our proposal.	Noted.
90	Volume-III	Chapter 7 Service and Potable water system	2 of 7 3 of 7	7.3.1 b) 7.3.2 b)	Service water over head Tank (rectangular, MS construction) of 50 M3 effective capacity on bunker bay roof. Potable water over head Tank (rectangular, MS construction) of 25 M3 effective capacity on bunker bay roof.	Owner to please allow to consider Horizontal Cylindrical or Vertical cylindrical tank instead of rectangular tank.	Noted.
91	Volume-III	Ch 15: CW & ACW System	8 of 37	15.6 (A) (c)	The selected head of CW pump shall provide for adequate margin so that pumps are capable of supplying equipment design flow at 47.5 Hz frequency of power supply	Bidder understands that equipment design flow means condenser design flow and not the pump design/rated flow. In other words, at 47.5 Hz, CW pumps should be capable to meet flow and head requirement corresponding to 100% TMCR condition. Please confirm bidder's understanding.	Last point of clause 15.6 (A) (c) at Sheet 8 of 37 in Chapter 15 of Vol-III be read as: "The selected head of CW pump shall provide for adequate margin so that pumps are capable of supplying equipment flow at 47.5 Hz frequency of power supply at TMCR condition".
92	Volume-III	Ch 15: CW & ACW System	17 of 37	15.10 (B) (a) 15.10 (B) (c)	The model test should have been conducted as per Japanese standard JIS-B- 8327 (latest version) and specific speed of the model tested should lie within ± 5% of the specific speed of the pump offered ...In general these tests shall be conducted as per Japanese standard JIS-B8327 (latest version).	Alternatively, CW pump model test shall be done as per HIS, which is being widely accepted in the industry. Owner is requested to confirm the proposal	Noted.
93	Volume-III Volume VI	Ch 15: CW & ACW System Ch 11: Buildings Description	3 of 37 8 of 18	15.3 11.9	j) Stop log gate and coarse screens at up stream of CW & ACW pumps. Each sump shall be provided with stainless steel (SS 316L) groove for inserting coarse screen, fine screen and stop logs. Grooves for stop log shall be provided before and after the screen.	Discrepancy between referred clauses. Bidder understands that only coarse screen shall be required. Please confirm.	Coarse screen & Stop log gate shall be provided in line with Chapter-15 Volume III
94	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	11 of 37	C (f) GENERAL DESIGN REQUIREMENT FOR VERTICAL WET PIT PUMPS (CW & ACW PUMPS) point f	The pump suction bell diameter shall be such as to limit the flow velocity at the maximum flow to within 1.5 m/sec.	Owner to please allow bell design as per HIS guidelines, As per HIS recommended velocity is 1.7 m/s.	Bid specifications to be followed.
95	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	9 of 37	15.6 A(e)	The pump & motor assembly shall be supported by two (2) floor arrangement. The lower floor will be provided below the discharge flange to provide an access to the discharge connections. The discharge head shall have a flanged discharge connection.	Owner is requested to provide following options for CW pump house: A) Open type CW pump house with gantry crane arrangement. B) Single floor arrangement for CW Pumps with accessible platform to CW pump motors for O & M.	A) CW pumps shall be housed inside the building. B) Noted.
96	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	31 of 37	n.	Thrust bearing cooling system pipes and valves: SS 316	As per Chapter 27 clause 27.4.5 for circulating water carbon steel MOC is acceptable, As CW pumps are lubricating water and CW water quality is same, So owner to please allow to use Carbon steel MOC for pipings and valves for thrust bearing cooling.	Bid specifications to be followed.
97	Volume-III Volume-VI Volume-III	Ch 15: CW & ACW System Ch 15: CW & ACW System Ch 11: Buildings Description Ch 27: LP pipings	3 of 37 5 of 37 9 of 18	15.3 15.4.8 11.10 27.4.13	CW pipe filling line from ACW discharge header to CW pipe with motorized isolating valve. For carrying circulating water from CW pump house to TG-area (near condenser) and from TG-area to cooling tower CW pipes (buried) shall be of MS construction Underground CW and ACW piping shall be provided with suitable protective coating/wrapping and shall be suitably stiffened to withstand soil loads and loads due to heavy vehicles at road crossings Cooling water conduits of adequate size shall be provided from C.W pumps to condenser and hot water conduits from condenser to cooling tower. These conduits shall be formed of structural steel conforming to IS: 2062. Pipe shall be provided with 3 coats of epoxy paint of minimum DFT of 350 microns over two coats of compatible primer after sand blasting. The pipes shall be tested before commissioning of the system Buried CW Pipes shall be encased in 500 mm thick RCC. However this thickness shall be reviewed for live loads at road crossings according to AWWA M11 and adequately revised.	Discrepancy found between stated clauses, As per first clause CW pipes are mentioned as buried pipe with MS construction encasement details are not mentioned. In second and third clause pipe painting and coating details are mentioned. In third clause it is mentioned that CW pipe is RCC encased. Owner to please clarify requirement of RCC encasement. For buried RCC encased pipe mentioned painting and coatings are not envisaged	Buried CW piping under rail/road crossing only shall be encased in 500 mm thick RCC/Culverts. The painting/protection of pipes (burried and overground) shall be in line with clause 27.13, Chapter 27 of Vol-III. However, RCC encasing mentioned in this clause is applicable only for buried CW piping under rail / road crossings. Thickness of pipe shall be selected accordingly.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
98	Volume III Volume VII	Chapter 17	2 of 20 21 of 120	1.2 (i) (b) 111-12-3100		In chapter 17 Clause 1.2 (i) (b) cooling water ΔT is mentioned as 10 Degree C. Owner to please note ΔT of cooling water is finalized as per condenser inlet and outlet parameters. So kindly indicate "By bidder" in place of 10 degree C.	ΔT of cooling water shall be 10 deg. C.
99	Volume-III Volume-VI	Chapter 18 Chapter 18 Chapter 13	5 of 23 7 of 23 18 of 21	18.3.1 18.4.1 (j) 13.11.4	Staircases with handrails and posts, platforms, FRP access doors with all accessories, internal walkways and walkways at CT top with stainless steel pipe handrails and posts, all necessary stainless steel inserts in the concrete etc., for satisfactory maintenance of the Cooling Tower as detailed in civil tender specification. Access to the hot water distribution system shall be provided with two RCC stair leading to FRP door giving access to distribution system At the throat level a reinforced concrete landing of 1.2m minimum width shall be provided with a hot dip galvanized steel access door for the interchange.	Discrepancy found between stated clauses. One clause indicates FRP access doors and other clause indicates galvanized steel access door. Owner to please check and inform MOC of access door.	FRP access doors shall be provided in line with Clause 18.3.1 and 18.4.1 (j) of Chapter 18 in Volume III.
100	Volume-VI Volume-III	Chapter 13 Chapter 18	18 of 21 5 of 23	13.11.5 18.3.1	Handrailing shall be of hot dip galvanized construction and shall be out of 32 mm NB pipes of medium class conforming to IS: 1239 and provided with etch primer and bituminous painting. Staircases with handrails and posts, platforms, FRP access doors with all accessories, internal walkways and walkways at CT top with stainless steel pipe handrails and posts, all necessary stainless steel inserts in the concrete etc., for satisfactory maintenance of the Cooling Tower as detailed in civil tender specification.	Discrepancy found between stated clauses. One clause indicates galvanized handrails with IS:1239 MOC and other clause indicates stainless steel pipe handrails and post. Owner to please note as per our past project experience handrail MOC shall be IS:1239. So owner to please allow us to use IS:1239 MOC as per stated in clause 13.11.5 of Chapter 13, Volume VI.	Please follow specifications as per Clause 18.3.1 of Ch-18 at Sheet 5 of 23 in Vol-III.
101	Volume-III	Ch 18 : NDCT	7 of 23 10 of 23	18.4.1 (e) 18.4.3.1	The hot water distribution shall be by RCC main and secondary ducts finally through UPVC/HDPE/FRP pipes fitted with nozzles for uniform distribution through the fill, which shall be film type. The fill shall be of non-clogging type fills like modular splash/trickle grid/turbo splash or splash type fills like V-bar splash/splash grid and easily installable. The fills shall be adequately supported to prevent sagging and damage. The tower shall be levelled so that water will be uniformly distributed over the fills and does not cause channeling. The splash type fills shall be placed horizontally.	Discrepancy found between stated clauses. One clause indicates film type fill and other clause indicates splash/ modular/ trickle type fills. Owner to please clarify type of fills.	Please follow specifications as per Clause 18.4.3.1 of Ch-18 at Sheet 10 of 23 in Vol-III.
102	Volume-III	Ch 18 : NDCT Datasheet	22 of 23	3.3	Effective storage Capacity: 10 minutes of cooling tower flow at full load operation of the unit (between Min. & Max. water level)	NDCT basin effective capacity shall be selected by EPC contractor based on their proven experience for 660 MW and 800 MW plants. Please confirm	Bid specifications to be followed.
103	Volume-III	Ch 18 : NDCT Datasheet	23 of 23	3.6	Cold water discharge channel / pipe: Required effective cross-sectional area for 1.0 metres/sec. water velocity	Bidder understands that 1 m/s velocity is required at minimum water level upto cooling tower outlet only. For channel design 1.8 m/s velocity is acceptable as mentioned in Volume VI Chapter 21 clause 21.2 (f) and 21.3 (f) for open channels.	Please follow specifications as given against S.No. 3.6 in the table at sheet 23 of 23 of Chapter-18 in Vol-III.
104	Volume-III	Chapter 18	12 of 23	18.4.8	i) Quantity - 6 Nos. (2 Nos. per Tower + 2 Nos. common standby).	Bidder understands that basin outlet shall have provision to install two screens (one per partition) / Other two common screens will be provided for storage only. Owner to please confirm.	Clause 18.4.8 (i) of Ch-18 at Sheet 12 of 23 in Vol-III be read as "Quantity - 2 Nos. (1 No. per partition)"
105	Volume-III	Chapter 18	19 of 23	18.5.5 e (iii)	For obtaining swirl free and fully developed flow condition the minimum upstream and downstream straight lengths at the measuring cross section shall be 20 pipe diameters and 5 pipe diameters respectively	Owner to please allow to follow CTI guidelines for straight length requirements for flow meter installation.	Noted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
106	Volume-III Ch 2: Turbine Generator & Auxiliaries Ch 2: Turbine Generator & Auxiliaries Chapter-15 CW and ACW system Volume II Chapter-18 NDCT Datasheet Volume II Ch 8: FG & LD Ch 2 : Project	40 of 87 11 of 87 74 of 87 5 of 37 22 of 23 8 of 57 3 of 10	2.2 (1) (b) 1.1.2.viii Cl. No. 15 15.4.3 2.4. point xv of 3.1 3.0	Design cold water temp. 32.5°C Condenser design pressure : As optimized by bidder at 1% make-up and 32.5°C CW temperature for VWO condition but not exceeding 70 mmHg (abs) Other conditions for computing heat balance diagrams: Design condenser pressure : As optimized by the bidder at 1 % make-up and 32.5 °C CW temperature at VWO condition (not more than 77 mm of Hg (abs)). The temperature at outlet of the Cooling Tower for design purposes shall be 330 C considering cooling tower approach of 50 C (max) at rated conditions and design inlet air Wet Bulb Temperature to be 280 C. Cold water temperature (˚C): 33 Degree C The cold-water temperature of 33°C shall be guaranteed for the design conditions of CW flow, range, ambient WBT and RH as per the performance test procedure of cooling tower elaborated elsewhere in the specification. Condenser cooling water inlet temperature of 33°C and 9°C temperature rise across the condenser.	Discrepancy found between referred clauses. Bidder understands that, Cold water temperature (˚C): 33 Degree C is to be considered for designing of condenser and cooling tower. Please confirm acceptance.	Cold water temperature shall be considered as 33 deg C in line with Chapter 8, Volume II.
107	Volume-III	Chapter 27	2 of 31	27.1.3	WILLIAM & HAZEN formula shall be used for calculating the friction loss in piping systems with the following "C" value. Stainless steel pipe 100	As stainless steel pipes are highly resistant to corrosion, the surface finish of the pipe internal surface is maintained and hence, "C" value of stainless steel pipes shall be considered as 140 instead of 100 as given in specification. This is being followed in other executed projects as well. Request Owner's confirmation in this regard	Bid specifications to be followed.
108	Volume-III	Chapter 27	3 of 31	27.1.6	Corrosion allowance of 1.6 mm will be added to the calculated thickness being considered	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 installed across the globe. Please accept our above proposal	Bid specifications to be followed.
109	Volume-VII	111-12-3300 Flow diagram of CW and ACW system	22 of 120			In flow diagram CW blowdown tapping is indicated after condenser (Hot water side), Bidder envisage to take blowdown tapping from cold CW side i.e. CW pump discharge, so that blowdown water reaches to end users of FGD, AHP and CHP area. Similar arrangement have been installed NTPC khargone (2X660 MW) and Buxar TPP (2X660 MW). Request owner to revisit and provide acceptance.	Bid specifications to be followed and CW blowdown may be used for FGD, AHP and CHP.
110	Volume III	Ch 27 : Low Pressure Piping, Valves & Specialities Sheet 2 of 35	2 of 31	27.1.3	Water Velocity in m/sec Pump discharge : 2.5 m/s	In DM/ condensate transfer piping (stainless steel pipe handling clean DM water), higher velocity (upto 6 m/s) shall be considered, as in CEP/BFP discharge piping handling similar quality of water.	Bid specificatons to be followed
111	Volume-III Volume-II	Ch 2: Turbine Generator & Auxiliaries Ch11 : QAP	39 of 87 50 of 103	2.1 (o) 16.0	2X100% capacity, fully automatic debris filter shall be installed on each condenser inlet line of suitable mesh size for clarified water application shall be provided with covered shed above ground level at the outside of the TG building at the upstream of COLTS for each CW inlet line. Debris filter shall be supplied with automatic self wash system. The debris filter design has to be suitable for clarified water quality. Debris filter flushing line outlet shall be routed to ash dyke by suitable arrangement. Condenser on load tube cleaning system/debris filter for main turbine condenser and drive turbine condenser (if offered)	Owner to please note that being river water application, Debris Filter shall not be required. Moreover clarifier water is filtered with six (4W+2S) rapid gravity filters and then it is supplied to CW sump and forebay. As per clause 15.14 coarse screen is also provided in CW pump sump to remove debris. So We request owner to remove debris filter from condenser inlet side.	Requirement of Debris filter is deleted.
ECC							
112	Volume I	Section V: ECC	44 of 62	44.24	I. Chain pulley block shall not be used for loads more than two (2) tonne.	Bidder request owner to allow use of chain pulley blocks for loads upto 10T	Bid specifications to be followed.
113	Volume VI Volume III	Ch 09: Steel Structure Ch 27: Low Pressure Piping, Valves & Specialities	8 of 28 12 of 31	9.8.2 27.11.3	.....Where pipes are not encased wrapping as per IS:10221 shall be provided outside... Coating and wrapping/ Anti corrosive Protection Coal tar tape	Bidder understands that where pipes are not encased wrapping & coating shall be done as per IS:10221 or IS:15337 or equivalent.	Please follow Cl.No.27.11.3, Sheet-12 of 31, Chapter-27, Vol-III.
Electrical							
114	Volume I Volume IV - Electrical Works	Section V: ECC Ch1: Electrical Scope of Work	15 of 62 6 of 58	27.1 1.02.36	FACILITIES TO BE PROVIDED BY THE OWNER The Contractor shall make its own arrangement of construction power and further distribution arrangement; and the provision of temporary lighting and other facilities needed shall be provided by the Contractor. The Bidder shall make its own arrangement of construction power and further distribution arrangement; and the provision of temporary lighting and other facilities needed shall be arranged by the Bidder subject to Owner's approval.	Construction power is the basic facility to be provided by Owner for the construction of power plant within the plant area. Hence, Bidder request Owner to provide construction power at 11kV at one point within the 1x800MW expansion project area. Owner may please provide the construction power on free of charge basis.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
115	SECTION - VII BOOK 2 OF 3 Price Schedule	Attachment -6 (P)	-	i) _____ p)	Unit Auxiliary Power Consumption comprising of all Unit Auxiliaries and Station Auxiliaries required for continuous Unit operation at 800MW (i.e. 100% rated load of the unit) under rated steam conditions and at guaranteed optimized condenser pressure with 0% make-up _____ Transformer losses (refer Annexure-II to Atttachment-6 (P) for list of transformers) i) Iron losses ii) Copper losses iii) Cooler losses	Transformers are continuously operating equipment during normal operation of power plant and hence losses of transformers to be covered in total auxiliary power consumption guarantee. NTPC/Other SEBs also follows the same method for guarantee of transformer losses. In addition they also specify following note for calculation of transformer losses contributing to auxiliary power consumption: "*NOTE: 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 request Owner to combine the power consumption of "(p) Transformer losses" along with total auxiliary power consumption referred as "(i) Unit auxiliary power consumption and issue amendment considering "NOTE" mentioned above.	Bid specifications to be followed.
116	SECTION - VII BOOK 2 OF 3 Price Schedule	Schedule-8A: Break up of Type Test Charges for Equipment Priced in Schedule-1 Schedule-8B: Break up of Type Test Charges for Equipment Priced in	-	2	LIST OF TYPE TESTS ON ELECTRICAL EQUIPMENTS Gas Insulated Switchyard (A) The following type tests on typical 400kV (As Applicable)GIS bay module as per IEC 62271-203. The components forming parts of the GIS which are covered by other standards shall comply with and shall be type tested according to those standards. (B) For surge arrestor and Bus VT following type tests as per relevant IEC. 400kV (As Applicable) Surge Arrestor (As per IEC60099-4)	Bidder would like to clarify that the Gas Insulated Switchyard are already type tested by OEM hence bidder propose to submit Type test report for acceptance of Owner. Hence, bidder request Owner to delete the list of type tests for GIS from the Schedule 8A and Schedule 8B.	Schedule 8A & 8B of price schedule in Section-VII, book 2 of 3 stands deleted.
117	SECTION - VII BOOK 2 OF 3 Price Schedule	Schedule-8A: Break up of Type Test Charges for Equipment Priced in Schedule-1 Schedule-8B: Break up of Type Test Charges for Equipment Priced in Schedule-2	-	3 & 11	3.0 Transformers **(A) Generator Transformer** (a) Short circuit test as per IEC-60076-5 - 1No. **(B) Station Transformer/Stand-byTransformer** (a) Short circuit test as per IEC-60076-5 - 1No. **(C) Unit Transformer** (c) Short circuit test as per IEC-60076-5 - 1No. **(F) 11/6.9 KV transformer (For each type and rating):** (c) Short circuit test - 1No. **(G) Aux./LT transformer (For each type/ rating):** (b) Short circuit test - 1No. **(I) TieTransformer** (a) Short circuit test - 1No. **11 b) Transformer** (i) Short circuit test on transformer	Transformer Manufacturers in India are not willing to perform short circuit test and they 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, Bidder requests Owner to accept the theoretical evaluation of the ability of transformer to withstand dynamic effects of Short circuit by check against the manufacturer's calculation and design consideration for short-circuit strength as per clause no. 4.2.1 of IEC 60076-5. As per IEC 60076-5, when calculation and design consideration is selected, validation by comparison with a previously tested similar transformer shall be done. Guidance for the identification of a similar transformer is given in annex A of IEC 60076-5. Owner may please confirm.	For Power Transformers (GT, ICT, ST and UT), Dynamic Short Circuit Withstand Test shall be conducted on one unit of each type and rating of transformers to validate the design and quality unless such tests has been successfully conducted as per Indian Standard 2026 Part-5 within last 10 years (as on last date of bid submission) on transformer of similar design. Further, Type Test report of transformer shall only be acceptable provided the offered transformer has been manufactured from the same plant. Criterion for similar design shall be as per Annexure-J of Central Elecricity Authority "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" and inline with the latest Central Electricity Authority "Technical Standard for Construction of Electrical Plants and Electrical Lines Regulations 2022". For Auxillary Power Transformers (11 / 6.9 kV) and Service Transformers (11 / 0.433 kV), Short Circuit Test shall be carried out on 01 No. of each type and rating.
118	SECTION - VII BOOK 2 OF 3 Price Schedule	Schedule-8A: Break up of Type Test Charges for Equipment Priced in Schedule-1 Schedule-8B: Break up of Type Test Charges for Equipment Priced in Schedule-2	-	10.0	10.0 Generator Circuit Breaker	GCB is not applicable for this project. Owner may please delete this clause and issue amendment.	Sr. No. 10.0 (Generator Circuit Breaker) of Schedule-8A & Schedule-8B of SECTION - VII BOOK 2 OF 3 (Price schedule) stands Deleted

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119	SECTION - VII BOOK 2 OF 3 Price Schedule	Schedule-8A: Break up of Type Test Charges for Equipment Priced in Schedule-1 Schedule-8B: Break up of Type Test Charges for Equipment Priced in	-	25	Any other type test not covered above, but required for the Scope of Work under the Package	Owner may please specify specific test to be quoted by bidder instead of the general clause as mentioned in referred clause. Bidder request to delete this clause and issue amendment.	Clause 25 of Schedule-8B & Schedule-8B of SECTION - VII BOOK 2 OF 3 (Price schedule) & in Price Formats stands Deleted
120	SECTION - VII BOOK 2 OF 3 Price Schedule	Schedule-8A: Break up of Type Test Charges for Equipment Priced in Schedule-1 Schedule-8B: Break up of Type Test Charges for Equipment Priced in Schedule-2	-	Note: 2 Note: 1	Any Type Test found applicable/ considered essential during detailed Engineering for any of the offered Equipment but not indicated above shall be deemed to be included in the above quoted price. Any Type Test found applicable/ considered essential during detailed Engineering for any of the offered Equipment but not indicated above shall be deemed to be included in the above quoted price.	Bidder request Owner to list all required type test in schedule 8A and 8B before submission of bid instead of specifying general note below schedule 8A and schedule 8B as per referred clause.	Note-1 under Schedule 8B and Note-2 under Schedule 8A of SECTION - VII of Vol-I BOOK 2 OF 3 stands deleted.
121	Ch1: Electrical Scope of Work		5 of 58	1.02.22	Solar System – Roof top solar at the top of all RCC buildings including existing Administrative Building, VIP Guest House in Colony, Field Hostel in Colony, Subordinate Rest House in Colony and Medical Health Centre in Colony	Bidder request Owner to provide Elevation and plan of following building for installation of Roof top solar: (1) Existing Administrative Building, (2) VIP Guest House in Colony, (3) Field Hostel in Colony, (4) Subordinate Rest House in Colony (5) Medical Health Centre in Colony	Available drawings are attached as Annexure-14 However, bidder may visit site for any further information.
122	Volume IV Electrical Works	Ch 6: Power Transformers	28 of 105	DATASHEET: GENERATOR TRANSFORMERS	12.0 Insulation Level (LI: Lightning Impulse Voltage, AC : Short duration induced & separate source AC withstand voltage) (a) HV- (LI/SI/AC) 1425kVp/ 1050kVrms/630kVrms (b) HV Neutral (LI/AC) 170kVp/70kVrms (c) LV- (LI/AC) 170kVp/70kVrms 25 Terminal bushing 25.1 Impulse (1.2/50 Wave withstand) kV peak 125 1050 170 25.2 One minute power frequency with stand (Dry & Wet) kV rms 26. Bushing Current Transformer (BCT)	Bidder would like to clarify that the BIL (Basic Insulation Level) specified in tender is not in line with the CEA standard specification for Power Transformer and reactor. As per CEA, the BIL shall be as follows for 420kV Generator Transformer for thermal power plant. **Insulation level on winding:** Lightning Impulse (HV/LV) : 1425 kVp / 170 kVp Chopped wave impulse (HV/LV) : 1570 kVp / 187 kVp Switching impulse (HV) : 1175 kVp One minute pf withstand (HV/LV) : 630 kV rms / 70 kV rms **Insulation level on Bushing:** Lightning Impulse (HV/LV) : 1550 kVp / 170 kVp Switching impulse (HV) : 1175 kVp One minute pf withstand (HV/LV) : 750 kV rms / 77 kV rms Owner may please clarify the which BIL to be followed for Generator Transformer.	Noted, Basic insulation levels (BIL) shall be applicable as per CEA standards.
123	Volume IV Electrical Works _____ Volume IV Electrical Works	Ch 6: Power Transformers _____ Ch1: Electrical Scope of Work	53 of 105 _____ 15 of 58	DATASHEET: STATION TRANSFORMERS _____ 1.09.00	12.0 Insulation Level (LI: Lightning Impulse Voltage, AC : Short duration induced & separate source AC withstand voltage) (a) HV- (LI/SI/AC) 1425kVp/ 1050kVrms/630kVrms (b) HV Neutral (LI/AC) 170kVp/70kVrms (c) LV- (LI/AC) 75kVp/28kVrms 25 Terminal bushing 25.1 Impulse (1.2/50 Wave withstand) kV peak 125 1050 170 25.2 One minute power frequency with stand (Dry & Wet) kV rms 26. Bushing Current Transformer (BCT) _____ Insulation level 400kV: Rated Lightning Impulse : 1425 kVp 400kV: Rated PF withstand: 630 (Dry)	Bidder would like to clarify that the BIL (Basic Insulation Level) specified in tender is not matching with BIL of Generator transformer mentioned in the CEA standard specification for Power Transformer and reactor. Owner may please specify the Winding and Bushing BIL separately which is to be followed for Station Transformer.	Noted, Basic insulation levels (BIL) shall be applicable as per CEA standards.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
124	Volume IV Electrical Works	Ch 6: Power Transformers	104 of 105	DATASHEET: INTERCONNECTING TRANSFORMERS	n) Winding (HV / MV) (ii) Lightning impulse (kVp): 1300 / 950 (iii) Switching impulse (kVp): 1050 / - (iv) One min. PF withstand (kV rms): 570 / 390 q) Bushing (HV / MV) (ii) Lightning impulse (kVp): 1425 / 1050 (iii) Switching impulse (kVp): 1050 / - (iv) One min. PF withstand (kV rms): 630 / 460	Bidder would like to clarify that the BIL (Basic Insulation Level) specified in tender is not exactly matching with the CEA standard specification for Power Transformer and reactor. As per CEA, the BIL for 315 MVA, 420kV Interconnecting Transformer is **Insulation level on winding:** Lightning Impulse (HV/MV) : 1300 kVp / 950 kVp Switching impulse (HV/MV) : 1050 kVp / 750 kVp One minute pf withstand (HV/MV) : 570 kV rms / 395 kV rms **Insulation level on Bushing:** Lightning Impulse (HV/MV) : 1425 kVp / 1050 kVp Switching impulse (HV/MV) : 1050 kVp / 850 kVp One minute pf withstand (HV/MV) : 695 kV rms / 505 kV rms Further, Bidder would also like to clarify that this is also not matching with BIL of generator transformer and station transformer. Owner may please clarify the correct BIL to be followed for Interconnecting Transformer.	Basic insulation levels (BIL) shall be applicable as per CEA standards.
125	Volume IV - Electrical Works	Chapter - 1	3 of 58	1.02.06	The interconnection between the ICT and 220kV switchyard shall be through IPS Aluminuim tubes, complete supply, erection, testing, commissioning and interconnection of all the equipment and accessories as required shall also be in the scope of Bidder.	As per Volume-VII, Dwg. No. 111-29-0200, Plot plan, Interconnection between ICT and 220kV switchyard is shown via overhead conductor and IPS tube. However, as per referred clause, same shall be via IPS tube. Kindly confirm the actual requirement.	ICTs shall be connected with 220 KV Bus through overhead conductors and 220 KV ICT bays equipments i.e. Isolators, circuit breaker and CTs etc. shall be connected with IPS Aluminuim tube.
126	Volume IV - Electrical Works	Chapter - 1	8 of 58	1.03.01	400kV Switchyard: Complete up to line take off tower (Take off tower by others).	Bidder propose to keep the outgoing line gantry as terminal point because generally the transmission line contractor terminates the line at switchyard outgoing line gantry only.	Noted. 400 kV switchyard termination point will be upto outgoing line take off gantry. Jumper for take off gantry to line shall be provided by the Bidder.
127	Volume IV - Electrical Works	Chapter - 1 Chapter - 4	8 of 58 5 of 88	1.03.00 4.02.04.Q	Terminal Points: PLCC & FOTE System including 48V DC System for 400 kV Lines. Space provision in Switchyard Control Room for locating 48V DC system, PLCC & FOTE equipment to be supplied by HVPNL.	Bidder understand that bidder to only consider space provision and integration of HVPNL supplied PLCC and FOTE system is in scope of contractor. Kindly confirm if the bidder's understanding is in order.	Bidder's understanding is correct. However Bidder shall provide (Only at Power Plant end)) outdoor switchyard equipments i.e. wave Trap, CVT & connecting Cables from CVT to PLCC/FOTE system.
128	Volume IV - Electrical Works	Chapter - 1	10 of 58	1.05.02.xii)	Bidder shall supply 1 No. ETAP software along with license for Owner's use.	Owner is requested to provide the list of sub modules required for ETAP software.	ETAP 18.0 (or latest version) software be supplied for Load Flow Anaysis, Short Circuit Analysis, Motor Starting Analysis, Relay Co-ordination Study & other requisite module for the following : 1) Transformer sizing 2) Sizing of HV/MV/LV switchboard. 3) Electrical system study/short
129	Volume IV - Electrical Works	Chapter - 4	2 of 88 20 of 88	4.02.02 4.08.01	R. Pre-insertion resistor (PIR) for 400kV lines The Circuit Breaker shall be equipped with controlled switching with consequent optimization of switching behavior when used in switching of transformers (ICT's, GT, STs) and Lines. The controller shall be provided in Main & Tie circuit breakers of transformer bays.	a) Bidder understand that, CSD, meeting the functional requirement of PIR, can be proposed in place of PIR. Kindly confirm whether our understanding is in order. b) Please clarify the requirement of both PIR and CSD for 400kV lines. c) In case of 400kV Short lines, neither PIR nor CSD is required. Please confirm.	As per clause 4.02.02 (R) PIR requirement for 400KV lines is only applicable in case line length is more than 200KM. In case of DCRTPP, Yamunanagar line length is less than 200 Km and hence PIR shall not be applicable. Exact line length shall be informed during detailed engineering. Further CSD device is to be provided for Main & Tie breakers controlling ICT, GT, ST and Reactor
130	Volume IV - Electrical Works	Chapter - 4	3 of 88	4.02.02	A. All the bays shall have its own Local Control Cubicle (LCC).	Bidder has considered LCC for all Bays and Bidder do not envisage separate panel for BUS PT & Bus bar. BUS PT wiring shall be considered to adjacent LCC panel. Please confirm.	BUS PT independent LCC to be provided or alternatively the wiring can be done in adjacent LCC panel. For Busbar Protection, no LCC to be considered because the wiring shall be routed to C&R Panel.
131	Volume IV - Electrical Works	Chapter - 4	9 of 88	4.04.03	4M wide road inside the fence of switchyard for complete periphery shall be provided. Bidder to note that this road is dedicated road inside the switchyard fence which is in addition to main patrol road outside the switchyard fence.	8m wide road on periphery shall be provided as per Volume VII, Plot plan drawing. Same road can be used for main patrolling purpose. Additional periphery road is not required. Hence, not envisaged. Kindly provide your acceptance for the same.	Bid specifications to be followed, however final layout will be decided during detailed engineering.
132	Volume IV - Electrical Works	Chapter - 4	9 of 88	4.04.03	4M wide road shall be provided around the building in addition to approach road from switchyard fence area till the building.	Bidder is not clear about the use of this road because such regular maintenance road is not required for GIB. Moreover, if access is still required, hydra can approach to GIB by driving on gravel areas as done for AIS switchyard. Bidder request Owner to remove this requirement.	Noted. Road around GIB stands deleted, however bidder to provide approach road to GIB.
133	Volume IV - Electrical Works	Chapter - 4	9 of 88	4.04.04	The equipment shall be designed to withstand normal operating voltage even if the inside gas pressure decreases to atmospheric pressure as long as no switching operations are performed.	Gas insulated switchgears are compact and designed to withstand normal operating voltage at rated pressure of gas filled. If the inside gas pressure decreases, we recommend to disconnect and earth the circuit. Due to safety reasons, this clause of technical specification is not recommended. Owner may please review and issue suitable amendment.	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
134	Volume IV - Electrical Works	Chapter - 4	10 of 88	4.04.11	Viewing windows shall be provided at the disconnectors and earthing switches to ensure that each contact position can be inspected.	Bidder would like to clarify that bidder shall provide Mimic with semaphore indicators in the panel front so that the switching positions of the Circuit Breaker and the Disconnector can be viewed easily. Also, Numerical relays shall have a digital mimic diagram on the relay screen where-in all the switching positions can be seen. Also, on the drive mechanism of Circuit breaker and 3 position disconnector cum earth switch, we provide mechanical indications of ON-OFF & earth position. Hence, Viewing windows is not recommended by OEM.	Bid specifications to be followed.
135	Volume IV - Electrical Works	Chapter - 4	12of 88	4.04.32	These insulators shall be designed to have high structural strength and electrical dielectric properties and shall be free of any voids and free of partial discharge at a voltage which is at least 5 % greater than the rated voltage.	PD test voltage and PD values shall be as per type tested design & inline with relevant IEC 62271-203 Table -6.	PD test voltage and PD values shall be as per relevant IEC.
136	Volume IV - Electrical Works	Chapter - 4	14of 88	4.04.44	….suitably sub-divided into individual arc and gas- proof compartments preferably for: a) Bus bars b) Intermediate compartment c) Circuit breakers d) Line disconnectors e) Voltage Transformers	Bidder shall follow the gas partitions as shown in the tender SLD, 400kV GIS SINGLE LINE DIAGRAM, Drg. No. 112-10-200. Please confirm.	Switchgear shall be suitably sub-divided into individual arc and gas- proof compartments preferably for: a) Bus bars b) Intermediate compartment c) Circuit breakers d) Line disconnectors e) Voltage Transformers f) Current Transformer
137	Volume IV - Electrical Works	Chapter - 4	15 of 88	4.04.48	Clear space of 5 meters shall be provided on three sides of the GIS equipment for easy movement along with equipment / trolley Clearance on maintenance bay side shall be at least 10 meter wide (clear space from edge of GIS (400kV) to inner edge of wall).	Owner is requested to accept the clearance for maintenance bay and clear space as per GIS vendor recommendation.	Bid specifications to be followed.
138	Volume IV - Electrical Works	Chapter - 4	16 of 88	4.05.01.g)	Spring Operating Mechanism, one for each pole, shall be employed for closing and tripping the circuit breakers. 220-V DC will be used for control / tripping.	Bidder request Owner to accept drive mechanism for 400kV GIS breaker as per OEM type-test design.	Bid specifications to be followed.
139	Volume IV - Electrical Works	Chapter - 4	20 of 88	4.07.07	The gap between open contacts shall withstand at least rated phase to ground voltage for eight (8) hours at zero-gauge pressure of SF6 gas. The breaker shall also withstand all dielectric stresses in open position at SF6 lockout pressure for 60 minutes.	Test on 8 hrs at zero pressure is not specified by any standards. We comply as per IEC 62271-100. We confirm that breaker will withstand all Dielectric Stresses imposed on it in Open Condition at Lockout Pressure for 15 minutes (i.e. 2 p. u. Power Frequency Voltage across the Breaker).	Noted, however bidder shall submit type test report for the following test also: 1) Test to demonstrate the Power Frequency Withstand capability of breaker in open condition at lock out pressure for 15 minutes (i.e. 2 p. u. Power Frequency Voltage across the Breaker). 2) Electromagnetic Compatibility Tests (if applicable) 3) Radio Inference Voltage Tests
140	Volume IV - Electrical Works	Chapter - 4	54 of 88	4.28.06	BREAKER FAILURE PROTECTION RELAY	Local breaker back-up protection for Main bays shall be offered as part of Busbar protection bay units. Separate relays are not envisaged. Please confirm.	Noted. LBB protection as a built-in function of Bay Protection Unit/ Bus Bar Protection is acceptable provided it meets all the requirements specified for the LBB function.
141	Volume IV - Electrical Works	Chapter - 4	70 of 88	4.35.11	All disc insulators shall be dimensioned appropriately so as to have the required Electro - Mechanical strength for EHV outdoor duties.	Kindly confirm if bidder can also propose long rod insulator in place of Disc insulator.	Noted.
142	Volume IV - Electrical Works	Chapter - 4	76 of 88	4.39.06	At least one local control cubicle (LCC) shall be tested together with the GIS during factory acceptance tests	As the 400kV equipment will be sent separately to site and complete bay assembly will be done at site, it is not feasible to test assembled bay with LCC in factory. Hence it shall be tested through simulator. However, assembled bay with LCC will be tested at site as per specification. 'The requirement of testing on completely assembled bay can be done at site only & it is not part of the routine tests. Please confirm acceptance.	Noted.
143	Volume IV - Electrical Works	Chapter - 4	80 of 88	ANNEXURE – B	22. Noise level - 48 dB	During switching operation Noise level shall be as per OEM type tested design. However, noise level of GIS under charged condition shall not exceed 48 dB as per tender specification. Also please clarify the distance at which the noise level shall be measured.	Noise level at base and up to 500 mtrs from base of circuit breaker shall be 140 dB (Maximum).
144	Volume IV - Electrical Works	Chapter - 4	80 of 88	ANNEXURE – B	Max. SF6 Operating pressure <= 8.5	Operating pressure varies from manufacturer to manufacturer. Bidder request HPGCL to consider the pressure levels as per type tested design.	Noted
145	Volume IV - Electrical Works	Chapter - 4	81 of 88	ANNEXURE – C	SF6 to Air bushing - Material of enclosure - Porcelain As per clause 4.15.00 of Volume IV - Electrical Works, . The bushing can be with composite insulators (Silicon rubber) or with porcelain insulators with all surfaces free from imperfection.	There are two contradicting clauses in technical specification. Hence, we would like to offer composite type SF6 to Air bushing in line with the mentioned clause, which is widely being accepted by all utilities.	Noted. Porcelain or composite isulators type bushing can be used.

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146	Volume IV - Electrical Works	Chapter - 5	5 of 37	5.03.02	Phasor Measurement Unit (PMU)	Supply of PMU is not considered under this contract. If PMU is supplied by HVPNL, then the bidder shall provide space inside the building to locate the PMU panel and shall extend auxiliary supply, CT, PT, GPS signals to the PMU panel in order to facilitate PMU data transfer to LDC. Integration works with PDC is also excluded from Bidder's scope.	Bidder to provide only space provision and interfacing arragements for PMU.
147	Volume IV - Electrical Works _____ Volume IV - Electrical Works	Chapter - 6 _____ Chapter - 6	6 of 105 _____ 26 of 105	3.06.00 _____ 6.02.07	The transformer and all its accessories including bushing/ built in CTs etc. shall be designed to withstand without damage, the thermal and mechanical effects of any external short circuit to earth and of short circuits at the terminals of any winding for a period of 5 secs. shall be demonstrated by Bidder by calculations. The dynamic ability to withstand short circuit shall be demonstrated (a) by tests or (b) by furnishing the test report of transformers supplied by the Bidders or (c) by means of calculations as per IEC 60076. The short circuit level of the 400 kV System to which the transformers will be connected is 63kA for 1 sec (sym, rms, 3 phase fault). _____ Following type tests **shall be performed on one transformer of each type and rating** in accordance with relevant standard: Dielectric type test - Short circuit test	There is a discrepancy between two clauses, hence Bidder understands that the referred clause no. 3.06.00 will be followed. Owner may please confirm bidder's understanding.	Clause no. 6.02.07 of Chapter 6, is for Type Test to be conducted on Power Transformers, however owner reserve the right to waive off conducting any or all tests. In case Short circuit test is waived off, then as per Clause 3.06.00 (b) & (c) of Chapter 6, bidder shall demonstrate dynamic ability of transformers to withstand short circuit.
148	Volume IV - Electrical Works	Chapter - 13	20 of 43	13.06.18.xviii)	Accordingly, all numerical relays shall be connected to the respective panel redundant ethernet switches through suitable communication cable (RJ45).	Please furnish the requirement of communication Architecture-PRP (or) HSR (or) RSTP that need to be followed for SAS at 400kV switchyard.	Communication Architecture for SAS at 400kV switchyard shall be PRP.
149	Volume IV - Electrical Works	Chapter - 24	1 of 23	24.04.00	Battery size	The battery for Switchyard has been sized by considering the worst case condition as tripping of all circuit breakers connected to one Main bus in the event of a busbar fault. Please confirm.	As per clause 1.29.05, Chapter-1, Volume-IV, batteries are to be sized for two hours. The switchyard battery shall meet the following conditions: 1. Emergency lighting in 400kV Switchyard Control Room & GIS Hall. 2. All continuous DC loads of Relay & Control Panels. 3. Interlocking coils of isolator /earth switches. 4. Loads in worst of the following conditions: i. Simultaneous operation of the maximum number of breakers & associated euipments in case of bus fault. ii. Operation of breaker failure relay (LBB Relay).
150	Volume IV - Electrical Works	Chapter - 25			Switchyard outdoor lighting	Bidder have considered mounting of light fixtures on towers, gantries & building structures in addition to lighting masts to achieve better uniformity for illumination of the Switchyard.	Noted
151	Volume IV - Electrical Works	Chapter - 25	5 of 34		In the hazardous areas like Hydrogen generation plant, fuel oil handling areas or any other gas/ liquid fuel storage/ handling areas in bidder’s scope, lighting shall be flame proof.	Bidder understands that the Switchyard shall fall under non-hazardous area. Please confirm	Confirmed.
152	Volume IV - Electrical Works	Chapter - 36	2 of 30	36.02.00	Augmentation & Modification of existing 220 kV switchyard including ACSR busbars, Bus Coupler Bay, protection & metering system, SCADA system (SAS), extension of shield wires, fencing, earthmat, trenches, roads, drains, shifting of existing Main-Bus I & II EMVT and transfer Bus EVT (from Bay 14 side toward Bay 1) etc. and all other interfacing provisions are in the scope of EPC Bidder.	Owner is requested to provide the following details for 220kV existing switchyard: 1. Existing make & model number of SAS system 2. Existing SAS Architecture of 220kV Switchyard 3. Existing busbar protection type (centralised or decentralised) 4. Existing busbar protection relay make and model no.	Reqisite information is as below: 1. Siemens Make, DIGSI-4.82 2. All Relays connected with PAS Station Unit with Ethernet Switches 3. Decentralised 4. Main Bus Bar Protection Relay- Siprotec- 7SS52 and feeder Bus Bar Protection Relay- Siprotec-7SS52
153	General				PQM	Bidder is not considering any Power Quality meters in our scope as the same is not mentioned in specification. Please confirm.	Confimed
154	General				Line lengths	Please Furnish the location of remote end switchyard along with line length of outgoing 400kV lines, in order to choose the appropriate protection & communication interfaces.	Line length of outgoing 400KV lines will be less than 200KM.
155	General					Owner is requested to provide following for 400kV & 220kV switchyard: 1. Substation Automation System Architecture 2. Energy Distribution and Monitoring System Architecture	Available drawings of exisiting 220kV SAS are being uploaded as Attachment 11 However, being an EPC job, bidder to visit the site for further details. Further for 400kv system Drg No. 112-10-0400: SAS Configration Diagram and Drg No. 112-10-0500: EDMS configuration are being uploaded as Attachement 15 and 16 respectively.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
156	Vol-IV	Chapter-1(Electrical Scope of Work) Chapter-11(11 KV & 6.6 KV Switchgears)	12 of 58 4 of 41	Cl. No. 1.07.11 Cl. No. 11.03.09	In 11 kV Switchgear breaker rating of shall be standardized to have same rating among the group of feeders mentioned below: i. Outgoing feeders ii. Incomer to Station Switchgear, Tie between Station Switchgears and Outgoing Tie Feeder to Unit Switchgear. Breaker rating of various feeders shall be standardized to have same rating among the group of feeders as indicated below: 11kV Switchgear • Outgoing feeders, • Incomer to Station Switchgear, Tie between Station Switchgears and Outgoing Tie Feeder to Unit Switchgear.	Bidder proposes following: i. Outgoing feeders: - As per Vol-IV, Chapter-1(Electrical Scope of Work), Cl. No. 1.20.04, Outgoing feeders to motors shall be rated for Motor nameplate current rating with 10% margin rounded off to the next higher rating. - Outgoing feeders to transformers shall be rated for respective transformer rating. - Outgoing Tie feeders to 11kV Switchgear shall be rated for respective downstream 11kV Switchgear load with 10% margin rounded off to the next higher rating. Ii. Outgoing Tie Feeder to Unit Switchgear rating shall be same as Unit switchgear Incomer.	Bid specifications to be followed.
157	Vol-IV	Chapter-1(Electrical Scope of Work) Chapter-11(11 KV & 6.6 KV Switchgears)	12 of 58 29 of 58 4 of 41	Cl. No. 1.07.11 Cl. No. 1.21.02 Cl. No. 11.03.09	In 6.6 kV Switchgear breaker rating of shall be standardized to have same rating among the group of feeders mentioned below: i. Incomer and bus coupler ii. Outgoing motor feeders The incomers, bus coupler and bus bars of 6.6 kV switchgear shall be sized (continuous thermal rating) as per the LV winding current rating of AT at principal tap with rounded off to the next higher rating. Breaker rating of various feeders shall be standardized to have same rating among the group of feeders as indicated below: 6.6 kV Switchgear • Incomer and bus coupler. • Outgoing Motor.	Bidder proposes following: i. Bus-coupler rating as 2/3 rating of respective Incomer in line with other utility practice and successfully executed projects. ii. As per Vol-IV, Chapter-1(Electrical Scope of Work), Cl. No. 1.20.04, Outgoing feeders to motors shall be rated for Motor nameplate current rating with 10% margin rounded off to the next higher rating.	Bid specifications to be followed.
158	Vol-IV	Chapter-1(Electrical Scope of Work)	27 of 58 & 29 of 58	Cl. No. 1.20.06 & 1.21.04	Asymmetrical short circuit current breaking capacity of the breaker shall consider the higher time constant for decay of current in the vicinity of power generating stations and the breaker offered shall be suitable for this duty.	Requirement is not clear to Bidder. Bidder requests Owner to elaborate the term "in the vicinity of power generating stations " with reference to Asymmetrical short circuit current breaking capacity of the breaker.	Due to large time constant of generator and transformers in power plants, breakers are required to interrupt currents with high DC components. Further, Type test T100A must have been carried out both for 11kV and 6.6 kV Switchgears being supplied for the power plant. In case of absence of valid type test report, same has to be carried out by the bidder without any implication.
159	Vol-IV	Chapter-1(Electrical Scope of Work)	28 of 58	Cl. No. 1.20.07	The 11kV Switchgear shall have the following spare feeders: i) Unit Switchgear & Station Switchgear: - One number dry type spare transformer feeder - One number oil type spare transformer feeder	Bidder requests Owner to clarify rating selection criteria for these type of spare transformer feeders.	Rating of spare feeders will be equal to highest rating Oil / Dry type transformer connected to the switchgear bus.
160	Vol-IV	Chapter-1(Electrical Scope of Work)	28 of 58	Cl. No. 1.20.07	The 11kV Switchgear shall have the following spare feeders: ii) Coal Handling Plant Switchgear, Ash Handling Plant Switchgear & FGD Switchgear: - One number dry type spare transformer feeder on each bus section. - One number oil type spare transformer feeder on each bus section.	Bidder requests Owner to clarify selection criteria for these type of spare transformer feeders.	Rating of spare feeders will be equal to highest rating Oil / Dry type transformer connected to the switchgear bus.
161	Vol-IV	Chapter-1(Electrical Scope of Work)	28 of 58	Cl. No. 1.20.09 (d)	"Restoration of normal operating condition shall be through planned manual changeover through synchro check paralleling or manual dead bus closing. All the above operations shall be possible to be carried out through DCS, including selection of breakers."	Bidder understands that operations referred in this clause only shall be carried out through DCS, including selection of breakers. Please confirm Bidder's understanding.	Restoration of normal operating condition shall be through planned manual changeover through synchro check paralleling or manual dead bus closing. All the above operations shall be possible to be carried out either from DCS or ECP, including selection of breakers.
162	Vol-IV	Chapter-1(Electrical Scope of Work)	29 of 58	Cl. No. 1.20.12	Current Transducers (for Y Phase), for giving analogue input to DDCMIS system from 6.6kV Motors shall be provided in the switchgear modules.	Bidder understands that this requirement is applicable for 11kV motor feeders as Cl. No. 1.20.00 pertains to 11kV Switchgears & there is similar dedicated Cl. No. 1.21.08 pertaining to 6.6kV motor feeder defining Current Transducers (for Y Phase) requirement. Please confirm.	In second para of Clause 1.20.12 of Ch-1 at Sheet 29 of 58 in Vol-IV, figure "6.6 kV" be read as "11 kV"
163	Vol-IV	Chapter-1(Electrical Scope of Work)	29 of 58	Cl. No. 1.21.01	There shall be one No. 6.6 kV Unit Auxiliary Switchgear (two bus section and two bus coupler).	Bidder proposes 6.6 kV Unit Auxiliary Switchgear with two bus section and One bus coupler as there shall be limited outgoing feeders from this switchgears. Also, bidder may adopt single continuous line-up for 6.6 kV Unit Auxiliary Switchgear bus-sections coupled through One bus-coupler & riser. This is in line with other utility practice and successfully executed projects.	Bid specifications to be followed.
164	Vol-IV	Chapter-1(Electrical Scope of Work)	29 of 58	Cl. No. 1.21.05	In each bus section of the 6.6 kV switchgear at least one spare feeder shall be provided for highest rating motor and one spare feeder for lowest rating Motor.	Bidder proposes to provide each bus section of the 6.6 kV switchgear with one spare feeder of highest rating motor.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
165	Vol-IV Volume-VII	Chapter-11(11 KV & 6.6 KV Switchgears) Main Single Line Diagram(112-10-100)	2 of 41	Cl. No. 11.01.02	Following minimum sets of 6.6 kV switchgears shall be provided 1. Unit Auxiliary Switchgear UAS-A 2. Unit Auxiliary Switchgear UAS-B 3. Station Auxiliary Switchgear SAS 4. DM Plant Auxiliary Switchgear DMPAS 5. Raw Water Auxiliary Switchgear RWAS 6. Bunker Auxiliary Switchgear BNKAS 7. Coal Handling Plant Auxiliary Switchgear CHPAS 8. Ash Handling Plant Auxiliary Switchgear AHPAS 9. FGD Auxiliary Switchgear FGDAS	Bidder requests Owner to allow 6.6kV Switchgear applicability based on load centre & respective consumer load rating specifically for the following switchgears listed in said clause of tender specification: " 3. Station Auxiliary Switchgear SAS 4. DM Plant Auxiliary Switchgear DMPAS 5. Raw Water Auxiliary Switchgear RWAS .... 9. FGD Auxiliary Switchgear FGDAS " Owner may please accept.	Station auxilairy switchgear SAS & DM Plant auxiliary switchgear DMPAS can be clubbed together to form a common switchgear and shall be be located near the bulk load centre. It shall also cater to the 6.6kv auxiliries of ETP (if applicable). However Raw Water auxiliary switchgear RWAS and FGD auxiliary switchgear FGDAS shall remain seperate & independent as per tender specification.
166	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	2 of 41	Cl. No. 11.01.04	Base channel frame of the switchgear with hardware in panel design.	The requirement specified in the referred clause is not clear. Bidder requests Owner to elaborate the term "with hardware in panel design".	Clause refers to base channel of the panels along with the Hardware (like anchor bolts / fastners) as per panel design.
167	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	3 of 41	Cl. No. 11.01.09	Bidder to ensure that spare feeders in 6.6kV Switchgear as mentioned in Chapter – 1 shall be provided at the time of handing over the plant (irrespective of the spares finalised during detailed engineering) subject to the contract provision.	6.6kV Switchgear spare feeders shall be considered as per Vol-IV, Chapter-1(Electrical Scope of Work), Cl. No. 1.21.05. Please confirm.	Spare feeders shall be provided as per clause 1.21.05 of Chapter-1 at Sheet 29 of 58 in Vol.IV, however final quantity of spare feeders will be considered at the time of handing over of the plant.
168	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	3 of 41	Cl. No. 11.01.11	Draw out Type Line PT in separate draw out cubicle to be provided in each 11/6.6kV Switchgear.	Bidder proposes Line PT in respective Incomer panel in line with other utility practice and successfully executed projects.	Bid specifications to be followed.
169	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	3 of 41	Cl. No. 11.01.12	Each bus section of the 11 kV / 6.6 kV HT switchgear shall be provided with separately mounted draw out type Bus PT in an independent cubicle.	Bidder proposes that Bus PT can be accommodated in Bus-rise panel in case of Switchgear with Bus-coupler.	Noted
170	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	3 of 41	Cl. No. 11.01.13	High breakdown voltage dielectric flooring shall be provided in the switchgear rooms housing the 11kV/ 6.6kV/ 415V panels.	The requirement specified in referred clause is not clear. Bidder requests Owner to elaborate the requirement.	In place of conventional insulating mats in front of panels, provide dielectric epoxy flooring in the switchgear rooms. Flooring shall be provided in width of 1.5 meters area in front of Panels without any break in front portion of gap between adjacent panels. . The thickness of the flooring shall be as per OEM standard.
171	Vol-IV Volume-VII	Chapter-11(11 KV & 6.6 KV Switchgears) Main Single Line Diagram(112-10-100)	5 of 41	Cl. No. 11.03.12	"......All the rating & requirements shown in the above drawings as well as enclosed Annexure, datasheets within this NIT document represents the minimum requirement only; exact rating, number and type of feeders etc. shall be decided by the EPC bidder considering indicated ratings & requirement as minimum."	Bidder requests Owner to allow HT Switchgear rating, quantity, type of feeder requirement based on load centre & respective consumer load rating.	Station auxilairy switchgear SAS & DM Plant auxiliary switchgear DMPAS can be clubbed together to form a common switchgear and shall be be located near the bulk load centre. It shall also cater to the 6.6kv auxiliries of ETP (if applicable).
172	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	6 of 41	Cl. No. 11.04.03 (iv)	Circuit breaker & vacuum contactors of identical rating shall be physically and electrically interchangeable.	Bidder shall provide type-tested HT Switchgear design. Inter-changeability mentioned for Circuit breaker & vacuum contactors of identical rating shall only be considered, if available in Switchgear supplier's type tested design. Please confirm.	Circuit breaker should be interchangable with identical rating circuit breakers. Similarily vacuum contactors should be interchangable with identical rating vacuum contactor.
173	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	9 of 41	Cl. No. 11.04.04 (xi)	Over voltage factor arising out of such switching operations shall not exceed 2.5 times the peak value of rated phase to neutral voltage at motor terminals. This shall be established by conducting over voltage test as per IEC draft document on substitute circuit at an approved laboratory such as CPRI (Central Power Research Institute, Bhopal) or KEEMA-Holland or CESI-Italy	Bidder requests Owner to accept valid type test certificate in lieu of conducting this test.	Noted, however validity of Type tests shall be as per latest Guidelines of CEA, otherwise Bidder has to carry out fresh type tests without any implications.
174	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	15 of 41	Cl. No. 11.04.11 (ix)	Suitable self powered transducers as per IS : 12784 Part - I for feeding signals to panel mounted electrical meters (ammeters , voltmeters, VAR meters and Wattmeter etc.) and DCC MIS , shall be provided. All transducers shall be tested as per IEC - 60298 (for impulse test etc) and SWC as per ANSI C 37.90a. 1989. All these transducers shall provide two decoupled 4-20mA output signals one for driving the meters and one for use in DDCMIS.	Bidder wish to clarify that all the meters in the switchgear shall received current & voltage input directly from respective CT & VT secondary. Transducer shall be provided only for DDCMIS signal interface. Please confirm.	Noted, furhter the current transducers (for Y phase) in all 11KV, 6.6KV and 415 V motor feeders will also cater Ammeter to be provided in the LPBS.
175	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	18 of 41	Cl. No. 11.04.12 (xiv)	Synchronizing relay, check relay, guard relay including auxiliary relay shall be provided in each switchgear for manual planned changeover	Bidder proposes to utilize functionality of respective feeder numerical relay in lieu of dedicated Synchronizing relay, check relay, guard relay including auxiliary relay as per said clause of tender specification. Please confirm.	Noted
176	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	18 of 41 37 of 41	Cl. No. 11.04.13 (i) Protections: Item No. 1.0, Note-4	Three number instantaneous under voltage relay (27) having an adjustable voltage setting range of 40% to 80% of 110V. Numerical under voltage relays (27) with time delay relay including VT fuse failure relay shall be provided for bus VTs.	Bidder proposes to utilize under-voltage function of respective feeder numerical relay in lieu of dedicated under voltage relay (27) required as per said clause of tender specification. Please confirm.	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
177	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	18 of 41 37 of 41	Cl. No. 11.04.13 (ii) Protections: Item No. 1.0, Note-4	Fuse failure relay with hand reset operation indicator and self reset contacts. "…….. including VT fuse failure relay shall be provided for bus VTs."	Bidder proposes to utilize function of respective feeder numerical relay in lieu of Fuse failure relay required as per said clause of tender specification. Please confirm.	Noted
178	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	19 of 41	Cl. No. 11.04.13 (iii)	Definite time delay relay (2) with repeatability of 1%, four parts of self reset contacts and a hand reset flag indicator, having time range 2.5 sec to 25 seconds.	Bidder proposes to utilize function of respective feeder numerical relay in lieu of Definite time delay relay (2) required as per said clause of tender specification. Please confirm.	Noted
179	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	19 of 41	Cl. No. 11.04.13 (iv)	High speed lock out relay with adequate contacts for tripping motor feeders connected to bus section.	Bidder proposes to utilize lock-out function of all the feeder numerical relays in lieu of High speed lock out relay required as per said clause of tender specification. Please confirm.	Bid specifications to be followed
180	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	23 of 41	Cl. No. 11.04.21	Finishing paint on panels shall be shade (light grey), RAL 7032 unless required otherwise by the Owner.	There is discrepancy in paint shade with reference to Vol-IV, Chapter-1(Electrical Scope of Work), Cl. No. 1.41.00, Sr. No. 15, which states paint shade as RAL-5015. Owner is requested to clarify which paint shade shall be followed.	Paint shade shall be RAL 7032 for matching with the panels of existing plant.
181	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	36 of 41	Protections: Item No. 1.0, Note-3	".....Apart from protection relays, each breaker shall be provided with separate discrete auxiliary relays for anti-pumping (94), trip annunciation (30), trip supervision (74), electrically reset type breaker contact multiplication (52X) relay and lockout (86) functions. Lockout relay shall be hand reset type."	Bidder proposes to utilize lock-out function of all the feeder numerical relays in lieu of High speed lock out relay required as per said clause of tender specification. Please confirm.	Bid specifications to be followed
182	Vol-IV	Chapter-11(11 KV & 6.6 KV Switchgears)	37 of 41	Protections: Item No. 1.0, Note-7	Separate locked rotor protection relay (50 LR) with auxiliary relay (50 LRX) shall be furnished	Bidder proposes to utilize function of respective motor feeder numerical relay (as per Vol-IV, Chapter-11(11 KV & 6.6 KV Switchgears), Protections: Item No. 1.0(C), (f), in lieu of Separate locked rotor protection relay (50 LR) with auxiliary relay (50 LRX)required as per said clause of tender specification. Please confirm.	Noted
183	Vol-IV	Chapter-1 (Electrical Scope of Work)	7 of 58	Cl. No. 1.02.41	In the GIS switchyard, necessary communication equipment shall be provided to transmit the required data & signals of the power station to State Load Dispatch Centre other necessary equipment shall be provided.	Bidder understands that communication equipment at plant end GIS switchyard shall be supplied under this clause. Any modification or other work at State Load Despatch Center (SLDC) end is not in bidder's scope. Please confirm Bidder's understanding is correct.	Noted
184	Vol-IV	Chapter-1 (Electrical Scope of Work)	8 of 58	Cl. No. 1.03.02	PLCC & FOTE System including 48V DC System for 400 kV Lines.	Bidder understands that PLCC & FOTE at plant end for 400kV lines shall be supplied under this clause. Remote line end PLCC and FOTE shall not be in bidder's scope. Please confirm Bidder's understanding is correct.	PLCC & FOTE System including 48V DC System at both end of 400 kV Lines is not in the scope of Bidder. Bidder only provide space for installation of the same in the 400kV switchyard control room .However Bidder shall provided (Only at Power Plant end)) outdoor switchyard equipments i.e. wave Trap, CVT & connecting Cables from CVT to PLCC/FOTE system.
185	Vol-IV	Chapter-4 (GIS)	2 of 88	Cl. No. 4.02.02 H	Metering panels with ABT energy meters and necessary hardware and software suitable for ABT scheduling/information/monitoring. Necessary erection and wiring shall be covered in the scope of the Bidder. ABT montoring system repeater HMI shall be provided at Main Control Room for Generator scheduling by Shift Engineer. Requirement of ABT scheme scheduling and monitoring scheme shall be finalized during detailed engineering.	Bidder's understanding is that metering system HMI is required in the Main plant/Generator control room. HMI is not required at 400kV GIS control room. Kindly confirm bidder's understanding is correct.	Confirmed.
186	Vol-IV	Chapter-4 (GIS)	4 of 88 ____ 20 of 88	Cl. No. 4.02.02 R _____ Cl. No. 4.08.1	Circuit breakers of line bays to be provided with PIR, if the Line Lengths are more than 200 KM (as Applicable). Also, circuit breakers for Line, GT, ST and ICT shall be provided with CSD (Controlled switching device). _____ The Circuit Breaker shall be equipped with controlled switching with consequent optimization of switching behavior when used in switching of transformers (ICT's, GT, STs) and Lines. The controller shall be provided in Main & Tie circuit breakers of transformer bays.	There is contradiction in the requirement of CSD for 400kV Circuit breakers between the two tender clauses. Bidder understands that CSD shall be required for circuit breakers of GT, ST and ICT bays and PIR is required for circuit breaker of outgoing lines. Further, Owner may please clarify the requirement of CSD for Tie bays and Reactor bay.	As per clause 4.02.02 (R) PIR requirement for 400KV lines is only applicable in case line length is more than 200KM. In case of DCRTPP, Yamunanagar, line length is less than 200 Km and hence PIR shall not be applicable. Exact line length shall be informed during detailed engineering. Further CSD device is to be provided for Main & Tie breakers controlling ICT,GT, ST and Reactor.
187	Vol-IV	Chapter-4 (GIS)	37 of 88	Cl. No. 4.26.01	Each set of Relay Panel for GT Bay/ ST Bay/ICT Bay Relay Panel may contain 2 Nos. of vertical panels, each set of Relay Panel for Tie CB Relay Panel may contain 1 No. of vertical panel and one set of Busbar protection panel may contain 2 – 3 Nos. of vertical panels.	Bidder understands that it is not mandatory to segregate main & backup protection relays in separate vertical panel. Both main and backup protection relays can be installed in same panel. Please confirm the same shall be acceptable.	Bid specifications to be followed.
188	Vol-IV	Chapter-4 (GIS)	37 of 88	Cl. No. 4.26.06	Each 400 KV Line feeders shall have facility for live bus and dead bus closing. Live bus closing shall be ensured through synchro check relay and this synchro check relay is to be provided separately in each Bay Protection Panel.	Please confirm synchro check function as in-built function of BCU shall be acceptable.	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
189	Vol-IV	Chapter-4 (GIS)	43 of 88	Cl. No. 4.26.20 xiv)	Each numerical relay shall have a USB/serial interface on the front for local communication to a Personal Computer and Printer. Additionally, facilities shall be provided to access each discrete protection function including modification in relay settings and monitoring of the relay from a HMI. For numerical relays of switchyard, the HMI shall be located in SWYD control room at the Substation Level and for those in GRP, dedicated engineering /DR workstation has to be provided in CER. A printout of all settings, scheme logic, event records etc. shall be accessible through the HMI.	Considering that all switchyard relays will be communicating with SAS system, bidder proposes to use SAS engineering PC for the functions of relay setting, scheme logic, event records, etc. required as per given clause. Hence requirement of separate HMI for these functions can be eliminated. Please confirm bidder's proposal can be acceptable for 400kV switchyard relays.	Each numerical relay shall have a USB/serial interface facility on the front for local communication. No separate HMI required for front port communications with relays as there will be dedicated OWS/EWS HMI provided in the SAS.
190	Vol-IV	Chapter-4 (GIS)	44 of 88	Cl. No. 4.26.24.01	Availability Based Tariff Metering Panels	Based on the ABT panels details given in the table, bidder understands that ABT meters shall be installed inside the relay panels. No separate ABT metering panels are required. Please confirm bidder's understanding is correct.	Bid specifications to be followed, as separate ABT metering panels are required.
191	Vol-IV	Chapter-4 (GIS)	46 of 88	Cl. No. 4.27.00	3. Composite Numerical Directional Over Current (Instantaneous / IDMT) and Earth Fault Relay 67/67N	Please confirm 67/67N function as in-built function of Main-1 shall be acceptable.	Not acceptable and hence Bid specifications to be followed.
192	Vol-IV	Chapter-4 (GIS)	46 of 88	Cl. No. 4.27.00	4. Over-Voltage/ Under-Voltage Protection Relay 59/27	Please confirm 59/27 function as in-built function of Main-1 shall be acceptable.	Not acceptable and hence Bid specifications to be followed.
193	Vol-IV	Chapter-4 (GIS)	46 of 88	Cl. No. 4.27.00	STATION TRANSFORMER BAY PROTECTION PANEL	List of protection functions for station transformer bay have been defined as individual relays for transformer differential, REF, overcurrent, overfluxing, etc. Bidder wants to propose one multifunction numerical protection relay instead of separate relays for each protection function. Please confirm bidder's proposal shall be acceptable.	Bidder to provide two independent Numerical Protection Systems, each fed from a separate DC supply.
194	Vol-IV	Chapter-4 (Substation Automation System)	4 of 37	Cl. No. 5.03.01 vii)	Bidder shall offer the Bay Controller Unit (BCU) (one HOT and one COLD) for each bay in a diameter (One diameter will consists of three bays) at 400kV level.	Bidder understands one bay controller unit (BCU) for each 400kV circuit breaker and associated DS's/ES's shall be required as per given clause. Thus three (3 Nos.) BCU's per diameter shall be required. Please confirm Bidder's understanding is correct.	Only GT bay shall have 2 BCU (1 working + 1 redundant) for each breaker (main and tie breaker). Cabling for both BCU shall be common. In case of failure of working BCU, redundant BCU shall take over. For other 400 KV bays, single BCU shall be provided with each breaker. However, 2 Nos. spare BCUs shall be provided by the Bidder as mandatory spares.
195	Vol-IV	Chapter-4 (Substation Automation System)	4 of 37	Cl. No. 5.03.01 vii)	Co-ordination in commissioning of Phasor Measurement Unit: If PMU is envisaged by SLDC then the bidder has to make all arrangement to locate the PMU panel and extending auxiliary supply, CT, PT, GPS signals to the PMU panel and PMU data transfer to LDC are also included in the scope.	Bidder understands that PMU supply shall not be in Bidder's scope. Please confirm.	Confirmed, however space provision is to be kept for PMU and interfacing arragements are to be made for PMU by the Bidder.
196	Vol-IV	Chapter-4 (Substation Automation System)	17 of 37	Cl. No. 5.08.02 i)	Supplier will supply communication channels between the Substation Automation System and the Remote-Control Center.	Bidder understands that there is no work at remote control center (LDC/RLDC) under this project scope for bidder. Please confirm bidder's understanding is correct.	Noted.
197	Vol-IV	Chapter-4 (Substation Automation System)	19 of 37	Cl. No. 5.09.00 f)	Necessary Online Modem/Software required to transfer metering data to HVPNL/PGCIL Shall also be provided.	Bidder has considered all necessary works at 400kV GIS end only. No work related to modification/installation at remote end (ie., HVPNL/PGCIL) is envisaged by bidder under his scope of work. Please confirm bidder shall not be involved in remote end works related to supply, installation and modification, etc. except for coordination with 400kV GIS substation.	Noted.
198	112-10-100	Main Single Line Diagram	Sheet 1 of 2	–	LHP PMCC & LHPAT-1A & 1B LIGNITE HANDLING PLANT TRANSFORMER LHPT-A, LHPT-B	Bidder clarifies that as Lignite handling system is not applicable for this tender, hence these PMCC and Transformers are not applicable.	In Main Single Line Diagram 112-10-100 at Sheet 1 of 2, the word "Lignite" be read as "Lime".
199	Volume IV Volume II	Ch1: Electrical Scope of Work Ch 7: Painting	Sheet 50 of 58 Sheet 11 of 15	1.41.00 6.0(6.0)	4. LT switchgear:7042 6.0 Switchgear Light grey 631 (IS-5)	Shades mentioned at both the places are contradictory, hence shade-631 of IS-5 shall be considered inline with Ch 7: Painting. Owner may please confirm bidder's understanding.	Paint shade of LT switchgear shall be RAL 7032 to match with the panels of the existing plant.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
200	Volume IV & 112-10-100	Ch1: Electrical Scope of Work/Ch 32: Emergency DG Sets & Main Single Line Diagram	Sheet 51 of 58/Sheet 2 of 30 & Sheet 1 of 2	1.43.01/32.01.02 & FGD SLD	For FGD system two separate (1 working + 1 standby) 750kVA, 415V, **0.8pf,** 3 phase, 3 wire emergency set shall be considered. _____ Single Line Diagram FGD Main DG Set **P.F. = 0.85**	Power factor at both the places are contradictory . Please clarify.	Power factor of 0.8 be considered as per clause 1.43.01 of Ch-1 at Sheet 51 of 58 in Vol-IV.
201	Volume IV	Ch 8 : Neutral Grounding Resistors	Sheet 7 of 7	Data sheet_2.9	Insulation class of insulating material: Over 220°C class C	Data seems to be a value for temperature rise and not insulation class. Owner may please review and issue amendment.	Bid specifications to be followed.
202	Volume IV	Ch 15: Local Push Button Stations & Miscellaneous Equipment	Sheet 3 of 4	15.03.07	All LPBs shall be of Di-cast aluminium/ FRP. LPB shall be of following types: ☐ Type-A: With Stop Push Button in FRP enclosure ☐ Type-B: With Start & Stop Push Buttons in FRP enclosure ☐ Type-C: With Forward, Reverse & Stop Push Buttons in FRP enclosure	Bidder understands that both Di-cast aluminium /FRP are allowed. Further, please allow CRCA also as per standard practices.	Bid specifications to be followed.
203	Volume IV	Ch 16: AC & DC Motors	Sheet 8 of 22	16.16.04	At no stage, speed switch shall be provided to achieve requirements mentioned in Clause No. 16.16.01 to 16.16.03.	As per Motor OEM standard proven practice is to provide the Speed Switch, if the specification criteria not met . Hence, we request to Modify the clause no. 16.16.04 and issue amendment.	Bid specifications to be followed.
204	Volume IV	Ch 16: AC & DC Motors	Sheet 16 of 22	16.37.02_(ii)	Three (3) core cables …… stranded aluminium conductor, XLPE insulated, screened colour coded, laid up, FRLS PVC type ST2 sheathed, GI wire/strip armoured FRLS PVC type ST2 jacketed overall, 6.6 KV / 11 KV unearthed grade, heavy duty cables as per requirement for unearthed system as per IS: 7098 (Part-II).	In addition to the referred clause, bidder further clarifies that Single core cables as per sizing calculation and for ease of termination shall also be used for HT motors. Owner may please accept.	Bid specifications to be followed.
205	Volume IV	Ch 17 : Electrical Actuators With Integral Starters	Sheet 2 of 10	17.04.03	Power supply to electrical actuators shall be backed up with reliable battery supply.	Owner may please elaborate the tender requirement and area of application.	Reliable battery backup power supply shall be provided for microprocessor based valve integral digital display and control unit.
206	Volume IV	Ch 17 : Electrical Actuators With Integral Starters	Sheet 5 of 10	17.06.02 (vii)	At least two earthing terminals shall be provided for the motor body. Separate earting terminal should be provided for terminal box.	As per OEMs, two earthing terminals shall be provided, one on Motor body and one on Actuator terminal Box. Please accept.	Noted.
207	Volume IV	Ch 17 : Electrical Actuators With Integral Starters	Sheet 6 of 10	17.06.03 (i)	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.	Bidder would like to clarify that the same will be provided as per standard design of vendors approved by customer. Owner may please accept.	Noted.
208	Volume IV	Ch 17 : Electrical Actuators With Integral Starters	Sheet 5 of 10	17.06.02	The squirrel cage induction motor shall be designed for full voltage direct-on-line start, with starting current limited to 6 times full-load current.	Bidder clarifies that for smaller rating of actuators (<7.5kW) starting current limit shall be as per OEM offerings. Please accept.	Noted.
209	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	Sheet 6 of 28	4.a)	4)Terminal box a.Location: RHS viewed from DE / On top	Bidder would like to clarify that terminal box position shall be decided as per the layout requirement. Please accept.	Noted.
210	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	Sheet 7 of 28	7.a)	7) Electrical design a.Power Supply: 415 V +- 10%, 3-phase, 50 Hz + 5% & - 5%, 4-wire AC, 50 kA for 1 second, solidly earthed.	Bidder would like to clarify that power supply shall be 3 phase, 3-wire. Hoist panels shall be provided with integral control transformer to derive other voltage levels from 3 wire supply, hence neutral from upstream is not required. Same is also inline with 18.02.04 (1).	Noted.
211	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	Sheet 9 of 28	18.01.05	a) Power Supply system - 415 V+10%/-10% 3 phase and neutral 50 HZ +5%/-5%	Bidder would like to clarify that power supply shall be 3 phase, 3-wire. Hoist panels shall be provided with integral control trafo to derive other voltage levels from 3 wire supply, hence neutral from upstream is not required. Same is also inline with 18.02.04 (1)	Noted.
212	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	Sheet 15 of 28	18.02.04 (1)	1) LTAC: 415V, 3 phase, 50 Hz, 4 wire solidly earthed system.	Bidder would like to clarify that power supply shall be 3 phase, 3-wire. Hoist panels shall be provided with integral control trafo to derive other voltage levels from 3 wire supply, hence neutral from upstream is not required. Same is also inline with 18.02.04 (1)	Noted.
213	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	Sheet 18 of 28	18.02.07 (i)	Power cable suitable for 3 Phase, 4 wire, AC power supply system.	Bidder would like to clarify that power supply shall be 3 phase, 3-wire. Hoist panels shall be provided with integral control trafo to derive other voltage levels from 3 wire supply, hence neutral from upstream is not required. Same is also inline with 18.02.04 (1)	Noted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
214	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	Sheet 24 of 28	18.03.03	i) Power supply to the hoist shall be 415V +/- 10%, 3 phase, 50Hz +/- 5% AC 4 wire with solidly earthed neutral to be tapped from ACDB..	Bidder would like to clarify that power supply shall be 3 phase, 3-wire. Hoist panels shall be provided with integral control trafo to derive other voltage levels from 3 wire supply, hence neutral from upstream is not required. Same is also inline with 18.02.04 (1)	Noted.
215	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	Sheet 24 of 28	18.03.03	iii) Each transformer shall be provided with tappings at +5% & + 10% on the primary.	Bidder understands that this clause shall be read as "Each transformer shall be provided with tappings at ±10% in step of 5% on the primary". Please confirm.	Confirmed.
216	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	Sheet 23 of 28	18.03.01	ii) Flexible festoon cable system with supporting rollers & guide rail for power cable and for control cable.	Bidder understands that both festoon cable and DSL are required as mentioned at clause no. 18.03.04. Please Confirm.	Confirmed.
217	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	Sheet 25 of 28	18.03.04	Suitable arrangement shall be provided to intimate control room during emergency in the form of audio-visual alarm. Necessary contacts/auxiliary relays shall be provided.	Bidder would like to clarify that Cranes and hoists are stand alone Equipments meant for erection and maintenance duty & having no bearing in the operation of main plant and its auxiliary systems. Hence interlinking it with control room, Monitoring and signalling, mimic panel are not envisaged. Please accept.	Noted.
218	Volume IV	Ch 24: Battery & Battery Charger	Sheet 4 of 23	24.04.11	The procedure for estimating battery capacities shall be as per guidelines stipulated in IEEE-485 for Lead acid Battery. While estimating battery capacities, aging factor of 25%, temperature correction factor as per standard, contingency (10%), a design margin of 20% shall be kept. Derating factor for prolonged float charging shall be duly taken into account, as applicable, in estimating battery capacity.	Bidder would like to clarify that aging factor for plante batteries is considered as 1, as per the IEEE485. Further, Derating Factor for Prolonged Float Charging is not applicable for Lead Acid Batteries. Please accept.	Noted.
219	Volume IV	Ch 24: Battery & Battery Charger	Sheet 6 of 23	24.07.01	Note: The calculated minimum battery size is indicated in the BOQ. Bidder to offer the battery meeting the minimum size requirement as indicated in the BOQ.	Owner may please elaborate the clause.	Battery size shall be finalised during detailed engineering
220	112-10-100	Main Single Line Diagram	Sheet 1 of 2	Table-1 and Table-2	List of Motors at 11kV and 6.6kV in table format	Bidder understands that the list is indicative only and voltage level of motor shall be as per clause 1.27.00 of Volume-IV, Ch1: Electrical Scope of Work Sheet 36 of 58.	Noted.
221	Volume IV	Ch 25: Illumination System	Sheet 22 of 34	25.12.27	iv. All junction boxes, receptacles, lighting fixtures etc. shall be grounded with 8 SWG G.S. wire.	Bidder clarifies that all junction boxes, receptacles, lighting fixtures, lighting pole etc. shall be grounded with 14 SWG G.S. wire which is suitable for laying along with conduits and being considered in ongoing projects. Please accept.	Noted.
222	Volume IV/Electrical	Ch1/Electrical Scope of Work	29 of 58	1.20.13	11 kV Switchgears shall be provided with Vacuum Circuit Breakers (VCB). Vacuum contactor as an alternative to breaker is acceptable only for CHP & AHP.	Bidder understands that all the 11KV Outgoing transformer feeders shall be provided with vacuum contactor for CHP areas. Owner may please confirm	Vacuum contactors to be provided only for conveyor drives.
223	Volume IV/Electrical	Ch1/Electrical Scope of Work	30 of 58	1.21.09	6.6 kV Switchgears shall be provided with Vacuum Circuit Breakers (VCB). Vacuum contactors shall be provided only for the conveyor feeders	Bidder understands that all 6.6KV conveyor motor including crusher motor for CHP areas shall be provided with vacuum contactor . Kindly confirm	Vacuum contactors to be provided only for conveyor drives.
224	Volume IV/Electrical	Ch1/Electrical Scope of Work	30 of 58	1.21.09	6.6 kV Switchgears shall be provided with Vacuum Circuit Breakers (VCB). Vacuum contactors shall be provided only for the conveyor feeders	Along with CHP and AHP, frequent starting Motors such as Crushers, Wet ball Mill etc. in FGD shall also be provided with Vacuum contactor in case of HT drives. Please confirm.	Vacuum contactors to be provided only for conveyor drives.
225	Volume IV/Electrical	Ch1/Electrical Scope of Work	12 of 58	1.07.08	All electrical items located below ground (motors, JBs, Local Push Button, junction boxes, cable glands, lighting luminaires shall be flameproof type	Bidder understands that as a standard industrial practice, for CHP, FGD areas, use of non flame proof type Equipments (motors, JBs, Local Push Button, junction boxes, cable glands, lighting luminaires) below ground is acceptable as followed for past projects .Please accept.	Bid specifications to be followed.
226	Volume IV/Electrical	Ch 13/415V Switchgears & DC Boards	16 of 43 17 of 43 18 of 43	13.06.12 ii) 13.06.15 13.06.16	a) For Test control supply, the Bidder shall provide separate 415/110 control transformer. b) For TEST control supply control transformers of adequate rating (min. 2 KVA rating) shall be provided c) For control supply 415/110 V control transformers of adequate rating with 100% standby shall be provided.	Bidder understands that 2x100% control transformer shall be provided, which will function both for test and service mode control supply (415/110V) by Slide in Contacts available in Service Test position. Hence separate control transformer for Test is not required.	Noted.
227	Volume IV/Electrical	Ch1/Electrical Scope of Work	37 of 58	1.27.04	Locked rotor current of the LV motor shall not exceed 600% of full load current subject to 20% IS tolerance.	kindly note as per standard industrial practice starting current of LV motor shall be as per IS 12615:2018 subject to 20% IS Tolerance. Kindly confirm	Locked rotor current of LV motor shall be as per latest IS 12615.
228	Volume IV/Electrical	Ch1/Electrical Scope of Work	45 of 58	1.36.01	There shall be a maximum spacing of 1500 mm between cable tray supports, except fittings (elbows, tees, etc.) which shall be supported at each splice.	As a standard industrial practice, maximum spacing of 2000 mm between cable tray supports in horizontal run is acceptable. Same has been followed for past executed Projects. Please accept.	Bid specifications to be followed.
229	Volume IV/Electrical	Ch1/Electrical Scope of Work	31 of 58	1.22.14	For transformers rated 1000 kVA and below, cables shall be used on the LV side.	Kindly accept the option for Both cable and busduct based on layout suitability.	Cable and NSPBD - both can be used on LV side for transformers rated 1000 kVA and below.
230	Volume IV/Electrical	Ch1/Electrical Scope of Work	40 of 58	1.30.02	i) For 11kV - 50kA - 0.2 sec for outgoing motor feeders and transformer feeders and 50kA-1sec-for tie and incomer feeders. ii) For 6.6kV - 40kA - 0.2 sec for outgoing motor feeders 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.	Bidder further clarifies that for feeder protected by Vacuum contactor unit (VCU) shall be as per fault clearance time recommended by fuse manufacturer. Kindly accept	Noted, subject to the condition that the fault clearance time should be less than the rating of the equipments.
231	Volume IV/Electrical	Ch 13/415V Switchgears & DC Boards	8 of 43	13.06.01 ii)	All PCCs/PMCCs/MCCs except for the utility MCCs & Stacker Reclaimer MCC shall be fully draw out type having self-aligning type secondary plug-in contacts. All DBs and utility MCCs (as mentioned in single line diagram) & Stacker Reclaimer MCC (intelligent type) shall be fixed type. The design and construction shall be such as to allow extension at either end.	Bidder Clarifies that, Stacker Reclaimer MCC being a standalone panel and due to space constrain on machine, It will be Fixed type, Single front, non intelligent type, Compartmentalised, Floor Mounting, without rear access. As per standard industrial practice same has been considered for all the other past projects. Kindly accept the same for Stacker Reclaimer MCC and also for all other standalone Local starter cum control panel .	Stacker Reclaimer MCC shall be Fixed type, Single front, intelligent type, Compartmentalised, Floor Mounting, without rear access.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
232	Volume IV/Electrical	Ch1/Electrical Scope of Work	5 of 58	1.02.20	LV Dry type transformer neutrals shall be connected to earth pit through 1Cx400 sq mm XLPE cable.	As the LV transformers are indoor, earthing with cable of 400sq mm will not be suitable from the cable routing till pit. Bidder proposes to use 75x10 mm GS flat from Transformer neutral to Pits. Same is also inline with Volume IV Electrical Works, Ch 12 : Service Transformers Sheet 17 of 17 (sr. xxii). Please accept.	Specifications as per Clause 1.02.20 of Ch-1 at Sheet 5 of 58 in Vol-IV be followed.
233	Volume IV/Electrical	Ch1/Electrical Scope of Work	13 of 58	1.07.17	Sensitive relays, VFDs, other electrical and electronic devices shall be located in controlled environment such as air-conditioned control room and electronic equipment room as applicable.	Bidder proposes to provide VFD panels less than 100kW near to Motor loads as recommended by system OEMs. Such VFD panels shall be with IP-54, indoor installation as per OEM recommendation. Please accept.	VFD panels less than 15 KW can be located near to motor loads as recommended by OEM. Such VFD panels shall be with IP 55, indoor installation.
234	Volume IV/Electrical	Ch1/Electrical Scope of Work	35 of 58	1.25.08	LV power supply feeders shall have moulded case circuit breaker (MCCB) with ELCB for over current & short-circuit protection.	Bidder understands that MCCB with inbuilt overcurrent and earth fault protection to be provided. Please confirm.	Confirmed.
235	Volume IV/Electrical	Ch1/Electrical Scope of Work	35 of 58	1.25.09	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.	As Downstream Lighting panels are being considered with MCB with ELCB as incomers, the outgoing of LDBs shall be with MCCB only. Please confirm.	Clause 1.25.09 of Ch-1 at Sheet 35 of 58 in Vol-IV be read as:- "Lighting Distribution Board shall have 4 pole MCCB incomer & bus coupler and 4 pole MCCB outgoing feeder. Lighting panel shall have TPN MCB with ELCB incomer and SPN outgoing feeders. Further, there will be no fuses in Illumination System."
236	Volume IV/Electrical	Ch1/Electrical Scope of Work	41 of 58	1.20.10 (iii)	Above 19 core two or more of above cables	Bidder proposes to use 24C, 27C cables for OEM specific application such as ESP package and ILMS. Please accept.	Noted.
237	Volume IV/Electrical	Ch1/Electrical Scope of Work	43 of 58	1.32.01	Fire break shall be provided by applying a suitable fire-resistant coating on cables for the required length to meet the fire rating of 2 hours.	Bidder clarifies that as per prevailing practice fire rating of 30 min to be provided for fire break. Same is also inline with Ch 23: Fire Sealing System, Sheet 4 of 11.	In Clause 1.32.01 of Ch-1 at Sheet 43 of 58 in Vol-IV, the word / figure, "2 hours" be read as "30 minutes"
238	Volume IV/Electrical	Ch7/Electrical Scope of Work	5 of 18	7.05.01 (vi)	The transformers are to be provided with flanged bi-directional wheels & axles for rolling the transformer parallel to either center line 1676mm rail guage.	Bidder clarifies that for transformer rated 7.5MVA and below, rail gauge shall be as per manufacturer recommendation based on size of tank, as these transformers shall be directly lifted from their foundation/rail without requirement of Rolling.	For BOP area Transformer rated 5 MVA & above shall have Flanged Bi-Directional wheels & axles (with Locking arrangements) for rolling transformer (parallel to either centre line 1676mm) with rail gauge . The rail shall be provided for the transformers & shall be extended from foundation of the transformers upto the nearest approach road as per standard industry practice. Only for transformers rated below 5 MVA flat rollers shall be provided.
239	Volume IV/Electrical	Ch 11 : 11 KV & 6.6 KV Switchgears	2 of 41	11.01.01 & 11.01.02	Following minimum sets of 11 kV switchgears shall be provided: FGD Switchgear – FGDS Following minimum sets of 6.6 kV switchgears shall be provided: FGD Auxiliary Switchgear FGDAS	Bidder proposes to feed 11/0.433kV Transformers from Unit Switchgears, hence separate 11kV FGD Switchgear is not envisaged, Similarly HT Motors of FGD area shall be fed from Unit / station HT switchgears, hence separate 11kV FGD Switchgear is not envisaged. Similar Philosophy is being followed by NTPC/Other SEBs. Please accept.	In case there is no 11kV auxiliary in FGD system then 11kV switchgear is not envisaged for FGD. However, 6.6KV switchgear of FGD shall remain separate & independent as per tender specification.
240	Volume IV/Electrical	Ch 11 : 11 KV & 6.6 KV Switchgears	9 of 41	11.04.05	The circuit breaker shall be wired up for local & remote operation. Each breaker cubicle shall be equipped with following: ii. One (1) TEST/NORMAL/TRIAL mode stay put type selector switch with pistol grip handle and key interlock. iii. One (1) Spring return to neutral type close-neutral- trip control switch.	Switchgear breakers shall be provided with Numerical relays, which will have inbuilt front pad for selection of L/R, Trip/Close, hence separate mechanical selector switches will not be required. Similar philosophy is being followed by NTPC/Other SEBs. Please accept.	Bid specifications to be followed.
241	Volume IV/Electrical	Ch 12 : Service Transformers	4 of 17	12.01.15 (vii)	Three (3) Nos. duplex resistance winding temperature detectors / thermistors shall be provided in HV winding of each transformer.	Bidder clarifies that as per OEM designs, Three (3) Nos. duplex resistance winding temperature detectors / thermistors shall be provided in LV winding of each transformer.	Noted.
242	Volume IV/Electrical	Ch 12 : Service Transformers	5 of 17	12.01.15 (xii)	Off-circuit tap changers with lockable operating handle and mechanical tap position indicator shall be provided.	Bidder clarifies that as these are dry type transformers, OCTL (off Circuit Tap Links) shall be provided at HV side for facilitating Tap Changing. Please accept.	Noted.
243	Volume IV/Electrical	Ch 13 : 415V Switchgears & DC Boards	6 of 43	13.03.02	All PMCCs shall have duplicate incomers (only at the ends) with a bus-coupler at the center	Bidder clarifies that Incomers may be placed in between as per the layout requirement.	Bid specifications to be followed.
244	Volume IV/Electrical	Ch 19 : HV Cables	3 of 11 & 4 of 11	19.04.01 & 19.04.01 (ix)	...armoured with galvanized wire or strips for multi core cables … For three (3) core cables: - The armouring shall be of galvanised steel wire.	Bidder understands that armouring of multicore cables shall be with galvanized wire or strips. Please confirm.	Confirmed.
245	Volume IV/Electrical	Ch 20 : LV Power Cables	2 of 12	Sr. A (2) & A (5)	LV Power Cables … 2C x 16 sqmm Al XLPE Cable ….3C x 16 sqmm Al XLPE Cable	Bidder understands that these are preferred cable sizes, however actual cable sizes shall be as per calculation based on sizing criteria mentioned in specifications, and cable sizes of 2Cx6, 2CX10, 3CX6 and 3CX10 are also applicable. Please confirm.	Bidder's understanding is correct and mentioned sizes are preferred cable sizes. Actual cable sizes shall be as per calculation based on sizing criteria mentioned in specifications.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
246	Volume IV/Electrical	Ch 22: Cabling System	13 of 22	22.11.03	Laying of cables directly buried in ground is not acceptable	Bidder clarifies that cables for street light/High Mast shall run along the line up of poles/Mast, directly buried, with protection of brick layer and back filling. Please accept.	Cables for street lighting/High Mast shall be buried from the nearest overhead structure.
247	Volume IV/Electrical	Ch 25: Illumination System	15 of 34	25.09.17	For point wiring beyond lighting panel : i.e., from lighting Panel to junction Stranded conductor box (main run): 10 sqmm aluminium.	Bidder clarifies that Lighting wire of 2.5sq mm Copper shall be used from Lighting panel to Fixtures as per standard practice and for ease of wiring in conduits. Lighting fixtures in a circuit shall be limited based on 2.5sq mm copper wire. Please accept.	Noted.
248	Volume IV/Electrical	Ch 34: Variable Frequency Drive	3 of 17	34.04.07	VFD output shall be pure sine wave with harmonics distortion in output voltage and Current less than 3%.	Bidder clarifies that The Total Harmonic Distortion (THD) of the voltage and current at inverter output shall be as per IEC.	Noted.
249	Volume IV/Electrical	Ch 34: Variable Frequency Drive	8 of 17	34.08.02	Indoor dry type (for motors rated till 160kW)/ Outdoor ONAN type (for motors rated above 160kW)	Bidder clarifies that Transformer shall be dry type up to Motor rating of 400kW driven by LV VFD as per OEM recommendation. Please accept.	Bid specifications to be followed.
250	Volume VI Civil, Structural & Architectural Works	Ch 02: Scope of Work Sheet	1 of 7 & 3 of 7	2.6	Tentative list of various civil works covered under the scope is given below: 5. ESP control room 45. FGD Control room and MCC Building	Bidder clarifies that Switchgear and control room for ESP and FGD shall be located in Common ESP Cum FGD switchgear cum control Building. Please accept.	Noted. ESP switchgear & control Room and FGD switchgear & control room can be accomodated in common Building with following arrangement along with Elevators (of 8 persons Capacity): Ground Floor- Cable vault for ESP First Floor - ESP switchgear & control Room, Toilets (Ladies & Gents) Second Floor - cable Vault for FGD Third Floor - FGD switchgear & control room Fourth Floor - HVAC Equipments for Building
251	Volume IV/Electrical	Ch1/Electrical Scope of Work	45 of 58	1.36.01	Cable trays covers shall be provided for all top row cable trays and raceways.	Bidder understands cable trays covers shall be applicable only in outdoor area for horizontal runs.	Cable tray covers to be provided as per Clause 22.05.02 (iii) (g) of Ch-22 at Sheet 6 of 22 in Vol-IV.
252	Volume IV/Electrical	Ch1/Electrical Scope of Work	46 of 58	1.36.02 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.	As per standard design practice vertical spacing for trays shall be 300 mm measured from the bottom of the upper tray to the bottom of the lower tray. Please accept.	Noted.
253	Volume IV/Electrical	Ch1/Electrical Scope of Work	50 of 58	1.41.00	Light fittings - RAL 7035	Bidder propose colour code for lighting fixtures shall be as per OEM. Please accept.	Noted.
254	Volume IV/Electrical	Ch 10 : 6.6 kV & 11 kV Segregated Phase Busducts	3 of 14	10.01.02 iv) a	Outdoor portion of busduct shall be supported from the ground/floors on the steel supports.	Bidder propose outdoor portion of busduct shall be supported from building wall, for small rating outdoor transformers placed adjacent to building, to avoid interface with fire pipe, maintenance etc surrounding transformer. Please accept.	Bid specifications to be followed, however In front of TG Building A row wall of Transformer yard, bus Duct can be supported from Building wall.
255	Volume III Mechanical Works	Ch 33: Layout Requirements	8 of 11	29 (x)	Separate cable tray for optical fiber cable/UTP cable shall be provided.	Bidder proposes to lay the optical fiber cable/UTP cable in Perforated trays along with C&I cables as per prevailing practice. Please accept.	Noted.
256	Volume V Instrumentation & Control Works	Part B/Ch 6: Supervisory Control Panels, Supervisory control Desks, Equipment Panels	16 OF 26	6.20.02, iii	Minimum clear height between finished floor Level & False ceiling shall be 3600 mm for aesthetical purpose.	Bidder propose minimum clear height between finished floor Level & False ceiling shall be 3000 mm as being followed for ongoing projects.	Minimum clear height be kept as per Clause 6.20.02 (iii) at Sheet 16 of 26, Part-B, Ch-6, Vol-V.
Control & Instrumentation							
257	Volume-V/ Part-A	S No. 1	46 of 96	2.3 (F)	Condenser Tube Leak detection at each inlet & outlet CW line: Cation Conductivity (Insertion /Retractable Type)	Bidder wish to clarify that cation conductivity analyzer sample needs to be passed through cat-ion exchange column and hence insertion/ retractable type is not applicable. Specific conductivity insertion type is feasible and will be provided in hotwell (one on each side) inline with tender requirement. This is inline with latest NTPC tenders. Bidder request Customer to accept Bidder's proposal.	In second last row of table at Sheet 46 of 96 of Vol-V, Part-A, the word "Cation Conductivity" be read as "Specific Conductivity"
258	Volume-V/ Part-A	S No. 1	46 of 96	2.3 (F)	Deaerator: Silica, pH, Dissolved Oxygen	Bidder wish to clarify that silica & pH analyzer are already considered at Economizer inlet, separate silica and pH analyzer is not required at Dearator outlet. Bidder proposes to consider only DO analyzer at deaerator outlet. Please accept Bidder's proposal.	Bid specifications to be followed.
259	Volume-V/ Part-A	S No. 1	47 of 96	2.3 (F)	Any other analyser except Silica and Sodium shall be single channel only	Bidder wish to propose multi stream analyzer for Hydrazine and Chloride. This is inline with latest NTPC tenders. Please confirm.	Noted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
260	Volume-V/ Part-A	S No. 1	47 of 96	2.3 (F)	Any other analyser except Silica and Sodium shall be single channel only	Bidder proposes dual channel analyzers for pH, Conductivity, DO as per past project experience. Kindly accept Bidder's proposal.	Noted.
261	Volume-V/ Part-A	S No. 1	47 of 96	2.3 (F)	Triple and Dual analysers shall be provided for DM Plant Controls and chemical/O2 dosing controls.	Bidder wish to clarify that SWAS analyzers are not used in DM Plant controls. Also note that there is no plant Trip interlock on SWAS parameters. Hence, Bidder propose to have dual outputs from analyzers to DDCMIS for signals used in control application, instead of redundant analyzers. Request to confirm the same.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
262	Volume-V/ Part-A	S No. 1	50 of 96	2.3 (I)	Note-3: BOP/ offsite System shall have separate vibration analysis & diagnostic system. VMS system and VMAS system for complete plant shall be from single make and model only. VMS panels location indicated are minimum in the plant and same shall be finalised during detailed engineering. Bidder shall provide separate vibration monitoring, analysis and diagnostic system for Unit and BTG auxiliaries. Similarly vibration monitoring, analysis and diagnostic system shall be separate for plant BOP package / system like CHP, AHP, FGD and plant water system.	a) Vibration monitoring system for STG and BPFT shall be provided by OEMs as per their standard practice and make of the same may be different then the Main plant Vibration monitoring system. b) Common Vibration monitoring and analysis system shall be provided for SG, CHP, FGD and other BOP facilities. Please confirm	Bid specfiications to be followed.
263	Volume-V/ Part-B Volume-V/ Part-B	Chapter-2 Chapter-4	34 of 64 6 of 19	2.13.01 4.09.00	Four independent channel with selectable switching threshold for water conductivity Four isolated output relays for Hi, Lo, Hi-Hi, Lo-Lo Each of the switching systems shall be furnished complete with up to 2 nos. conductivity probes for Drip legs column for mounting the conductivity probes….. The electronic unit shall be separate & dedicated for each of the switching system.	Bidder wish to highlight discrepancy in Level switch channels requirement. Bidder wish to clarify that each drip leg shall have one high and one high-high level switch. Therefore, Bidder shall follow requirement given in Part-B/Ch 4 clause 4.09.00 for number of inputs and outputs. Please confirm.	Specifications be followed as per Clause 4.09.00 at Sheet 6 of 19 of Part-B / Ch-4, Vol-V.
264	Volume-V/ Part-A Volume-V/ Part-B	S No. 1 Chapter-4	10 of 96 11 of 19	3.00.00 (k) 4.15.01	Turbine supervisory system (TSS) including vibration analysers, vibration monitoring system, axial shift, eccentricity measurement system etc. for Main Turbine and BFP Turbine etc. Hardware and software provisions for diagnosis and analysis of plant auxiliaries vibration as indicated under Appendix-I to Part-A, Vol. V, "Contract Quantities other than DDCMIS item". Following minimum measurements are envisaged to be provided by the Bidder for supervisory purpose. However based on Bidder's standard and proven practice, the Bidder shall clearly identify and bring out the applicable measurements for his equipment's in techno commercial stage I – bid for owner's review/approval.	Bidder like to clarify that TSI measurements of BFPT shall be as per OEM standard. Bidder shall follow measurements provided in referred clause to the extent possible. Please confirm.	Bid specifications to be followed.
265	Volume-V/ Part-A Volume-V/ Part-A	S No. 1 S. No. 1	13 of 96 35 of 96	4.00.00 (i) 2.3 (A) (1.04.00)	Wall mounted/panel mounted Digital Display unit /Indicator shall be provided for Main steam pressure, temperature, Fuel flow, Generator load, MW export, MVAR, frequency, Turbine speed, Condenser vacuum for unit control room, off-site control rooms and service building. **CONTRACT QUANTITIES OTHER THAN DDCMIS ITEM** 50 nos. wall mounted/panel mounted digital indicators shall be considered by Bidder to be mounted at various place i.e TG floor, unit control room, BOP control room etc. Exact details shall be finalized by owner during detailed engineering.	Bidder wish to highlight that the 50 nos. of digital display units are on very higher side. Considering the locations indicated in the tender, Bidder proposes to consider 20 nos. of digital display unit. Please confirm.	Bid specifications to be followed.
266	Volume-V/ Part-A Volume-V/ Part-A	S No. 1 S No. 1	55 of 96 58 of 96		Standalone HMI: OWS: 1 no. for CPU REGN GIU: 1 no. for CPU REGN, Alkali dosing area GIU: 1 no. for CPU REGN, Acid dosing area Water system HMI: OWS: 1 no. for CPU REGN GIU: 1 no. for CPU REGN, Alkali dosing area GIU: 1 no. for CPU REGN, Acid dosing area	Bidder wish to highlight that the quantity of OWS & GIU for CPU regeneration, CPU Regeneration-Alkali dosing area and CPU Regeneration-Acid dosing area are indicated twice, under Standalone HIMI as well as under Water system HMI. Bidder request customer to check and delete the duplicated OWS & GIU.	OWS & GIU be supplied as per Sheet 58 of 96 of Vol-V / Part-A.
267	Volume V, Part A	Annexure II	57 of 96	A Stand Alone Common HMI	OWS Nos: 1, Clarified water Pump House Building CW chemical treatment, CW chlorination, Service Water Pumps.	Bidder request to check requirement of OWS in Clarified water pump house, the GIU are already considered inline with specification requirement. Please confirm.	OWS be supplied as per Sheet 57 of 96 of Vol-V / Part-A.
268	Volume V, Part B	Chapter 5	1 of 12	5.01.03	The SWAS panels shall comprise of two panels viz. Sample Conditioning Panel and Analyser Panel located in centralized SWAS room. All the SWAS panels shall be located in air conditioned area	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.	Bid specifications to be followed.

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269	Volume V, Part B	Chapter 9	17 of 36 18,19 of 36	9.02.08 9.02.08.03	For the applications specified at cl. No. 9.02.08.03 (a to f and h), FS cables shall be similar to the Fire survival control cables specified in electrical section (Vol. IV) except that conductor material shall be annealed tinned copper conductor. Size of conductor shall be same as defined at cl. No. 9.01.03.16. In addition the cables shall have high degree of immunity from electro¬magnetic interference. Fire Survival cables (Instrumentation, Power & control) for the applications specified at cl. No. 9.02.08.03 (g, i & j) shall be heavy duty mineral (Compressed MgO) insulated, solid copper sheathed, twisted annealed high electrolytic solid copper conductor and outer sheath covering with LSF/LSZH material. Complete cables for FDPS shall be Fire survival only. Fire survival cables (Power, Control and Instrumentation) shall be provided for the following applications, as these cables can withstand 750°C temperature for three (3) hours: i) Fire alarm, annunciation and protection system.	There is contradiction between clauses referred. Further, "Fire survival cables for complete FDPS" or "MICC cable for Fire alarm, annunciation and protection system" is not a industry practice. Bidder proposes to consider MICC cables for CHP and inert gas protected areas. For other areas of FPDS, Bidder proposes to use FRLS cables. This is inline with latest NTPC tenders. Bidder request Customer to accept Bidder's proposal.	Bid specifications to be followed, however MICC fire survival cables shall be provided in CHP. For other areas of FDPS applications, cable shall be fire survival type (withstanding 750 deg. C for a time upto 3 hours) in line with specifications provided in Vol-IV.
270	Volume V, Part B	Chapter 15	1 of 26	15.01.01, ii	All output signals of all stack monitoring analyzers shall be hardwired and connected to plant DCS/ DDCSMIS as applicable for monitoring, archiving and report generation for environmental monitoring authorities. DDCMIS & CEMS OWS shall be equipped/loaded with necessary Boiler/Stack emission monitoring system's calculations and report generation software packages for generation of report for submission to environmental monitoring authorities. This is specific application software, being supplied by Boiler/Stack emission monitoring system's sub vendor under bidder scope.	4-20mA signals from analyzers shall be hardwired to DDCMIS for monitoring only. Data for environmental monitoring authoritiies shall be provided from CEMS Datalogger/ OWS. Please confirm.	Noted.
271	Volume V, Part B	Chapter 16	11 of 18	16.06.00, iv, d)	The camera for FOPH and Fuel oil tank area, Ammonia unloading & handling area, H2 Area, O2 Area shall be explosion proof type and for CHP area, camera shall be flame proof type only.	Bidder wish to clarify that standard cameras shall be provided in CHP areas as considered for other areas. Explosion proof camera shall be provided only for FOPH, Fuel oil tank Area, Ammonia unloading and handling area, H2 area and Generator Seal oil skid area. This is inline with latest NTPC tenders. Please confirm	Bid specifications to be followed.
272	Volume V, Part B	Chapter 19	14 of 27	19.07.01.9 (iv)	Redundant Simulation Servers for running the simulation software : (qty as required)	Simulation servers could be integral to Instructor's OWS. Kindly, confirm this understanding.	Bid specifications to be followed.
273	Volume V, Part A, 1.0	-	44 of 96	2.01.00 Common Plant Areas - Other than Coal Handling plant	e. ADM Building Entry/Exit Gate Number of cameras: 322332	Bidder wish to highligh the typo error in no of cameras. Bidder understands that total 2 nos cameras are to be considered for "ADM Building Entry/Exit Gate" Kindly, confirm this understanding.	Noted.
274	Volume V, Part A, 1.0	-	54 of 96	Standalone System HMI	OWS 1 no IA/SA Area for IA/SA system	Bidder wish to clarify that HMI/ LCP of individual compressor/ dryer shall meet the functional requirement of local monitoring and operation. Additional OWS at Compressor house is not required and hence not considered. Please confirm.	Noted.
275	Volume V, Part B	Chapter 3.0	29 of 86	3.28.00	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. This is also inline with latest NTPC tenders. Kindly confirm.	Bid specifications to be followed.
276	Volume V, Part B	Chapter 3	56 of 86	3.47.14.03 MIS	The system shall have facility to store bulk data for 5 years duration with facility for retrieval of the same. Memory size of servers shall be designed & provided by bidder accordingly.	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.	Noted.
277	Volume V, Part B	Chapter 9	4 of 36	9.01.03.16 c)	Cables for binary signals used in relay based control system and Fire Protection & detection system shall be instrumentation paired cable of 1.5 Sq.mm conductor size, as per cl. No. 9.02.01 mentioned below with over all shielding only.	Bidder would like to clarify that, as per reputed fire detection system supplier, 0.5 sqmm instrumentation cable is more suitable than 1.5 sqmm cable. Hence request to allow to use 0.5 sqmm cable instead of 1.5 sqmm cable. Please accept Bidder's proposal.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
278	Volume V, Part B	Chapter 16	4 of 18	16.03.09	Facility for transferring camera images to separate recorders/ data storage devices like SAN (Storage Area Network)/NAS (Network Attached Storage) and play back facility of the same shall be provided. Bidder shall also provide additional data storage devices to store the backup data for one year.	Bidder would like to clarify that, as per past executed projects, for CCTV application, data storage shall considered as 90 days. This is inline with latest NTPC Tenders. Please confirm.	Noted.
279	Volume V, Part B	Chapter 16	11 of 18	16.06.00 iv	Camera Housing	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.	Bid specifications to be followed.
280	Volume V, Part B	Chapter 5	3 of 12	5.02.07	Power distribution board with external surge protection devices for distribution of Redundant UPS power supply with auto changeover circuitry & Non UPS 240/230 V AC power supply for all individual consumers as individual analyzers, auxiliary equipment inside and around the wet panel and Dry panel. Lighting receptacles and redundant fans shall be provided in each section of Dry panels. Each of the main systems shall have an individual isolation circuit breaker 2 pole type mounted nest to the individual power users. Panel fan failure, UPS feeder failure and 24 V DC feeder failure alarm shall be provided to DDCMIS.	Bidder understands that, Power distribution board will be part of SWAS dry panel only, separate Power distribution board is not required and hence same shall not be considered. Please confirm.	Bid specifications to be followed, however floor/wall-mounted power distribution board shall be acceptable.
281	Volume V, Part B	Chapter 15	4 of 26	15.01.03 (11)	Location of probe SO2/NOx/CO/CO2-On stack at approximate elevation of 35 Mtrs.	Bidder would like to clarify that, SO2/NOx/CO/CO2/Mercury probe location will be decided based on homogenous mixer of flue gas flow as per CPCB guidelines. Kindly confirm our understanding.	Confirmed.
282	Volume-V/ Part-A	S No. 1	50 of 96	2.3 (I) OTHER INSTRUMENTS	(j) Coal Crushers & conveyors (Motor + Driven Motor) Qty Bidder shall furnish microprocessor based vibration monitoring system for all HT motors and its associated pumps, fans, drives etc. for X, Y & Key Phasor directions, in BTG & BOP /offsite packages.	a) Bidder wish to clarify that Key phasor installation is not feasible for HT conveyors because of space constraints. Hence Bidder request Customer to remove the requirement of keyphasors in Conveyors. Please confirm 2. Bidder understands vibration sensors (X & Y end) are applicable for only HT conveyor motors & not conveyor (driven equipment). Please confirm.	Confirmed.
283	Volume-V/ Part-A	S No. 1	74 of 96	6.00.00	The Control System of CHP DDCMIS has following process blocks: i. All belt conveyors. ii. Track Hopper ii. Vibrating Grizzly feeders. iii. Belt Feeders iv. Crushers v. Flap Gates. vi. Dry Fog Dust Suppression System vii. Apron Feeder with dribble conveyor viii. Belt Weigher ix. Metal Detector x. In Line Magnetic Separator xi. Hydraulic Scoop Coupling. xii. Coal Sampling unit. xiii. Air Conditioning & Ventilation system for CHP xiv. Electrical system for CHP. xv. Service water system, Cooling water system and Potable water system. xvi. Compressed Air System for CHP.	Bidder understands that process blocks in Volume-V: PART A, Clause 6.00.00 indicates systems to be monitored/ controlled from CHP DDCMIS. Bidder proposes following process blocks for Control System of CHP DDCMIS: 1. CHP Stream-A 2. CHP Stream-B Please accept Bidder's proposal.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
284	VOLUME - VII TENDER DRAWINGS	Drg No 111-13-5210	48	-		Bidder proposes that 1 No of PT at discharge of each seal air fan of FGD inlet damper, FGD outlet damper & FGD bypass dampers. TT, TS & PS shall be provided in case separate heater is provided in seal air lines of FGD inlet damper, FGD outlet damper & FGD bypass dampers. Please confirm Bidder's understanding.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
285	VOLUME - VII TENDER DRAWINGS	Drg No 111-13-5210	48	-		In Bidder's FGD system, flow measurement of slurry at outlet header of slurry recirculation pumps is not used for control purpose. Hence, same shall not be applicable. Please accept.	Schemes/drawings provided in the tender are indicative, same shall be finalized during detailed engineering.
286	VOLUME - VII TENDER DRAWINGS Volume-V/ Part-A	Drg No 111-13-5210 & Drg No 111-13-5211 S. No. 1	48,49 50 of 96	I OTHER INSTRUMENTS	(k) Vibration sensor is indicated in Tender P&IDs for OAB, Absorber Emptying Pumps, Auxiliary Absorbent Pumps, Limestone Slurry Pumps, Mill circuit Pumps etc. For any other HT motors & driven drive envisaged for plant.	For FGD, Bidder understands that vibration sensors are to be provided for HT drives only, as per Vol. V: PART A, Clause-I OTHER INSTRUMENTS. Please confirm Bidder's understanding	Noted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
287	VOLUME - VII TENDER DRAWINGS	Drg No 111-13-5210	48	-		As per QFGDM proven practice, Absorber inlet SO2 value (without O2 Correction) is used for control of Limestone Slurry Feed. Absorber outlet SO2 measurement is not required for the same. Absorber outlet Flow measurement is not required for any control purpose in FGD. Hence, we propose the following 1. Absorber outlet SO2 analyser & FT is not envisaged. Absorber outlet SO2 & FT shall be measured from Chimney CEMS analyser & FT. 2. Oxygen analyser for Absorber outlet/outlet SO2 value correction is not envisaged. Please accept Bidder's proposal.	Schemes/drawings provided in the tender are indicative, same shall be finalized during detailed engineering.
288	Volume V Instrumentation & Control Works	Part B/Ch 2: Field & Measuring Instruments	46 of 64	2.19.01	PULL CORD SWITCH .... 4. "One number Trip indicator panel per conveyor, which shall display the exact number of safety switches (pull cord or belt sway switches) operated in a loop of conveyor considering 10% spare switches. ..... Trip Indicator panel shall be separate for PCS & BSS respectively.	Bidder proposes to consider one number combined Trip indicator panel with display for PCS & BSS per conveyor. Please accept Bidder's proposal.	Noted.
289	Volume V, Part B Volume V, Part B Volume V,	Chapter 2 Chapter 2 Chapter 2	46 of 64 47 of 64 47 of 64	2.19.01 2.19.02 2.19.03	PULL CORD SWITCH .... Degree of protection-Flame proof/Explosion proof for NEC class 2, Division 1 area BELT SWAY SWITCH Degree of protection : Flame proof/Explosion proof for NEC class 2, Division 1 area ZERO SPEED SWITCH Degree of protection : Flame proof/Explosion proof for NEC class 2, Division 1 area	Bidder understands that Flame proof/Explosion proof type of switches are not applicable for CHP & FGD area. Please confirm Bidder's understanding.	Bid specifications to be followed.
290	Volume V, Part B	Chapter 2	49 of 64	2.19.06	3 D TYPE ACOUSTIC WAVE LEVEL TRANSMITTER Application: each FGD Silos	Bidder understands that 3D Type acoustic wave level transmitter is not applicable for FGD Silos. Accordingly, Bidder shall consider Radar type LT for FGD Silos as per standard & proven practice Please confirm Bidder's understanding.	Fly ash silos and lime stone silos shall be provided with 3D Radar type level transmitters.
291	Volume III Mechanical Works Volume V, Part B	Ch 1: Steam Generator & Auxiliaries Chapter 2	170 of 186 49 of 64	8.07.00 2.19.06	Each dust hopper shall be provided with a high level and a low level dust level monitor operating on proven Radio frequency measurement principle. 3 D TYPE ACOUSTIC WAVE LEVEL TRANSMITTER Application: each ESP Hopper (First Field),…	Bidder understands that only RF type level switch (low and high level) is to be considered for each ESP dust hopper as per Volume III, Ch 1: Steam Generator & Auxiliaries, Clause 8.07.00. 3D Type acoustic wave level transmitter is not applicable for ESP Hoppers. Please confirm Bidder's understanding.	For all ESP Hoppers, RF type Level switches and indicators shall be provided.
292	Volume IV Electrical Works Volume IV Electrical Works	Ch 30: Electrostatic Precipitator	6 of 13 7 of 13	30.10.01 30.10.01 (ii)	The control system shall be designed for automatic and manual local/ remote operation. ESPs serving one boiler shall be provided with a complete control system consisting of microprocessor based Electrostatic Precipitator Management System (EPMS),... ii) The EPMS shall include, but not be limited to, the following features for each unit : a) The EPMS shall also be of same family DDCMIS	Bidder understands that EPMS shall be microprocessor based system as per Volume IV, Ch 30: Electrostatic Precipitator, Clause 30.10.01 as per our standard & proven practice. However, EPMS shall not be of same family as that of DDCMIS. Please confirm.	EPMS shall be PLC based system. However, EPMS may not be necessarily of same family as that of DDCMIS.
293	Volume V/ Part A Volume V/ Part B Volume V/ Part B	S. No. 1 Chapter 16 Chapter 16	45 of 96 13 of 18 14 of 18	4.00.00 (3) 16.07.01.06 (xiii) 16.07.03 (i)	Operating Stations: Eleven (11) nos. with 32" LED monitors 40" LED Monitors with 1920 x 1080 pixel resolutions & 178 deg V/H viewing angle. Configuration of Operating stations shall be same as specified at Vol. V, Chapter 3 with 40" sized LED monitors	Bidder wish to highlight discrepancy in monitor size for CCTV workstations. Bidder understands that monitor size shall be 32" inline with Cl. No. 4.00.00 (3) of Volume-V/ Part-A Please confirm.	Confirmed.
Civil Structural & Architectural							
294	Volume VI : Civil, Structural & Architectural Works	Chapter-2 (Scope of Work)	5 of 7	Cl. No. 2.6, Item No. 65	Proposed site is having trees all over the site. Cutting and removing the trees and clearing the site from all other obstruction is in the scope of bidder. Necessary permission to cut the trees from relevant department must be obtained by bidder himself at his own cost.	Bidder requests Owner to take mandatory permission from statutory authorities including MOEF, forest department for tree cutting. Bidder requests Owner to cut the trees prior to handover of clear site for execution, levelling and grading.	In the scope of bidder. However HPGCL will facilitate the bidder in this regard.
295	Volume VI : Civil, Structural & Architectural Works	Chapter-05 (Geo Technical Investigation)	7 of 7 1 of 7	Cl. No. 5.0	Attached Geo-tech Report by CENGRS for 2 x 300 MW existing plant Soil investigation report of the existing 2 x 300 MW (Units 1 & 2) adjacent to the proposed site is attached as a reference for the bidders.	a. Geo-technical report provided in the specification is incomplete. Bidder requests Owner to provide a complete Geo-technical report showing the latest sub-surface information. b. Also, Bidder requests owner to provide Soil investigation report and recommendations for the locations within new proposed plant.	Bidder may visit the site to collect further information.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
296	Volume VI : Civil, Structural & Architectural Works	Chapter-17(Architectural Works)	5 of 21	Cl. No. 17.6.4.1	Trees of different category and height shall be planted as per prior approval from Owner. In addition to above, Bidder has to develop Green belt by planting around 80,000 of trees in approximate 32 hectares of land ,location as approved by Engineer in charge. Green belt area as mentioned above is approximate. Actual area to be decided as/MoEF&CC guidelines.	Based upon MOEF Guidelines, Bidder request owner to confirm the followings: a. Bidder requests Owner to specify the exact requirement of Greenbelt area in hecatres and demarcate the same in plot plan drawing. b. Bidder requests Owner to specify the exact requirement of trees to be planted for Green Belt.	Green belt development as per tender specifications is in the scope of bidder. Maintenance of green belt till commissioning of plant or minimum 1 year after completion of Green belt development whichever is later is also in the scope of bidder. Green belt development shall be done by specialized contractor approved by forest department and HPGCL.
297	Volume VI : Civil, Structural & Architectural Works	Chapter-02(Scope of Work)	5 of 7	Cl. No. 2.6, Point 77	Clearing and removing the buried items if any in the whole proposed plant area and the same is to be deposited to the Client. Any infrastructure buried underground shall be demented/relocated by bidder without any additional cost.	Bidder requests Owner to make available Underground existing utilities survey report/As-built drawings to the bidder.	No list is available. Clearing and removing the buried items if any in the proposed 800 MW plant area shall be in bidder scope and the same is to be deposited to the Client.
298	Volume VI : Civil, Structural & Architectural Works	Ch 02 Scope of Work	1 of 2	15.1	Ash handling system shall comprise of bottom ash, coarse ash, fly ash handling systems, ash slurry pump house and ash compressor house, ash water pump house, **ash pipe supports including culverts, coarse ash tank, ash water sump bridges etc. upto the existing Ash Dyke.**	Bidder requests HPGCL to provide corridor survey report and drawing of Ash disposal piping route from plant to ash disposal area. Corridor route survey is required in order to understand the requirement of crossover, culvert, bridges, etc. for Ash disposal piping route.	No corridor survey report is available to collect required information. Bidder shall visit site and collect the data.
299	Volume VI : Civil, Structural & Architectural Works	Ch 02 Scope of Work	1 of 3	24.1	Free board of 1000mm minimum shall be maintained. The maximum level of Reservoir shall 250mm below the invert level of raw water **intake channel (leading to existing raw water reservoir).**	Bidder requests HPGCL to provide Raw Water Intake Channel/System drawings and Intake corridor survey drawing.	Bidder shall visit site and collect the data
300	Volume VI : Civil, Structural & Architectural Works	Chapter-5 (Geo-technical Investigation)	5 of 7	Cl. No. 5.5	Bore holes shall be located to cover the entire area. All bore holes shall be sunk up to a depth of 20.0 to 40.0 m as indicated in table below.	Bidder understands that Bore hole depth and Nos. shall be decided during detail engineering. Please confirm	Bid specifications to be followed.
301	Volume VI : Civil, Structural & Architectural Works	Chapter-5 (Geo-technical Investigation)	1 of 7	Cl. No. 5.2	As per the attached geotechnical report, It is advised to provide Pile foundation for boiler foundation, chimney foundation, cooling tower, main plant building structures,TG foundation, mill building foundation, mill foundation, conveyor gallery trestle (of height more than 25m) foundation, junction tower foundation, crusher house foundation, fly ash silo foundation including all other major structures in FGD and other areas. For conveyor gallery (of height less than or equal to 25m) foundation, type of foundation (pile/open foundation) shall be decided based on findings of final geotechnical report. For ESP and stacker reclaimer foundation if open foundation is feasible as per Approved Geotechnical report, bearing capacity corresponding to 25mm settlement of foundation shall be considered.	Bidder understands that the Type of Foundations for respective Structures may be decided by the bidder by detailed Geo-technical Investigation during detailed engineering stage. Please confirm.	Bid specifications to be followed.
302	Volume VI : Civil, Structural & Architectural Works	Chapter-10 (RCC Structures & Foundations)	1 of 46	Cl. No. 10.3	All RCC liquid retaining structures shall be designed as uncracked section for water face and cracked section with crack width limited to 0.1 mm for earth face in accordance with IS:3370 (Part 1 to 4) by working stress method, using limited steel stress. For all other underground structures such as conveying structures / slurry pump house/ pump houses / underground structures such as tunnels, reclaim hopper pit, not in contact with liquid on inside face may be designed as cracked sections with crack width limited to 0.1mm for both faces. Only CW Forebay & CW Channel may be designed for crack width as 0.2mm for earth face in accordance with IS:3370 (Part 1 to 4) by working stress method, using limited steel stress. However water face to be designed as uncracked section.	Bidder highlights that there is ambiguity in the Clause regarding Design Of Liquid Retaining Structures by Limit State Method for Cracked Section with Crack width 0.1 to 0.2 mm limits / by working stress method considering uncracked section using limited steel stress. Owner to confirm the same.	Bid specifications to be followed. Structure shall be designed with working stress method as already mentioned in tender document.
303	Volume VI : Civil, Structural & Architectural Works	Chapter-21 (Water Supply, Drainage & Sanitation)	1 of 13	Cl. No. 21.2 e)	The rectangular drains shall be minimum 450 mm wide of RCC construction. The pipes for water drainage system shall be of RCC class NP2 conforming to IS:458 with minimum size of 150 mm NB. However, for road crossings etc., pipe of class NP3 SHALL BE PROVIDED. For rail crossings, pipes conforming to railway loading standards shall be provided. If sufficient clearance cannot be provided between the top of the pipe and road top, the pipes shall be encased in RCC. Minimum clear width of drain shall be 300 mm.	Bidder shall consider 300 mm as minimum clear width of storm water drain (rectangular) as per clause 21.3 b). Please confirm.	Minimum clear width shall be kept 450 mm.
304	Volume VI : Civil, Structural & Architectural Works	Chapter-23 (Concrete Road & Rigid Pavement)	1 of 2	Cl. No. 23.1	The main plant access road and a portion of the main plant complex circumferential road shall be Type I.	For "portion of main plant circumferential road shall be Type-I" Bidder understands that the extent shown in Plot Plan is to be followed. For " main plant access road" Bidder requests Owner to clarify extent & location.	Main plant access road shall be type-I road and shall be as per layout to be finalized during detailed engineering. The main plant area shall encompass boiler, turbine, ESP up to chimney.
305	Volume VI : Civil, Structural & Architectural Works	Chapter-23 (Concrete Road & Rigid Pavement)	1 of 2	Cl. No. 23.1	Type II roads shall consist of one 4.5 metre wide RCC paved carriageway with 1.5m wide hard shoulders with drains on either side. A turning area at blind ends shall be provided. Plant areas where infrequent access is needed shall be served by Type II roads. Examples of Type II roads are the lay-down area roads.	Bidder understands that the extent shown in Plot Plan is to be followed.	Roads shall be provided as per layout finalized during detailed engineering. Shoulders shall be provided with 60 mm thick pre cast concrete pavers over 100 mm thick sand laid over 80 mm thick PCC M20 grade.
306	Volume VI : Civil, Structural & Architectural Works	Chapter-23 (Concrete Road & Rigid Pavement)	1 of 2	Cl. No. 23.1	Type III roads shall be of R.C.C & 3.75m wide with 1.0m wide hard shoulders on either side. Type III roads shall be provided along the plant boundary for access for security and maintenance.	Bidder understands that the extent shown in Plot Plan is to be followed.	Roads shall be provided as per layout finalized during detailed engineering. Shoulders shall be provided with 60 mm thick pre cast concrete pavers over 100 mm thick sand laid over 80 mm thick PCC M20 grade.
307						Bidder requests Owner to provide the Civil, Mechanical & relevant GA Drawings of Existing Raw Water Reservoir & RW Pump House	Bidder shall visit site and collect the data

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
308						Bidder requests Owner to provide the Civil, Mechanical & relevant GA Drawings of Intake Pump House & Raw Water Intake Corridor	Bidder shall visit site and collect the data
309						Bidder requests Owner to provide the Civil, Mechanical & relevant GA Drawings of existing Ash Dyke & Ash Disposal Pipe Corridor	Bidder shall visit site and collect the data
310	Volume VI : Civil, Structural & Architectural Works	Chapter-22 (SWITCHYARD CIVIL WORKS)	2 of 5	Cl. No. 22.2.2	The distance between terminal and dead end gantry shall be taken as 200 meters.	Bidder request the Owner to provide the exact location of TERMINAL.	out going gantry of the switchyard.
311	Volume VI : Civil, Structural & Architectural Works	Chapter-23 (CONCRETE ROAD AND RIGID PAVEMENT)	1 of 2	Cl. No. 23.1	Road leading to main gate of power house shall be double lane road with suitable berm. Minimum thickness of road shall be 25 cm and width of 7.5m each.	Power house building vicinity shall be paved with RCC paving whereas the referred spec clause is indicating the bidder to construct 19.5 m wide road including central berm from main gate of power house up to main gate. {Total width of road including Carriageway Width of 7.5 m (2 Nos), 1.5 m wide hard shoulders and central berm of 1.5m width(min) will be around 19.5m}. Bidder is unable to understand exact extent of this 19.5 m wide double lane road. Hence, Owner is requested to provide the mark-up for double lane road in the plot plan so that all bidders are at par.	19.5 M wide road stands deleted. Road from main gate to power house shall be provided as per layout to be finalized during detailed engineering.
312	Volume VI : Civil, Structural & Architectural Works	Ch-11 (Buildings Description)	5 of 18	Cl. No. 11.2	Main entrance to control room shall be provided with air locked lobby with automatic closing sliding glass doors. Lobby shall be formed of anodized aluminium framing with toughened sheet glass 6 mm thick. Partition between control room and adjoining rooms shall be of glazed aluminium partition with 300 mm high brick wall at bottom for toe protection. All the doors shall be single leaf glazed aluminium doors for all cabins. For movements of panels suitably sized double leaf aluminium glazed doors shall be provided. Control room wall upto the false ceiling level shall be of aluminium glazed partition on either side of air lock.	Based on Bidder's experience 2 Hour Fire-rated Glass would be required in CCR floor as per Fire zone requirement. Owner to please confirm so that every bidder are at par on this consideration.	Noted
313	Volume VI : Civil, Structural & Architectural Works	Ch-11 (Buildings Description)	5	Cl. No. 11.2	Battery room shall be provided with PVC doors in PVC framing.	As per standard practice doors for battery rooms are steel doors. Owner to please check and confirm.	Noted. Battery room shall be provided with steel doors.
314	Volume VI : Civil, Structural & Architectural Works	21 - Water Supply, Drainage & Sanitation	10	21.9	All other buildings shall have minimum one toilet block each.	Bidder understands that toilets shall be provided for manned buildings only. Owner to please confirm/review.	Bid specifications to be followed.
315	Volume VI : Civil, Structural & Architectural Works	Ch-11 (Buildings Description)	16	11.2.3	**Electrical & control Building** Main door to switchgear room shall be steel sliding door having adequate area to admit switchgear.	Bidder understands that Door could be swing type or rolling shutter type. The adequate size of door shall be provided as per requirement. Owner to please confirm	To be decided during detailed engineering.
316	Volume VI : Civil, Structural & Architectural Works	Ch-11 (Buildings Description)	16	11.2.3	Roof shall be given access by means of staircase.	Bidder propose staircase till roof to be provided in case of any equipment on roof which needs maintenance, else cage ladder will be provided till roof. Owner to please confirm.	Bid specifications to be followed.
317	Volume VI : Civil, Structural & Architectural Works	Ch-11 (Buildings Description)	11	11.12.a	Service Bldg For the accommodation of all Executives permanent brick wall not to be provided, **instead wooden partition wall of cubicle type is to be provided**	Bidder proposes Aluminium glass partition instead of wooden partition, this is as per current industrial practice and less maintenance compare to wood for end user. Owner to please confirm.	For accommodation of all executives, rooms shall be of brick wall only. For full height rooms, no wooden partition shall be considered. However, big size glazing/glass work shall be provided in all rooms on inner/outer wall of buildings. Further, all low height partitions shall be of wooden only. Quality of wood/ finishes to be used for partition work shall be approved by HPGCL.
318	Volume VI : Civil, Structural & Architectural Works	Ch-11 (Buildings Description)	11	11.12	Service Bldg Specially designed long RCC porch shall be given in front at the main entrance for receiving cars of VIP"s. Length of the porch shall be at least 15 m	Bidder to bring to Owner's notice that Entrance porch shall be good enough to accommodate a single lane road of 3.5 mt width. 15mt length of RCC porch will be too large and may not look proportionally great from aesthetic point of view. Owner may please review.	Length of the porch shall be at least 8 m.
319	Volume VI : Civil, Structural & Architectural Works	Ch-11 (Buildings Description)	11	11.12	The bidder has to furnish the three dimensional architectural plans along with the colour codes for the above buildings for approval of the Purchaser for adopting one among the alternatives proposed	Bidder understands that 3d Perspective Views shall be provided for Service building with external colour options. Owner to please confirm.	The bidder has to furnish the three dimensional architectural plans/ 3d perspective views along with the colour codes for TG building and service building for approval of the Purchaser for adopting one among the alternatives proposed.
320	Volume VI : Civil, Structural & Architectural Works	CH-17 (Architectural Works)	9	17.7.5.a	False flooring	This clause is conflicting with Clause 6.17, Owner to clarify which clause should be considered for False flooring / raised access floor.	Follow clause 6.17
321	Volume VI : Civil, Structural & Architectural Works	CH-6- (General Requirement of Buildings & Structures)	12	6.19	Statutory Requirements All masonry firewalls shall be minimum 345 thick and RCC firewall shall be minimum 200 mm thick	Bidder understands that as per industry practice only fire wall adjacent / facing transformer shall be 345 mm thick brick wall. Owner to confirm.	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
322	Volume VI : Civil, Structural & Architectural Works	CH-21- (Water Supply, Drainage & Sanitation)	2 of 13	Cl. No. 21.3 a) & Cl. No. 23.1	The drainage system shall be designed for a precipitation intensity equal to hourly rainfall for a return period of 1 in 50 years. However, storm frequency of 100 years return period shall be applied for Coal Storage area. These values shall be based on the recommendations of Indian metrological department (IMD). The drainage system shall be designed for precipitation intensity of 80mm per hour.	Bidder understands that precipitation intensity will be considered as 80 mm /hr. Please confirm.	Noted
323	Volume VI : Civil, Structural & Architectural Works	CH-21- (Water Supply, Drainage & Sanitation)	2 of 13	Cl. No. 21.3 i)	Invert of drainage pipe / drain shall be decided in such a way that the water can easily be discharged above the high water level in to **storm water holding pond**.	Bidder requests Owner to provide location of existing Storm Water holding pond with High Water level & Invert Level clearly indicated. Bidder request the Owner to provide OUTFALL location & details with Invert Level for Main Plant Area Storm Water Drains & CHP area Drains OUTFALL location & details with Invert Level separately considering the nature of the Plot Plan.	Bidder may visit the site to collect further information.
324	Volume VI : Civil, Structural & Architectural Works	CH-21- (Water Supply, Drainage & Sanitation)	5 of 13	Cl. No. 21.5.1	Sanitary sewers shall be designed for a minimum self cleansing velocity of 0.75 m/sec. and the maximum velocity shall not exceed 2.5m/sec.	Bidder noticed that as per CPHEEO Manual Clause No. 3.15.1, Table 3.9, consideration of Minimum Self Cleansing Velocity be taken as 0.6 m/sec at Initial Peak Flow. Please confirm.	To be decided during detailed engineering
325	Volume VI : Civil, Structural & Architectural Works	CH-21- (Water Supply, Drainage & Sanitation)	6 of 13	Cl. No. 21.5.1	All underground piping below concrete slab shall be cast iron of minimum 100mm dia and for outdoors it shall be reinforced concrete pipe of minimum 200mm diameter	Bidder requests that provision of 100mm diameter pipe for connecting SIP (Sewage inspection pit) to manhole be allowed and minimum diameter of pipe shall be 150mm (for population less than 1 lakh) as per CPHEEO manual. Please confirm.	To be decided during detailed engineering
326	Volume VI : Civil, Structural & Architectural Works	Ch 02 & Ch 11	5	2.6.66	Service building 3000 sqmts (G+3)	Please provide detailed requirement (for e.g., Size of rooms, No. of Rooms, Occupancy, etc.,) of service building.	The service building total area shall be 3000 sqm with (G+4). Operating floor of TG building shall be interconnected with service building. Detailed requirement shall be discussed during detailed engineering.
327	Volume VI : Civil, Structural & Architectural Works	Ch 02	6	2.6.84	Permanent store of 6000 sqm area shall be provided by the bidder. Out of this 3000 sqm shall be covered building	Bidder understands that 3000 sqmt of covered store and rest 3000 sqmts will be open store area.	Permanent store stands deleted from the scope of bidder.
328	Volume VI : Civil, Structural & Architectural Works	Ch 06	2	6.5	Vertical Head room Above False ceiling - 1000 mm	Space above false ceiling shall be as per requirement to accommodate services. Generally head room is not required above False ceiling. Please reconsider this clause.	Bid specifications to be followed.
329	Volume VI : Civil, Structural & Architectural Works	Ch 06	3	6.7.3	All stairs normally shall have not more than 15 risers in one flight. Aluminium angle nosing with minimum 50x25x3 angle or PVC nosing shall be provided for edge protection of RCC stairs	As per latest NBC, maximum number of riser shall be 12nos in one flight. Please confirm.	Noted
330	Volume VI : Civil, Structural & Architectural Works	Ch 06	3	6.8	For RCC stairs, handrails with 20 mm square MS bar balustrade with suitable MS flat & aluminium / Teakwood handrail shall be provided, unless specifically mentioned otherwise.	Bidder understands that teakwood or aluminium Top hand rail shall be provided for Service building only. As such handrail would not be compatible for other plant buildings. For other buildings bidder propose for 32 mm nominal bore MS pipes as per Clause No 6.8. Please confirm.	Teakwood top handrail shall be provided for service building. All other building shall be provided with 32 mm nominal bore MS pipes hand rails.
331	Volume VI : Civil, Structural & Architectural Works	Ch 06	12	6.18	Furniture All rooms shall be furnished for their intended use. The Contractor shall provide the Owner with a choice of furniture range	As per Clause 17.3 of chapter 3, furniture is to be supplied only for MPH control room complex be as specified under C&I specification.	Supply of furniture for all buildings in the project is in Bidder's scope. Furniture to be supplied shall be of Make-Godrej Interio, Durian, Wooden street or equivalent make as approved by HPGCL.CL.
332	Volume VI : Civil, Structural & Architectural Works	Ch 17	2	17.2.iv.	The consultant shall evolve the design philosophy based on Employer's guidelines and shall present it in the form of presentation drawings, Prospective views, 3-D Models & detail drawings	Bidders understands only digital 3D Perspective views shall be provided that too only for Service building and not physical 3D models. Digital 3D Perspective views are required for Central Control Room only. Owner to please confirm.	Bid specifications to be followed. Physical 3D models of the whole projects is also required to be provided by the bidder.
333	Volume VI : Civil, Structural & Architectural Works	Ch 17	3	17.4	Multiple drains (minimum 2) shall be provided for all roof areas. Any roof more than 8 m above grade shall have access from within the building for cleaning of roof drains	For cleaning Roof drains cage ladder outside building for roof access shall suffice requirement. Access within the building is not envisaged. Owner to please revisit this clause.	Bid specifications to be followed.
334	Volume VI : Civil, Structural & Architectural Works	Ch 17	4	17.6	**Landscaping**	Bidder understands that landscaping shall be provided for and around Service building only. Owner to please confirm.	Bid specifications to be followed.
335	Volume VI : Civil, Structural & Architectural Works	Ch 17	5	17.7.1	Plastering	Please provide external wall plaster thickness.	20mm thick plaster in mortar 1:4.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
336	Volume VI : Civil, Structural & Architectural Works	Ch 11	4	11.2	A roof shall be provided with roof water proofing treatment using high solid content liquid applied elastomeric water proofing membrane with separate wearing course as per ASTM-C-836 & 898. Thickness of the membrane shall be 1.5mm (min.). This treatment shall include application of polymerized mastic over the roof to achieve smooth surface and primer coat. Wearing course on the top of membrane shall consist of 25 mm thick PCC (1:2:4) cast in panels of maximum 1.2x1.2m size and reinforced with 0.56mm dia galvanized chicken wire mesh and sealing of joints using sealing compound/ elastomeric water proofing membrane. However, chequered concrete tile flooring 22mm (min.) thick of approved colour and shade conforming to IS:13801 shall be provided for path way of 1m width for access of personnel	Owner to confirm which water proofing detail to follow for TG building. The one specified in this section or in clause 17.4. The major variation is in wearing coarse thickness here it is mentioned 25 mm and in clause 17.4 is 40 mm.	Thickness of wearing coat shall be 40mm as mentioned in Cl.17.4 of specification.
337	Volume VI : Civil, Structural & Architectural Works	Ch 11	5	11.2	**TG Building** Portion of the structural steel column projecting into the room shall be encased with brick masonry to shield it from fire hazards.	Bidder understands that this is applicable only for CCR level floor plan up to Beam Column connection bottom level only.	Noted.
338	Volume VI : Civil, Structural & Architectural Works	Ch 11	5	11.2	**TG Building** Battery room shall be provided with PVC doors in PVC framing.	Please provide specification of PVC doors and PVC frames. Also owner to please check, as per industrial practice steel doors are provided for battery room.	Battery room shall be provided with steel doors.
339	Volume VI : Civil, Structural & Architectural Works	Ch 11	10	11.12	**Service Building** The building shall generally not exceed four storeys and shall be directly connected to the main plant building at operating floor. The floor area shall not be less than 1000 sqm for each floor.	Bidder understands that this clause is contradicting with Clause No. 2.6.66 of Chapter 2 where it is mentioned that Service Bldg. Area shall be 3000 sqmts with (G+3). In this Clause it is mentioned as 1000 sqmt per floor minimum with 4 storey building. **Owner to confirm.**	The service building total area shall be 3000 sqm with (G+4). Operating floor of TG building shall be interconnected with service building.
340	Volume VI : Civil, Structural & Architectural Works	Ch 11	11	11.12	**Service building** Seating accommodation for senior O&M executive along with supporting staff including furniture of latest style	Furniture arrangement is just to confirm the occupancy and space allocation. However furniture supply is not in scope of contractor. As per Clause 17.3 furniture is to be supplied only for Central Control room. Owner to confirm the same.	Supply of furniture for all buildings in the project is in Bidder's scope. Furniture to be supplied shall be of Make-Godrej Interio, Durian, Wooden street or equivalent make as approved by HPGCL.
341	Volume VI : Civil, Structural & Architectural Works	Ch 11	10	11.12	**Service building**	Please provide the sizes and number of rooms required, capacity for rooms like meeting room / conference room or provide occupancy for service building.	To be decided during detail engineering
342	Volume VI : Civil, Structural & Architectural Works	Ch 11	12	11.13	**Storage yard** The covered sheds shall be connected with bituminous roads in side storage yards	Please provide number of covered sheds and area, for storage yard.	Storage yard/ Permanent store stands deleted from the scope of bidder.
343	Volume VI : Civil, Structural & Architectural Works	Ch 11	12	11.14	Parking sheds shall be provided at service building, security complex, at CW pump house area etc., at all locations for operating staff. The parking sheds shall be of steel framed construction	Please provide number of cars for covered parking area for particularly each building /area.	Parking shed to accommodate 100 Nos. two wheelers vehicles and 50 Nos. four wheelers vehicles.
344	Volume VI : Civil, Structural & Architectural Works	Ch 17	9	17.7.5.i	**Cast-in-situ Terrazzo** Cast in situ terrazzo flooring shall be laid as per IS:2114, using white cement or cement with colouring pigment. Chequered finish shall be provided for treads. Total thickness of the finish shall be 25mm	Owner to please reconsider floor finish of staircase. As Cast in situ Terrazzo is not used on a days for floor finish.	Good quality granite flooring (color/quality as approved by HPGCL) shall be provided for staircase.
345	Volume VI : Civil, Structural & Architectural Works	Ch 17	12	17.7.7.e	Staircase wall shall be given dado of cast in situ terrazzo to a height of 2100mm. If Entrance lobby and lift area in Service building and Admin building shall be provided with granite tile dado to a height upto false ceiling level	Owner to please reconsider dado of staircase. As cast in situ terrazzo is not used on a days and aesthetically shall be some other materials that is widely used. Bidder proposes Ceramic glazed tile. Please confirm.	Noted.
346	Volume VI : Civil, Structural & Architectural Works	Ch 17	13	17.7.8	All inaccessible (where regular maintenance is not feasible) ventilators or windows of all buildings shall be provided with 6 mm thick Multiwall Polycarbonate plain or tinted sheet for preventing solar radiations.	Bidder request to reconsider this clause and 4 mm thick glass as per clause 17.7.10 shall be used instead of polycarbonate sheet. Aesthetically Polycarbonate may not be appealing over period of time.	Noted with slight amendment. 5mm thick glass shall be used.
347	Volume VI : Civil, Structural & Architectural Works	Ch 17	15	17.7.9	**Wall panelling** All the exposed structural steel i.e. wall, columns, bracings in STG control room and air-conditioning areas shall be provided with wooden wall panelling. The wall panel shall consist of teak wood batten grid of size 600x600 mm or as per site requirement. The size of batten shall be 2 inch x 1 inch. BWP grade plywood conforming to IS:710 shall be fixed on this grid. The Veneer of approved quality and shade shall be fixed on the plywood as exterior finish with suitable adhesive. The entire work shall be carried out to the satisfaction of engineer	Bidder understands that this Clause is contradicting with clause 17.7.7 where ceramic tiles are asked as dado till false ceiling. Bidder suggest to keep Ceramic tiles instead of wood cladding. Please confirm.	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
348	Volume VI : Civil, Structural & Architectural Works	Ch 17	15	17.7.11	Aluminium false ceiling system shall comprise of 84 mm wide 12.5 mm deep closed type plain panels of approved colour, roll formed out of 0.5 mm thick corrosion resistant aluminium alloy AA 5050	Bidder understands that the same type of false ceiling would be used in all the AC rooms for all Buildings.	Bid specifications to be followed.
349	Volume VI : Civil, Structural & Architectural Works	Ch 17	18	17.7.14.b	The tiles used for flooring & walls shall be 20 mm thick conforming to IS 4457. Tiles of approved quality and shade shall be used	Tile thickness is contradicting with clause 17.7.5.g where it is asked to use 25 mm thick tile. Owner to please clarify.	20mm thick tiles shall be used.
350	Volume VI : Civil, Structural & Architectural Works		15	17.7.10	For single glazed aluminium partitions and doors, Float glass or flat transparent sheet glass of minimum 6 mm thickness shall be used	Please confirm clear float glass or Toughened glass for partition and doors. As toughened glass is recommended for doors and partitions.	Toughened glass for partitions and doors to be used.
351	Volume VI : Civil, Structural & Architectural Works		21	17.7.15 Table 1	Service Building External wall Granular Finish Paint External	Granular Finish Specification in the tender document is missing. Owner is requested to furnish the same.	Bidder to submit the specification for owner's approval during detail engineering.
352	Volume II : General & Schedules Volume II : General & Schedules Volume II : General & Schedules Volume II : General & Schedules Volume VI : Civil, Structural & Architectural Works	Ch 1: Intent of Specification Ch 1: Intent of Specification Ch 1: Intent of Specification Ch 02: Scope of Work Ch 11: Buildings Description Ch 14: CHP	1 of 10 1 of 10 2 of 10 5 of 7 17 of 18 1 of 22	1.1 1.1 1.1 2.6 11.22 Ch 14 CHP	.....all electrical systems including switchyard, complete control and instrumentation and complete Civil, structural and Architectural works specified including Railways Siding/Tracks) e).....Coal Handling System including railway siding & railway tracks including track electrification, signaling etc., as per requirements of the Indian Railways, f).....railway siding and railway tracks, bridges and culverts for crossing of railways track inside plant area, landscaping and other miscellaneous buildings and structures. 64. Railway siding system and locomotive shed. RAILWAY SIDING SYSTEM Necessary statutory clearances/approval from Railways/Highway Authority / PWD shall be obtained by Contractor at his own cost.	Bidder understands that extent of railway siding and associated work is mainly governed by the requirement of respective zonal railway authority. Additionally, Feasibility report, Detail project report (DPR) and Engineering Scale Plan (ESP) of the proposed plant are not yet finalised from Indian Railway/RITES/RDSO. Those information's are not available in Tender documents also. In addition, some part of Railway track work is outside plant boundary. Hence, it is not possible to understand scope of Railway siding and associated works. Bidder requests owner to exclude overall railway siding and associated work from EPC bidder's scope of work. Owner to confirm the bidder understanding	Bid specifications to be followed..
353	Volume II	Ch 01 INTENT OF SPECIFICATION	3 of 10	1.1	Scope of the proposal Land for labour colony, **laydown area** for storage of equipment, fabrication yard or any other construction related activities is not available within the plant boundary. Bidder has to make his own arrangement to have these facilities outside plant boundary.	a. Bidder requests Owner to allow use of existing Greenbelt area within plant boundary for laydown purpose. Necessary permission from statutory authority (if required) to be taken by Owner prior to handover of land to contractor for project execution. b. In case requirement enlisted under "point-a" is not possible, Bidder requests Owner to allocated any nearby demarcated outside land for laydown purpose. c. Bidder requests Owner to indicate laydown area in plot plan.	Bid specifications to be followed.
STEAM TURBINE							
354	Volume III	Ch.2 : Steam Turbine and its Auxiliaries/ Section-1: Scope of Works	9 of 87	12.0 Other Miscellaneous Items	6) Chemical cleaning of all equipment and systems after their erection shall be in Bidder's scope.	Chemical cleaning for turbine and its components is done at shop before sending to site for assembly, hence any chemical cleaning is not envisaged after erection. Please confirm acceptance.	Noted
355	Volume III	Ch2: Steam Turbine and its Auxiliaries/ Section-2: Design Basis	29 of 87	1.18 d) Oil piping and fittings	(4) All the piping, fittings, valves, Main Oil Tank and complete strainer including body & element shall be of stainless steel. Further all the parts of lube oil coolers (tubular or plate type) which are coming in contact with lube oil shall be of stainless steel.	Material of Lube oil tank is carbon steel meeting the system requirement and is as per proven practice of the Bidder. Please confirm acceptance.	Clause 1.18 (d) (4) of Ch-2 at Sheet 29 of 87, Vol-III be read as under:- "Main Oil Tank shall be of Carbon Steel/Stainless steel and All the other piping, fittings, valves and complete strainer including body & element shall be of stainless steel".

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356	Volume III	Ch2: Steam Turbine and its Auxiliaries/ Section-2: Design Basis	72 of 87	13.0 AVAILABILITY REQUIREMENTS OF TG AND AUXILIARIES	13.3 The steam turbine generator unit along with auxiliaries is normally expected to operate in sliding pressure mode from rated pressure down to 40% of rated pressure in conjunction with steam generator, HP-LP bypass system and plant instrumentation and control system.	The temperature used for calculation of heat balances for main steam and reheat steam temperature shall be 600 and 600 deg.C. However, for loads below 50% of rated load the main steam temperature and reheat steam temperature shall be fine tuned based on OEM proven practice. Please confirm acceptance.	Bid specifications to be followed.
357	Volume III	Ch2: Steam Turbine and its Auxiliaries/ Section-2: Design Basis	33 of 87	1.22 PERFORMANCE REQUIREMENTS	c) Ensure during sliding pressure mode, throttle pressure slides from rated pressure down to 40% of rated pressure.		Bid specifications to be followed.
358	Volume III	Ch2: Steam Turbine and its Auxiliaries/ Section-2: Design Basis	75 of 87	15.0 Other conditions for computing heat balance diagrams:	6) In the sliding pressure mode of operation the throttle pressure will slide down from rated pressure to a value corresponding to 40% of rated pressure. For computing heat balance for sliding pressure mode of operation at 80%, 70%,60%, 50% & 30% of Unit rated load, rated temperature of atleast 565 deg.C and 593 deg.C* shall be used for main steam and hot reheat steam respectively.		Noted
359	Volume II	Ch 3: Operating Capability of Plant	1 of 4	3.3 The major operating capabilities for the unit(s)/plant shall be as follows:	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. However, the output after instantaneous increase shall be limited to 105% of TMCR Load. The throttle reserve shall be 0% for pure sliding pressure mode of operation.		Bid specifications to be followed.
360	Volume V	Part B/Ch 4: Main Equipment Related C&I system	12 of 19	4.15.01	2. (m) Casing vibration	As per bidder proven practice casing vibration is not envisaged. Owner is requested to clarify what is the expectation for casing vibration.	Bidder shall follow latest applicable international standard code for measurement of bearing pedestal vibration (bearing housing/casing vibration and shaft vibration.
Control & Instrumentation							
361	Volume-V/ Part-A	S No. 1	17 of 96	7.04.00	Complete Instrumentation cables shall be armored	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. This is inline with latest NTPC tenders. Bidder request Customer to accept Bidder's proposal.	Noted.
362	Volume-V/ Part-A	S No. 1	49 of 96	2.3 (I)	Bidder shall furnish microprocessor based vibration monitoring system for all HT motors and its associated pumps, fans, drives etc. for X, Y & Key Phasor directions, in BTG & BOP /offsite packages.	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.	a) Bid specifications to be followed. b) No. of HT drives for which key phasor are applicable shall be finalized during detailed engineering.
363	Volume-V/ Part-B Volume-V/ Part-B	Chapter-3	4 of 86 10 of 86	3.07.00 3.20.02	Control & protection signal exchange between any functional groups controllers and sub systems shall be hardwired only. b. Triple/dual analog sensors are required both in CLCS and OLCS for control purpose, then all of these triple/dual sensors shall be wired to the controller where CLCS loop is configured. If based on the same set of sensors, any protection action is required in OLCS (e.g., protection stop of drive) in another controller(s), then CLCS Controller shall provide three digital outputs for each such controller from three separate output modules (at defined LVM-Limit Value Monitor blocks inside Controller). The three such digital outputs of CLCS controller shall be acquired in each of the OLCS controllers in three separate digital input modules. Similar philosophy will be used when triple/dual analog sensors are required in OLCS in multiple controllers for protection function. c. If triple/dual/single binary sensors are required in OLCS in multiple controllers for protection function in these controllers, each of these sensors shall be shared among these controllers. Each of these sensors shall be directly shared from marshalling TBs without any 'active' multiplying hardware ('active' defined as hardware which requires a separate power supply for its functioning). Further, removal/insertion of any of such multiple modules shall not affect availability of such signal(s) to other modules.	Bidder would like to clarify that signal exchange between FGs within the DDCMIS shall be over peer to peer communication through control data highway. The same is proven and standard practice. Signals which are directly used for Boiler MFT and Main Turbine Trip shall be hardwired. Request to confirm the same.	Bid specifications to be followed. Communication between FGs of different set of controllers shall be through DDCMIS network.
364	Volume-V/ Part-B	Chapter-3	60 of 86	3.49.03	However for Servers and Historians / Station LAN Server/ Programming station/NMS Server/operating work station/PC/Laptops, the hardware shall conform to the following minimum requirements:	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 to be followed.

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365	Volume-V/ Part-A	S No. 1	11 of 96	4.00.00 (f)	For sequence, protection, control and alarm circuits, electronic transmitters, temperature elements with temperature transmitters etc. are to be provided. **Process actuated switches may be accepted only in very few cases if the same is as per standard and proven practice of equipment supplier subject to owner's approval** Wherever process actuated switches are being provided for sequence, protection and alarm purposes, adequate number of blind type switches separate for each application (i.e. sequence, protection, alarm) with separate necessary indicating gauges are to be provided meeting adequate redundancy requirements. Contacts of indicating type switches, gauges and receiver instruments shall not be acceptable.	As per referred tender clause, process actuated switches shall be considered only if its OEM standard practice. Bidder would further like to clarify that separate blind switches and indicating gauges shall be provided only if its applicable as per OEM standard practice. Please confirm.	Bid specifications to be followed.
366	Volume-V/ Part-A	S No. 1	13 of 96	4.00.00 (g), (iv)	No redundant instrument shall share a single process tapping.	Bidder confirm the same except for redundant DP measurement taps on orifice in pipelines with ≤ 2" diameter due to non-availability of space for proper oriented taps. Please accept Bidder's proposal.	Bid specifications to be followed.
367	Volume-V/ Part-A	S No. 1	14 of 96	4.00.00 Notes 10	DPG, DPT & DPS across the filters/strainers shall be provided	The strainers will not have space to provide tapping for three number of instruments. DPT with integral display shall be provided which shall meet functional requirement. Additional DPG and DPS will not be provided. Please confirm.	Confirmed.
368	Volume-V/ Part-A	S No. 1	14 of 96	4.00.00 Notes 12	Thermocouples shall be provided for Mill outlet temperature and for Services with Temperature > 200 deg C.	RTDs shall be considered upto 450°C maximum operating services as per standard proven industrial practice. Please confirm.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
369	Volume-V/ Part-A	S No. 1	17 of 96	7.05.00	Heat resistant instrumentation cable shall be provided for all instruments/equipments/ drives / devices located in hot areas such as Burner tilt, Hot air gates, Air heater areas, Furnace areas, Steam Drain & Vent valves, Turbine & Generator zone etc. This cable shall be laid from instruments / equipments / drives / devices from hot area application to a field JB / panel located in areas where ambient temperature is around 50 Deg. C. i.e. normal temperature area.	Bidder would like to clarify that as per plant design if head of instruments is located in areas where ambient temperature is around 50 Deg. C. i.e. normal temperature area then heat resistant cables are not applicable. Please confirm.	Bid specifications to be followed.
370	Volume-V/ Part-A	S No. 1	26 of 96	Appendix-I Part-A , Annexure-I, (v)	The control system shall be functionally distributed, (For Boiler, TG and BOP and similarly the control for 2 similar equipments like ID Fan A, B and C should be in different controllers & I/O cards) highly modular and arranged to reflect the functional grouping plant equipment and systems to be controlled.	In order to increase the availability of a process system, it is recommended that the complete process system shall be assigned to a single controller (which are dual hot redundant), instead of splitting the system in multiple controllers connected via data highway as that will increase the overall probability of failure of the process system due to increased number of elements in the overall process system. For example, entire condensate system (i.e. both CEPs, suction tank and piping instrumentation, discharge header system) shall be assigned to same DDCMIS dual hot redundant controller, instead of breaking the condensate system into 3 controllers. Please confirm.	Bid specifications to be followed.
371	Volume-V/ Part-A Volume-V/ Part-B Volume VII, Tender drawings	S No. 1 Chapter-3	28 of 96 79 of 86 102, 107,109,112, 113,114,115,	Appendix-I, Table "Drive I/O's" Table 3.2 DRIVE CONTROL PHILOSOPHY (Typical) Electrical interface drawings	Drive I/Os quantity Drive Interface	Please note that there is mismatch between signals indicated in Part-A , Appendix-I, Part-B, Chapter-3, Drive control philosophy and Volume-VII Tender drawings. Bidder request customer to inform which tender clause to be referred for Drive IOs. Please confirm.	Table 3.2 at Sheet 79 of 86 is drive control philosophy for this project. However, the same shall be finalized during detailed engineering.
372	Volume-V/ Part-A Volume-V/ Part-B	S No. 1 Chapter-7	37 of 96 2 of 19	3.00.01, (d) 7.01.05.(A)	For off-site PLC systems, configuration as per clause 7.01.03(A & B), Part- B, chapter 7 and chapter 14, Part-B, Vol . V shall be provided. UPS System for critical system like DDCMIS & associated items, PLC	Bidder would like to clarify that for PLC/ microprocessor based systems, redundant UPS feed shall be considered inline with clause 7.01.05(A) & 7.01.03(A & B) of Part-B. Please confirm.	PLC / microprocessor based system shall be fed from nearest located industrial grade UPS.
373	Volume V, Part B	Chapter 2	9, 11 of 64	2.06.01 (9) 2.06.02 (9)	Sheath OD 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.	Sheath OD shall be finalized based on the Thermo well sizing calculation during detailed engineering.
374	Volume V, Part B	Chapter 2	10, 11 of 64	2.06.01 (17) 2.06.02 (17)	Extension neck length: Minimum 100 mm above Insulation of pipe and Minimum 160 mm when there is no insulation on pipe.	When there is no insulation, it means it's a low temperature service. So, 100mm extension length is enough per typical industry practice to keep instrument head temperature low. Kindly, confirm this understanding.	Bid specifications to be followed.

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375	Volume V, Part B	Chapter 2	24 of 64	2.12.01	Orifice: 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.	Noted.
376	Volume V, Part B	Chapter 2	25 of 64	2.12.01	Maximum pressure drop/loss shall be limited to 60% of DP for Orifice plate subject to beta ratio within the range as specified.	Per contract (2.12.01 Sr. No 11), allowed beta ratio is 0.34 to 0.7. Hence, permanent pressure loss will be as per the permitted beta range. Kindly, confirm this understanding.	Noted.
377	Volume V, Part B	Chapter 3	5, 6 of 86	3.10.04	The control system hardware (controllers, modules/cards etc.) shall be housed in cabinets located in respective control equipment room (CER) unitised and offsite except for the remote I/O cubicles (as specified in Vol.-V, Part-A) which shall be located in respective areas	Bidder wish to clarify that controllers may also be located in Remote I/O cabinet, as decided during detailed engineering. Please confirm.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
378	Volume V, Part B	Chapter 3	9 of 86	3.19.03	The sensors for multiple measurement schemes for open loop controls shall always be in service (except when gone Bad) and operator shall not be able to select / deselect any of the sensors. Further, measurement scheme shall be implemented considering safety / availability aspects.	Bidder would like to clarify that proven macro logics shall be used for CLCS as well as OLCS. Please confirm.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.
379	Volume V, Part B	Chapter 3	32 of 86	3.30.05	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 specifications to be followed.
380	Volume V, Part B	Chapter 3	34 of 86	3.33.11	If width of a cabinet is 800 mm or above, double doors shall be provided.	Bidder wish to clarify that double doors shall be considered for cabinet widths above 800mm. For Cabinets width 800 mm and below single door shall be considered. Please confirm.	Bid specifications to be followed.
381	Volume V, Part B	Chapter 3	73 of 86	3.52.01	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 specifications to be followed.
382	Volume V, Part B	Chapter 8	1 of 11	8.01.02	For protection against sea environment, all impulse pipes, fittings etc shall be provided with durable epoxy coating with poly urethane finish.	Sea environment is not applicable for this site, hence this clause is not applicable. Kindly, confirm this understanding.	Noted.
383	Volume V, Part B	Chapter 8	1 of 11	8.01.03	SS tube shall be provided inside enclosures& racks from tee connection to valve manifold and then to instrument. For high pressure/ temperature applications (piping class A, B, C & D of the table no PCP) 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. Kindly, confirm this understanding.	Noted.
384	Volume V, Part B	Chapter 8	2 of 11	8.01.04	The source shut off (primary process root valve) and blow down shall be ½ 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.
385	Volume V, Part B	Chapter 8	3 of 11	8.02.03	1/4-inch size light drawn tempered copper/SS tubing conforming to ASTM B75 shall be used. It shall be at least 0.065 inch and shall be PVC coated.	PVC coating is not applicable for SS tubing. Kindly, confirm this understanding.	Noted.
386	Volume V, Part B	Chapter 9	3 of 36	9.01.03.13	All cables shall be paired cables with voltage grade rating of 660/1100V.	Since Instrumentation cables are applied for low voltage system (like < 60V circuits), so as per BS 5308 standard, the insulation of instrumentation cables shall be suitable for operation at voltages upto 300Vrms core to earth and 500Vrms core to core. Same shall be applied. Kindly, confirm this understanding.	Bid specifications to be followed.
387	Volume V, Part B Volume VII, Tender Drawings	Chapter 9	3 of 36 Sheet 5 of 15	9.01.03.15 114-15-0105	All wiring leaving a junction box or enclosure shall leave from terminal blocks and not from other devices in the enclosure. INTERFACING OF FIELD INSTRUMENTS 4-20mA INTEGRAL JB OF LIE/LIR	Bidder wish to clarify that instruments installed in LIR/ stanchion shall be directly connected from instrument terminals to the nearest Junction box and wiring leaving a standalone Junction box shall leave from Junction box terminal blocks. Please confirm.	Noted.

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388	Volume V, Part B	Chapter 9	26 of 36	9.07.00 (9)	FO & Network Cable shall be laid on separate cable sub-trays/through permanent lubricated rodent & termite proof HDPE protection pipe @ 53% fill factor with support from cable tray/Tressle structure inside building area. When the cables are laid outside buildings area, GI conduits/permanent lubricated rodent proof HDPE protection pipe @ 53% fill factor with shall be used with support from cable tray/Tressle structure. In areas where the same are required to be buried, the same shall be buried in separate trench approx. 1.0 mtr. Depth to be laid in 2" permanent lubricated rodent proof HDPE protection Pipe @ 53% fill factor covered with sand, brick laid breadth-wise and soil along the pipe line route by bidder.	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 specifications to be followed.
389	Volume V, Part B	Chapter 11	2 of 10	11.02.03	Thus for cavitation/flashing service, only valve with anti cavitations trim shall be provided.	Anti-cavitation trims are not applicable for flashing services. Rather, hardened trims are applicable. Kindly, confirm this understanding.	Noted
390	Volume V, Part B	Chapter 11	3 of 10	11.04.00	Non-corrosive, non-flashing, and non- cavitation service for process temperature up to 275 Deg C.: Trim Material = 316SS stellited with stellited faced guide posts and bushings	For Non-corrosive, non-flashing, and non- cavitation service, and which are far from cavitation zone, **SS316 trim material shall suffice, and stellited coating is not required.** Kindly, confirm this understanding.	Bid specifications to be followed.
391	Volume V, Part B	Chapter 11	5 of 10	11.07.02	Separate moisture separator unit for ensuring dryness of air entering I/P as well as the power cylinder is to be supplied with each control valve and control damper.	Dry Instrument Air is supplied to each control valve. AFR shall be provided for each control valve. Separate moisture separator is not applicable. Also, Same is not found in Volume VII, SECTION : CONTROL & INSTRUMENTATION "Hook-Up Diagram for Control Valve (With Pneumatic Actuator) (Sh. 19 of 19)" 114-18-0100. Kindly, confirm this understanding.	Bid specifications to be followed.
392	Volume V, Part B 1. Volume III 2. Volume III	Chapter 14 Annexure - A Chapter 25 Chapter 23	11 of 12 1. 32 of 36 2. 8 of 24	General - 14 1. 25.8 b 2. 23.5.1 g	Any Package not listed above shall be PLC (redundant hot standby controllers) controlled with one no. OWS, one no. OEWS (Operating & Engineering Work Station) and one no. A4 colour LJP. 1. HVAC: Air Conditioning System control system shall be PLC based. Each system shall be provided with required I/O modules and two Operator Work (OWS) Stations. 2. PLC based control panel for control and monitoring of the Compressed air system, field instruments, control cables, etc.	Bidder understand skid mounted PLC systems shall be as per OEM standard. The referred clause shall be applicable for separate package PLC systems. Kindly, confirm this understanding.	Noted.
393	Volume VII	114-04-0102	1 of 1	Section : C&I	Steam tracing.	Steam tracing is not applicable for this project site. Kindly, confirm this understanding.	Noted.
394	Volume VII	114-04-0103	1 of 1	Section : C&I	Vent connection in air service hook-up (FIG-B).	Vent connection is indicated in the referred hook-up drawing for air service. Bidder wish to clarify that Vent connection is not applicable for air service and will not be considered. Please confirm.	Noted.
395	Volume VII	114-04-0111	1 of 1	Section : C&I	M33x2 stub	Thermowell connection can be 1"RC or NPT. Request to confirm the same.	Noted.
396	Volume VII	114-01-0121	1 of 1	7	Communication bus between controllers and remote IO panels located in CW pump house shall be through fiber optic cable backed up by wireless link.	Bidder wish to clarify that for Remote IO connectivity, Fiber optic links are reliable. Further, wireless connectivity is provided for distant plant areas having very long distances. Since CW pumphouse is within plant area, Bidder proposes to consider redundant fibre optic link for connecting Remote IO. Please confirm.	Noted.
397	Volume V, Part A, 1.0	-	14 of 96	4.00.00 Notes:- 7	Pressure switches at inlet, outlet of individual pumps and discharge header of pumps for protection and auto start / stop & alarms shall be provided.	Bidder would like to clarify that, Pressure transmitters shall be provided as per flow diagram and process requirement. Kindly, confirm this understanding.	Noted.
398	Volume V, Part B	Chapter 1.0 Chapter 3.0	2 of 10 35 of 86	1.01.16 3.35.02 xii	All OEM software & software licenses shall be supplied with life time validity. Anti virus software's for all the Machines	Bidder would like to clarify that Antivirus software are provided with limited validity. Bidder proposes to consider validity of Antivirus software till warranty period. Post warranty period same can be directly discussed by Customer with the selected Vendor/OEM. Please confirm.	Noted.
399	Volume V, Part B	Chapter 2.0	4 of 64	2.02.00 (i)	Mercury in Steel for below 450°C and inert gas actuated for above 450°C of SS bulb and capillary	Bidder would like to clarify that mercury filled TG are not recommended since it is a neuro-toxic element. Hence, instead of mercury type TG, bimetallic type TG/ gas filled TG shall be provided. Kindly confirm.	Noted.

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400	Volume V, Part B	Chapter 2.0	9 of 64	2.06.01	5. Calibration and accuracy As per IEC-751/ANSI-C-96.1(special class) for T/C	a) Bidder proposes to consider class 1 accuracy for thermocouples of all applications as per past project experience. This suffice the requirement for power plant operation. b) Alternately, Bidder request customer to inform if special class of thermocouples are required for any specific applications.	Noted.
401	Volume V, Part B	Chapter 3	67 of 86	3.49.06	Graphical Interface Unit Minimum specifications of Graphical Interface unit shall be as follows:- 11. Configuration On board Intel – Xeon Octa core, 3.1 GHz latest processor or higher.	Bidder would like to clarify that, GIU configuration requirements are equivalent to OWS, which are generally not available. Hence bidder would like to provide GIU as per packages supplier standard and Proven practice. Kindly confirm our understanding	Bid specifications to be followed.
402	Volume V, Part B	Chapter 3	81 of 86	Table 3.2	8. DCS INTERFACE FOR PNEUMATIC DRIVE	Bidder would like to clarify that, limit switches for modulating type for Pneumatic drive/valve will be provided wherever applicable as per Tender flow diagrams. Please confirm.	Bid specifications to be followed.
403	Volume V, Part A	-	70 of 96 74 of 96 74 of 96 75 of 96 75 of 96	1.00.00 e) 4.00.00 (iv) 5.00.00 6.00.00 7.00.00	Electrical system of Unit DDCMIS will be a separate process block. However, electrical breakers of other DDCMIS shall be distributed along with respective process areas. Water System DDCMIS: (iv) Electrical system for water system Ash handling System (AHP) DDCMIS (iii) Electrical system for Ash Handling system Coal handling System (CHP) DDCMIS xiv. Electrical system for CHP. Stand-Alone Systems. (vii) Electrical System.	Bidder would like to clarify that as per Cl. no. 1.00.00 (e) separate process block will be considered for Electrical system of Unit DDCMIS. For other DDCMIS, electrical breakers will be distributed along with respective process areas and there will be no separate process blocks/FGs for Electrical system of these DDCMIS. Please confirm.	Noted.
404	Volume V, Part B	Chapter 3	62 of 86	3.49.03 Sr. No 10	Intelligent UPS (on line) with all accessories and software for remote monitoring for each workstation/ server	Bidder would like to clarify that all servers/ work stations will be fed from Plant UPS. Hence, separate Intelligent mini-UPS for servers/ workstations is not required. Please Confirm.	Bid specifications to be followed.
405	Volume III Volume-V/ Part-A	Chapter 25 S. No. 1	32 of 36 73 of 96 74 of 96 75 of 96 75 of 96	28.2 b) 3.03.01 5.00.00 6.00.00 7.00.00	Each system shall be provided with required I/O modules and two numbers of Operator Work (OWS) Stations. All the functional requirements specified below and general control logic specified under this section shall be implemented in the respective PLCs. Guidelines for Functional Grouping of Controllers (iv) Air Conditioning & Ventilation system for main TG building & ESP building. Ash handling System (AHP) DDCMIS (ii) AHP common system block: ash slurry pumps, ash slurry disposal system, ash water pumps, ash silo, air compressors for AHP, Air Conditioning & ventilation system of AHP building & local control rooms etc. Coal handling System (CHP) DDCMIS xiii. Air Conditioning & Ventilation system for CHP i) Main Plant AC Common Block: Common Air conditioning & ventilation system of various areas like TG building, CER, SWAS Room, UPS Room, Charger Room etc.	Bidder would like to clarify that DDCMIS based controls shall be provided for HVAC (except split ACs and dry ventilation) in respective DDCMIS inline with the referred clauses of Volume-V, part A. For service building, HVAC (except split ACs and dry ventilation) controls shall be PLC based inline with Volume-III, Chapter-25. For other non-plant buildings, HVAC (except split ACs and dry ventilation) control system shall be provided as per respective package OEM standard. Please confirm.	Noted.
406	Volume V, Part B	Chapter 1	2 of 10	1.01.17	All the WORK STATIONS, OWS, EWS, PC, Printers, Laptop, Servers, LVS as mentioned anywhere in this NIT/Specification shall meet the minimum technical requirements specified in chapter 3, Part B, Vol. V.	In referred clause, it is indicated that OWS/ server specification of DDCMIS shall be followed for all other systems to be provided for the proposed power plant. Bidder would like to clarify that OWS/server for other systems (viz. SWAS, CEMS, CCTV, EPABX, Bunker LMS, MIS, Simulator, PADO, VMAS, DMS, etc.) does not warrant technical requirement same as that of DDCMIS server/OWS. In view of above, Bidder proposes to consider workstations/ servers with i7 processor for other systems (viz. SWAS, CEMS, CCTV, EPABX, Bunker LMS, MIS, Simulator, PADO, VMAS, DMS, etc.). This suffices the functional requirement of the workstations/ servers for the indicated packages. Please confirm.	For DDCMIS/PLC based system/packages, bidder to follow specifications of work stations/servers/laptops as specified in Cl.No.3.49.03, Chapter-3/Part-B, Vol-V. For non-DDCMIS/Non-PLC packages, minimum requirement for servers / work stations shall be i7 type or higher.

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407	Volume V, Part B	Chapter 2	39 of 64	2.14.00	Solenoid valves shall be provided as per NAMUR standard	Namur type solenoid valve (Designed to mount directly to actuator) cannot be mounted with linear actuators used for control of knife gate valve, gate globe valve, etc. Bidder understands that for such applications Non-Namur valves are to be used. Please confirm.	Noted.
408	Volume V, Part B	Chapter 2	43 of 64	2.16.05	Electronic Flow-Meter … The flow meter shall provide local indication for instantaneous flow. It should also be possible to get local display for daily and monthly discharge. The flow meter shall indicate totaliser / integrator to get the daily and monthly discharge as stated above.	Bidder understands that flow totaliser values like daily, monthly shall be monitored from Control system. Hence, we do not envisage separate totaliser for Electronic Flow-Meters. Please confirm.	Noted.
409	Volume V, Part B	Chapter 2	43 of 64	2.16.05	Electronic Flow-Meter … (h) Liner material. Teflon.	Electromagnetic flowmeter tube liner material shall be finalised based on standard FGD practice & Instrument vendor recommendation. Please confirm.	Bid specifications to be followed.
410	Volume V, Part B Volume V, Part A	Chapter 3 S. No. 1	79 of 86 13 of 96	TABLE – 3.2 4.00.00	DCS INTERFACE FOR UNIDIRECTIONAL HT DRIVE (Signal Exchange envisaged between DCS and Switchgear/Drives) Pump / Fan bearing/Motor driven drive Vibration measurement - k. Pump / Fan/Motor driven drive bearing (DE & NDE) temperature measurement: RTD (2 Nos) l. Motor Bearing (DE & NDE) temperature measurement: RTD (2 Nos) m. Motor Winding temperature measurement: RTD (6 Nos) i. Triple measurement scheme Binary and analog inputs, which are, required for protection of more than one equipment as well as protection signals for HT Drives (fed by a supply feeder of ratings 3.3 kV onwards)/ MDBFP/TDBFP etc., triple sensing devices/signals shall be provided.	Bidder understands that number of temperature elements for measurement of bearing/winding temperature of HT drives shall be as per Volume V, Part B/Ch 3: DDCMIS, TABLE – 3.2. Please confirm.	Noted.
411	Volume II	Chapter 5	27 of 86	26.2	The major design features of the system shall be demonstrated by the Contractor at the Contractor's works or any other place mutually agreed within four months from the date of LOA. These are the system function tests, which have a major impact on the detailed system design & finalization of important engineering documents like configuration, functional grouping, BOM etc., but do not require a fully engineered system for conductance.	Bidder wish to clarify that FAT shall be conducted before dispatch of DDCMIS package from Vendor works. No separate testing of major design features shall be carried out within four months from the date of LOA. Please confirm.	Noted.
412	Volume II	Chapter 9	93 of 103	1.00.16 (A)	**Mandatory Spares for Solenoid Valves, Control valves, Power Cylinder, Control Dampers, Actuators, Flow Elements and Accessories** e) 2 sets of limit switches and 1 set of valve positioner for each control valve.	Bidder wish to inform that the requirement of spares for limit switch and valve positioner is on extremely higher side. Bidder request Customer to modify the requirement as below: "20% of limit switches of each type, whichever is more, 20% of of valve positioner for each type, whichever is more". Please confirm.	Clause 1.00.16 (e)of Ch-9 at Sheet 93 of 103 in Vol-II be read as under:- "1 set of limit switches and 1 set of valve positioner for each control valve OR 20% of limit switches of each type & 20% of valve positioners of each type, whichever is more"
413	Volume II	Chapter 9	93 of 103	1.00.16	**Mandatory Spares for Solenoid Valves, Control valves, Power Cylinder, Control Dampers, Actuators, Flow Elements and Accessories** f) 20 percent of position transmitter (4-20mA) and its accessories for total qty. of control valve. j) 20% of I to P converters, Pressure regulators.	Bidder wish to clarify that Position transmitters and I/P convertors are inbuilt in the valve positioner. Separate Position transmitters and I/P convertors are not considered for control valves. Hence, spares of the same are not considered. Please confirm.	Bid specifications to be followed.
414	Volume II	Chapter 9	94 of 103	1.00.16	F) Solenoid Valves: 20 percent or min 10 no. of each type & model for total qty. (whichever is more).	a) Bidder understands that the requirement indicated at Cl. No. 1.00.16(F) is for inline solenoid valves. Please confirm. b) Bidder wish to highlight that the spares requirement of 10 nos. of each type and model is on very higher side. Bidder request customer to modify the requirement as below: "20 percent of each type & model for total qty. (whichever is more)" Please confirm.	a) Confirmed. b) Bid specifications to be followed.
415	Volume II	Chapter 9	95 of 103	1.00.18	Mandatory spares not covered above Bidder to supply 10% or 1 no. (whichever is more) of each type of sensors, instruments, analysers, special instruments, Electronic cards , instrumentation fittings , mechanical fittings etc. for any other electronic system, feeder control cabinets, hydra-step (EWLI), Separator level control system, Vibration Monitoring System, CCTV, C&I Lab Instruments, On line Carbon in Ash analyser system, On line Coal mass flow/speed measurement system, Solid flow meter, 3 D Acoustic type level transmitters, Station LAN, MIS, Viscosity Meter, Hydrogen Instruments etc.	Bidder wish to inform that there are various type of items within each package/ equipment and it is not possible to quantify/ estimate the spares with the given requirement. Bidder request customer to specifically inform the spares requirement in each of the mentioned package/ equipment.	Bidder to supply 10% or 1 Nos. (whichever is more) for following additional spares: a) Online fuel flow measurement system. b) Online coal mass flow/speed measurement system. c) Online carbon in ash analyzer. d) 3D acoustic level transmitter. e) Acoustic pyrometer. f) Ammonia analyzer.

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416	Volume V/ Part B Volume V/ Part B	Chapter 2 Chapter 2	10 of 64 11 of 64	2.06.01 (13) 2.06.02 (13)	Electrical connection: Gold plated Plug in type. Double entry, one unused entry with blind plug. Electrical connection: Gold plated Plug in type. Double entry, one unused entry with blind plug.	Bidder understands that screwed cable gland type connection is also acceptable. Please confirm.	Bid specifications to be followed.
417	Volume V/ Part A Volume V/ Part A	S. No. 1 S. No. 1	2 of 96 7 of 96	2.01.00 2.04.13	For Messaging system, **wireless link** Remote Access Services, Broadband services and Remote Service Centre connectivity the fixed cost (e.g. service provider charges & its equipment etc.) and running cost till warranty period shall be included in the Quoted Price. Wireless Link:-For the following system identified below, Bidder shall consider wireless link or hardwired link for remote operation of the systems: 1. AAQMS system as described in Vol. V, Sub Sec chapter 15, Part B. 2. Between CHP stacker reclaimer PLC and station LAN switch/CHP DDCMIS as described in Vol. V, Sub Sec chapter 14, Part B.	Bidder understand that wireless link is applicable for areas indicated in Cl no. 2.04.13 point No. 1 & 2. Please confirm.	Bid specifications to be followed.
418	Volume V/ Part A	S. No. 1	7 of 96	2.04.11	A redundant station-wide LAN for connecting the unit and other sub systems of DDCMIS, PLCs, as applicable OWS, stations & DMS etc. as well for connecting to the other off-line services of the Station LAN This shall include all cables, hardware, software and accessories required for connecting Bidder's system upto the remote terminals at Headquarters. Complete system interfacing & successful implementation is in Bidder's scope.	a) Bidder request customer to provide terminal points for connectivity between Bidder's supplied system and Customer's existing system. b) Bidder to inform location of "remote terminals at Headquarters" for considering necessary hardware/software for connecting Bidder's system. c) Bidder request customer to inform that suitable provision (viz. web browser based) shall be considered for viewing data at Customer's head quarters. No cable connectivity is required for the same. Please confirm. c) Bidder request Customer to clarify "other off-line services of the Station LAN"	For interface with owner's system, bidder to follow Cl.No.3.47.03 at Sheet-54 of 86 of chapter-3, Part-B Vol-V.
CW,ACW,DMCW,RW, Intake							
419	Volume III Mechanical Works	Ch 4 : RW Intake & Plant RW System	2 of 8	4.1.3 4.1.6 (i)	Bidder shall replace (supply and install) all the three (3) existing vertical turbine type Raw water Intake Pumps with new pumps of same capacity & head.''	Since the scope is limited and it is outside power plant boundary works, Bidder request owner to exclude Raw water intake pumps and related works from EPC package scope. Kindly confirm.	Being EPC contract, shall be in the scope of contractor.
420	Vol-III	Chapter 7 Service and Potable water system	4 of 7	7.4.3 (b)	Motorized valves at inlet to each tank with suitable interlocking with level transmitters in the tanks	As per flow diagram Motorized valves and level transmitters shall be provided for 50 m3 service water tank and 25 m3 potable water tank only. For other tanks manual valves without any instruments shall be provided as per flow diagram. Owner to please confirm.	Motorized valves shall be provided in all tanks where level transmitter is provided.
421	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM Chapter 16 Chapter 16	5 of 37 3 of 12 5 of 12	15.4.5 16.2.2 16.3.4.4 (a)	The design flow rate in the filtered water (acw) side of the operating PHEs for the unit shall be considered same as the design DMCW flow rate, with the average temperature rise of ACW limited to 5.5° C under all circumstances. The design ACW flow rate shall be equally shared by the operating PHEs. A minimum of 20 % margin shall be considered over and above the total required heat load to compute the design heat load and subsequently the design DMCW flow for the closed circuit. In computing the design heat load and design DMCW flow in individual DMCW system Bidder shall ensure that the average temperature rise of DMCW is limited to 5.5 deg.C under all circumstances The required heat load shall be computed by obtaining the summation of maximum permissible heat loads encountered in respective operating coolers and TG islands & BOP system which shall be cooled by DMCW system. A minimum of 20% margin over and above the total required heat load as obtained above shall be taken into account by bidder to work out the design heat load rejected by DMCW system and to be picked up by ACW system for same.	We request owner to remove average temperature rise limit from ACW and DMCW side. Owner to please note cooling water flow and temperature rise across the coolers are provided by OEM as per their equipment / cooler proven design. We suggest to owner to modify clause as below, "ACW return temperature shall be not exceed CW hot water temperature."	Noted.
422	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	17/18 of 37	15.10 (c)	Bidder shall carry out a sump model study at a recognized Institute / Hydraulic research laboratory. Scale of the model shall be minimum 1:12. The hydraulic model study shall be conducted to study flow conditions in approach CW channel, forebay, pump bays, draft tubes for different discharges and different depths of water, different combinations of pump operations and to study velocity distribution in approach channel, forebay area, pump bays, draft tube etc. The model shall be based on Froude's law of similitude and shall be tested for following two more flow conditions, viz. a) At twice the prototype maximum Froude number, i.e., the Froude number of the model is two times that of the prototype b) At equal velocity criterion, i.e., the velocity is same both in the model and prototype.	Sump model shall be prepared considering Froude's law of similitude as per HI-9.8 and based on the scale ratio of 1:12 as per specification requirement. As per HIS 9.8 Cl.no 9.8.4.3 "Tests at prototype velocities are not recommended, as this will distort approach flow patterns and unduly exaggerate flow disturbance (e.g.vortices) in the model" Therefore, Bidder understands that "equal velocity criterion" means, equivalent velocity model and prototype shall be established based on froude's law of simlitude (i.e. 1F for model and prototype) irrespective of actual prototype velocity as per HIS 9.8. Request owner to confirm bidder's understanding.	Noted.
423	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	31 of 37 12 of 37	h. 15.6 (C) (o)	Column pipe, discharge head: Fabricated steel as per IS 2062 / IS 3589 with minimum thickness of 8 mm with 300 micron epoxy coating inside and outside The length of shaft and column sections shall not exceed 3M. The column pipe shall have a wall thickness of not less than 12 mm	Discrepancy found, Owner to please clarify required thickness of column pipe.	Minimum thickness of column pipe shall be 12 mm in line with clause 15.6 (C) (o), Chapter 15, Volume III.

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424	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	31 of 37	I.	All hardware: SS-316	Owner to please allow to use Stainless steel AISI type 316 for fasteners in contact with water. Others shall be of high-tension carbon steel.	Bid specifications to be followed.
425	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	31 of 37	Note: (i)	Pumps shall be capable of operating from shut-of point to a maximum flow of 10% over the point of intersection between system resistance curve and pump H-Q curve for single pump operation	As per ANSI/HI-9.6.3 , preferred operating range (POR) shall be between 80% to 120% of BEP point for pump having specific speed higher than 4500. (Operating a pump within POR ensures higher pump reliability and lower energy consumption). Also, bidder does not recommend single CW pump operation with operating range beyond the run out flow as established based on system resistance curve. Request owner to relook this requirement.	Note: (i) at Sheet 31 of 37 of Ch- 15, Voll-III be read as under "The pumps shall have stable head capacity characteristic continuously rising towards shut off conditions. The design shall ensure equal load sharing among the pumps operating in parallel. All pumps shall be identical having identical characteristic curves and shall be capable of running in parallel continuously without any restrictions. The pump shall operate satisfactorily in single pump operation as well as in parallel with all other working pumps. Pumps shall be able to operate satisfactorily and continuously at run out capacity conditions as determined with the help of system resistance curve."
426	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM DATA SHEET FOR AUTOMATIC SELF CLEANING	36 of 37	2.1	Max. Pressure drop in fully choked condition: 6 MWC	Owner to please note at fully chocked condition water will not flow across the strainer at this condition pressure drop will be zero. We understands that indicated value is applicable for 50% chocked condition. Owner to please confirm.	S.N. 2.10 of datasheet at sheet 36 of 37 Chapter 15, Vol-III be read as " Max. Pressure drop at 50% choked condition: 6 MWC".
427	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM DATA SHEET FOR AUTOMATIC SELF CLEANING	36 of 37	4.9.1		Owner to please allow to select valve MOC as per chapter 27: Low pressure piping. Self cleaning strainer will be installed on ACW system. As per clause 27.15.2 for 65 NB and above Cast iron material is acceptable for ACW system. Owner to please confirm.	Confirmed.
428	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	34 of 37	DATA SHEET FOR BUTTERFLY VALVES	Valve opening / closing time: 120 seconds (max) for CW pump discharge, condenser inlet/ outlet	Sequence and closing/opening time of butterfly valve shall be decided by bidder during detailed engg. based on transient analysis and system design. Bidder requests Owner to accept the same.	Noted.
429	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	30 OF 37 32 OF 37	DATA SHEET FOR CW PUMPS DATA SHEET FOR ACW PUMPS	15) CW Pumps - Voltage level : 11 kV 15) ACW Pumps - Voltage level : 11 kV	Voltage level for CW and ACW pumps shall be as per Electrical specification based on kW rating. Please confirm.	Voltage level for CW and ACW pumps shall be as per Volume IV.
430	Volume-III	Ch 34: General Requirements for Horizontal & Vertical Pumps	7 of 8	Annexure - A b of construction feature	Pumps shall be able to pass through solids upto 100 mm and capable of handling waste water which may contain, sludge, plastic solids etc	Clause 32.1.2.3 Group-C pumps are submersible pumps and it allows maximum particle size in water as 20 mm. We request to owner to allow maximum particle size handled by submersible pumps to 20 mm.	Bid specifications to be followed, as per Chapter 34, Annexure - A at sheet 7 of 8 of Volume III.
431	Volume-III	Chapter-27 LP PIPING, VALVES & SPECIALITIES Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	2 of 31 5 of 37	27.1.3 15.4.7	The pipes in CW, ACW & DMCW system shall be designed to maintain a maximum velocity of 2 M/Sec inside the pipelines at pump discharge. The velocity of water in the CW and ACW system shall not exceed 2.0 m/sec. All interconnecting piping and equipment handling CW/ACW shall be designed to withstand a pressure not less than the shut off head of CW/ACW pump respectively	Owner to please allow 2.4 m/s design velocity for DMCW and ACW system.	Bid specifications to be followed for CW & ACW systems, however pipes in DMCW system shall be designed for maximum 2.5 m/s velocity.

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432	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM	13 of 37	15.7.7 (iii)	Water required for cooling of pump-motor guide and thrust bearing shall be taken from main pump discharge through duplex filter.	For specified water quality, there is no requirement of duplex filter for this purpose. Please confirm the requirement.	Simplex filter shall be provided instead of duplex filter.
433	Volume-III	Ch 16: DMCW System	3 of 12	16.2.1	Capacity of pumps shall be fixed by taking 10% (minimum) margin on required DMCW flow.	Capacity of pumps shall be fixed at design DMCW flow. Design DMCW flow includes OEM margin over actual DMCW flow requirement. Owner to please confirm acceptance.	Bid specifications to be followed.
434	Volume-III	Ch 16: DMCW System	5 of 12	16.3.3.2 (a)	Suitable cleaning system complete with all equipment and accessories (viz. pumps, piping, valves etc.) for inside cleaning of the PHE's.	Owner to note that bidder has never come across of such cleaning/flushing requirement of PHE in executed projects and none of the PHE suppliers are aware of such requirement. In view of above and considering clarified water, bidder do not envisage separate cleaning/flushing arrangement of PHE. Please confirm. In case, the same is to be provided, bidder requests Owner to furnish the specification, P&ID and design philosophy.	Cleaning/flushing arrangement of PHE stands deleted
435	Volume-III	Ch 16: DMCW System	7 of 12	16.3.5 (f)	Plates shall be packed in a frame consisting of fixed frame plates and movable pressure plates aligned at top and bottom on carrying bars of special inverted "T" section to ensure three dimensional steering and locking arrangement. Plates shall be sealed at their outer edges and around the ports by gaskets in order to prevent intermixing of hot & cold water	Supplier specific design. Kindly remove the requirement	Shall be finalized during detailed engineering.
436	Volume-III	Ch 16: DMCW System	7 of 12	16.3.5 (h)	The plates shall be pressed from one piece. They shall be pressed in single operation. The corrugation shall be smooth, uniform & identical for every plate.	Supplier specific design. Kindly remove the requirement. The PHE plates shall be single press or muti press. Kindly confirm.	Bid specifications to be followed.
437	Volume-III	Ch 16: DMCW System	9 of 12	16.7.11	The DMCW pumps shall be equipped with the following safety features as a minimum: (a) Motor winding temperature high - annunciation. (b) Motor winding temperature very high - annunciation and trip. (c) Bearing temperature high - annunciation. (d) Bearing temperature very high - annunciation and trip. (e) Pressure on pump discharge high due to accidental closure of valve - trip and annunciation. (f) Any other protective feature deemed necessary for safe and reliable operation.	Instruments for mentioned application shall be provided in case of HT drive pump/ motor. For LT drive pump/ motor mentioned instruments were not applicable. Owner to please confirm.	Noted.
438	Volume-III	Ch 16: DMCW System	10 of 12	13 a.	DATA SHEET FOR DMCW PUMPS: Material of Construction: Casing: ASTM A 351 CF8M	As the DMCW circuit utilizes passivated DM water which is non-corrosive, Bidder envisage to consider Cast iron IS 210 FG 260 as the material of construction for casing. Request owner to confirm acceptance.	Bid specifications to be followed.
439	Volume-III	Ch 16: DMCW System	4 of 12	16.2.5	The capacity of the make up tank shall be adequate to provide a minimum of one (1) hour make-up water storage capacity in between the minimum and maximum operating levels based on the make up demand	As the DMCW system is closed system, there is no consumption of water in the system. There will be minor leakage in the system which is considered as per tender plant water balance diagram dwg. No. 111-12-3100. Hence, the capacity of make up tank is considered as 10 m3. Request owner to confirm bidder's understanding.	DMCW Make up tank of 10 m3 capacity shall be provided as per drg no. 111-12-3310 Rev 0.
440	Volume-VII	Composite Water Scheme Flow diagram-DMCW system (TG and SG Auxiliaries)	21 of 120 25 of 120	111-12-3100 111-12-3310	Composite Water Scheme: DMCW pump is receiving cold water at suction side from PHE. Flow dia. of equipment cooling water system: DMCW pump is receiving Hot water at suction side from equipment cooler.	There is a discrepancy for DMCW pump suction water (i.e. Hot water suction vs. Cold water suction) as per referred clauses. Hence, bidder understand that DMCW pump is receiving Hot water at suction side from equipment cooler. as shown in flow dia. Of equipment cooling water system(111-12-3301). Bidder understand that CCW scheme as shown in composite water scheme is tentative. Request owner to confirm bidder's understanding	DMCW Scheme as shown in composite water scheme shall be followed. However instrumentation, valves & specialities shall be as per flow diagram of DMCW system (TG & SG auxiliaries) 111-12-3310 Rev0.
441	Volume-III	Chapter 27	3 of 31	27.1.4	The pipes shall be sized for the worst (i.e. maximum flow, temp. and pressure values) operating conditions.	The pipe shall be sized for worst pressure and temperature conditions only. Owner to please confirm.	Bid specifications to be followed.
442	Volume-III	Chapter-15 CIRCULATING WATER (CW) & AUXILIARY COOLING WATER (ACW) SYSTEM Chapter-27 LP PIPING, VALVES & SPECIALITIES	1 of 37 3 of 31	15.3 27.1.13	In water service valves above 200 NB size may be butterfly valves as specified in Chapter-27 In water service, valves above 300 NB size may be butterfly valves.	Bidder intends to use butterfly valves for sizes 150NB and above for water services. Similar practices is followed in all the executed projects. Request Owner to accept the proposal.	Noted.
443	Volume-III	Chapter 27	17 of 31	27.15.2	…. gun metal to IS:318 for sizes 50 NB and below.	Bidder proposes forged carbon steel valves in place of gun metal valves for sizes 50 NB and below. Request to approve the same	Noted.

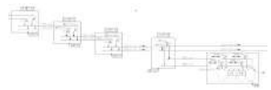
Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
444	Volume-III	Chapter 32	9 of 9	Sr No 1.4	These pumps shall be provided in all indoor sumps and outdoor sumps of 5 cum & above and underground cable vaults and CW pumphouse. Pumps shall be of 2 x 100% capacity for each sump.	Owner to please note Group-A pumps are fixed type vertical sump pumps and for CW pump house portable type submersible pumps are best suitable pumps. In place of Group-A type pumps we recommend to use Group-C submersible type pumps. Also note for CW sumps 2X100% pumps are not required. Four (4) Group-C type submersible pumps are sufficient to empty CW sump during maintenance.	Bid specifications to be followed and provide Group A type pumps in CW pump house in line with Chapter 32 Sheet 9 of 9, Vol-III.
445	Volume III	Chapter 32 DATA SHEET – MISCELLANEOUS PUMPSETS Chapter 11 TECHNICAL DATA SHEETS FOR EFFLUENT TREATMENT PLANT	9 of 9 8 of 23		DATA SHEET – MISCELLANEOUS PUMPSETS TECHNICAL DATA SHEETS FOR EFFLUENT TREATMENT PLANT	Sump pumps coming across the plant for handling of any kind of waste liquid will be as per the requirement mentioned in the Ch 32. Kindly confirm	Sump pumps for ETP shall be as specified in ETP Chapter-11, Vol-III.
Cranes and Hoists							
446	Volume III Volume III	Ch 28: Cranes & Hoists Ch 28: Cranes & Hoists	2 of 13 4 of 13	28.2.1 28.3 a)	Two (2) electrically operated overhead travelling (EOT) crane with associated auxiliaries, along with electrical equipment, control & instrumentation as required and specified shall be provided in the turbine hall for erection and maintenance of turbo generators and their auxiliaries. The crane shall be capable of lifting at lea**st 125%** of the weight of single heaviest component/ equipment to be handled in TG hall for erection as well as maintenance of the equipment provided in AB bay. Two (2) Electrically operated overhead travelling cranes capable of lifting single heaviest component/ equipment, including slings etc. (as applicable) to be handled in TG hall for erection as well as maintenance of the equipment provided in AB bay. Capacity of each crane : Minimum 130/40 T.	Bidder suggests crane capacity shall be selected with **110%** of the weight of single heaviest component/ equipment including lugs, slings and lifting beam to be handled by TG hall EOT crane except generator stator. Generator stator during erection and maintenance can be handled with the help of Strand Jack arrangement in line with the recent tenders/projects under execution for super critical power plants in India. Owner to confirm bidder understanding	Two (2) electrically operated overhead travelling (EOT) crane with associated auxiliaries, along with electrical equipment, control & instrumentation as required and specified shall be provided in the turbine hall for erection and maintenance of turbo generators and their auxiliaries. The crane shall be capable of lifting at least 125% of the weight of single heaviest component / equipment to be handled in TG hall (except for generator stator) for erection as well as maintenance of the equipment provided in AB bay. Each crane shall also be provided with associated lugs, slings and lifting beam. The capacity of the Auxillary hook shall be minimum 25% of the Main Hook capacity. Generator stator during erection and maintenance shall be handled with the help of Strand Jack arrangement by the bidder.
447	Volume II Volume III	Ch 5 : General Technical Requirement Ch 28: Cranes & Hoists	4 of 86 4 of 13	7.2.4 28.2.13	Lifting devices i.e. hoists and chain pulley jacks, etc. shall be provided by the contractor for handling of any equipment or any of its part having weight in excess of 500 Kgs during erection and maintenance activities For items weighing 300 kg and above, hoists and trolleys along with monorails shall be provided throughout the plant where crane cannot be utilized. For items weighing less than 1000 kg, manual hoists shall be provided. For items weighing 1000 kg and more, electric hoists (lift & travel) shall be provided. In case the lifting height is more than 10M, electric hoist (lift & travel) shall be provided irrespective of the weight. All hoists shall be provided with trolleys.	Discrapancies observed in referred clause For items weighing 500 kg and above, hoists along with monorails shall be provided throughout the plant where crane cannot be utilized. For items weighing less than 2000 kg, manual hoists shall be provided. For items weighing 2000 kg and more, electric hoists (lift & travel) shall be provided. In case the lifting height is more than 10M, electric hoist (lift & travel) shall be provided irrespective of the weight Owner to confirm bidder understanding	Specifications be followed as per Clause 28.2.13 of Chapter 28 at Sheet 4 of 13 in Vol-III.
448	Volume III	Ch 28: Cranes & Hoists	4 of 13	28.2.13	All hoists shall be provided with trolleys.	Please note that it is not feasible to provide trolley type hoists in all areas due to layout & headroom constraints. fixed type hoists i.e. chain pulley blocks without travelling trolley shall be provided. Kindly accept.	Noted.
449	Volume III	Ch 28: Cranes & Hoists	4 of 13	28.2.13	Hoists and Trolleys with Monorails	For electric hoists speeds have not been indicated. Same shall be as follows 1) Hoisting -2.5 to 3 Metres per minute 2) Cross travel-7 to 10 metres per minute. Further creep speed is not considered. Owner to confirm the bidder undrstanding.	Electric Hoist Speeds shall be as under:- 1) Hoisting- 03 meters per minute. 2) Cross travel- 07 meters per minute
450	Volume III Volume III	Ch 28: Cranes & Hoists Ch 28: Cranes & Hoists	5 of 13 8 of 13	28.3 (n)(i) 28.4.11	Access walkways of not less than 800 mm (clear) with hand railing of height of 1100 mm along the both side of bridge girder and cross over walkways. .....The width of platform shall not be less than 800mm in width and Guard rails shall be provided on the crab side of the bridge platform.	800 mm clear for cross over walkway is on conservative side. Please note that the crab is accessed only during maintenance and not regularly. Hence a walkway of 500 mm is adequate. Increasing the crab walkway affects the hook approaches. However we confirm that 500mm walkway shall be provided on both side of crane bridge girder. Owner to please confirm	Access walkways to be provided shall be as under:- 1) 800 mm clear walkway along long travel of TG Hall. 2) 500 mm (clear) on EOT crane bridge.

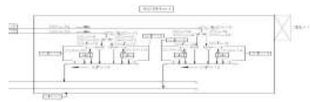
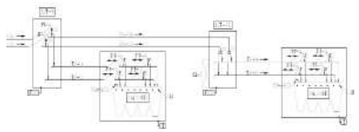
Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
451	Volume III	Ch 15: CW & ACW System	3 of 37 6 of 37	15.3 15.4.10vii)	EOT crane for handling pumps, motors and other equipment in the CW pump house. Capacity selection of the crane shall be as per stipulations given in Chapter-28 (Cranes & Hoists). ☐ Electric hoists for handling stoplog gates and coarse screens. vii.).....Sump gates shall be accessible by the pump house overhead crane.	Discrepency observed in referred clause. Sump gates (Stoplog gates and screens) shall be operated by separate electric hoist instead of pump house overhead crane. Owner to confirm	Confirmed.
452	Volume III Volume III	Ch 28: Cranes & Hoists Ch 28: Cranes & Hoists	28.2.2 28.2.3	3 of 13 3 of 13	….Auxiliary Hook of 5 T shall be provided in the cane for handling BFP. …The CW pumphouse EOT crane shall be provided with an auxiliary hook of 5T capacity.	In BFP building & CW pump house, Providing Auxiliary hook will not serve any significant purpose since all the components to be handled are within the approach of the single hook provided. Addition of Aux hook will affect the approach of main hook. Kindly review and confirm deletion of Aux hook requirement in BFP (BC bay crane) and CW EOT crane. Owner is also requested to check other ongoing/executed projects.	Requirement of Aux. hook for BFP EOT Crane is deleted. However bid specifications be followed for CW pumphouse EOT Crane.
453	Volume III	Ch 28: Cranes & Hoists	3 of 13	28.2.3	The rated capacity of all the other cranes shall be 25% over and above the heaviest component/ equipment to be handled including slings.	Under the clause refered "all other cranes" means excluding BFP BC Bay crane and CW EOT. Request owner to confirm bidders understanding.	Bid specifications be followed including for EOT cranes of CW Pumphouse & BFP.
454	Volume III	Ch 28: Cranes & Hoists	3 of 13	28.2.12	The EOT cranes shall be designed to operate with 125% of rated load without any permanent deformation.	Kindly clarify meaning of "rated load". Bidder understand rated load means the safe working load of crane. It may be noted that cranes are designed to operate without any permanent deformation at 100% of Safe working load (which has a margin of 110 % over heaviest weight to be lifted for TG hall /BC bay(BFP)/CW PH cranes and 125% margin for other areas cranes). Further the cranes are also overload tested at 125% of safe working load. Owner to confirm the bidder understanding	Rated load is the load of crane after taking 25% margin over the heaviest component / equipment to be handled. Cranes shall be tested at 125% of rated load.
455	Volume III	Ch 28: Cranes & Hoists	6 of 13	28.3 (t)	Runway/trolley Rails and rail joints: Rails shall be as per relevant Indian Standard and joints to be butt welded by thermit welding or fusion welding.	Rail to rail joints may be allowed by end clamping method also. Welding of rail and its associated tests are very difficult to carry out at site	Bid specification to be followed, however the issue may be discussed during detailed engineering.
456	Volume III	Ch 28: Cranes & Hoists	5 of 13 8 of 13	28.3(j)(a) 28.4.15	Vertical deflection caused by safe working load and weight of trolley in central position not to exceed 1/900 of the span. The vertical deflection of crane girder shall not exceed 1/900 of the span, as per IS: 807.	As per IS 807 the vertical deflection of the crane shall be 1/750 of the span of the crane (if the span of the cranes is more than 12m), and 1/600 of the span (if the span of the crane is less than 12m).Kindly confirm.	Vertical deflection shall be as per latest version of IS 807
457	Volume III	Ch 28: Cranes & Hoists	5 of 13	28.5.1	The EOT cranes for all other areas indicated in clause 28.1.3 above shall meet all the requirements indicated in clauses 28.3 and 28.4 above as applicable.	Noted for double girder EOT cranes as applicable of BFP – BC bay and CW pump house. For single girder cranes or other areas like in fire water Pump House,Raw Water Pump House etc. only DC electromagnetic type brakes can be provided. Thruster type brakes are not recommended for single girder cranes due to mounting and alignment issues.Further the quantity of brakes that can be provided per motion in case of single girder cranes and hoist is one only due to limitation of space.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
458	Volume III	Ch 28: Cranes & Hoists	5 of 13	28.5.1	The EOT cranes for all other areas indicated in clause 28.1.3 above shall meet all the requirements indicated in clauses 28.3 and 28.4 above as applicable.	Noted for double girder EOT cranes of BFP – BC bay crane and CW pump house crane. For other areas like Raw Water Pump Hous building,fire water pump house, compressor house etc where single girder cranes are to be provided, platform on crane bridge girder cannot be provided.The cranes structure being single girder, the platform cannot be supported on the crane structure. For maintenance purpose suitable platform along with acess ladder shall be provided at the end of bay at operating floor. For same reason/s mentioned above ,ladder to approach the bridge platform of these other areas cranes are also not required. Kindly review and confirm.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
459	Volume III	Ch 28: Cranes & Hoists	8 of 13	28.6.1	Electrical equipment shall be adequately rated to permit simultaneous operation of any combination of motions of the crane for it duty service..	The crane control is designed for simultaneous operation of any two motions. i.e Main and Aux hook ,Main and Cross travel, Main and long travel, Aux and cross travel or aux and long travel, which ever is more stringent. Owner to confirm th bidder understanding.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
460	Volume III Volume IV	Ch 28: Cranes & Hoists Ch 16 : Electricals of Elevator, EOT cranes & Hoists	9 of 13 5 of 22	28.6.2.3 16.10.01	Motor ratings shall be 25% (at least) over the maximum power requirement. The hoist motors shall be rated to lift 125% of the design load at rated speed. Continuous motor rating shall be arrived at considering 15% margin over the duty point input or 10% over the maximum demand of the driven equipment, whichever is higher, considering highest system frequency and voltage variation. If however, a higher margin is stipulated in the accompanying driven equipment specification, the higher stipulated margin shall prevail.	Discrepency is observed in referred clause We understand that the design load is the safe working load of the crane(which has a margin of 110 % over heaviest weight to be lifted for TG hall /BC bay crane/CW PH cranes and 125% margin for other areas cranes). Further 25% margin may please be reviewed since 15% margin over the duty point input or 10% over the maximum demand of the driven equipment, whichever is higher is sufficient, as provided for numerous cranes supplied and installed in earlier projects. Over rated motor will ultimately add to capital and running cost. Owner to confirm th bidder understanding.	Specifications be followed as per Clause 16.10.01 of Ch-16 at Sheet 5 of 22 in Vol-IV.
461	Volume III	Ch 28: Cranes & Hoists	10 of 13	28.6.4	Radio remote Control of EOT Crane:	We understand that only TG hall EOT crane shall be Radio remote control operated along with cabin. For cranes of other areas pendent push button operation is required in line with requirement mentioned at clause no 28.2.8, sheet 3 of 13. Owner to please confim the bidder understanding	Confirmed
462	Volume III	Ch 28: Cranes & Hoists	13 of 13	28.8	(vi) Crane Rails :- As per IS: 3443 Grade 50 C 12.	Crane rails of grade 55C11 may also be accepted. Availabilty of either grades are subject to availabilty in the market. Hence both the grades should be accepted. Owner to kindly confirm.	Bid specifications to be followed.
463	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	20 of 28 21 of 28	18.02.10(i) 18.02.10 v) (b)	The operator's cabin shall be steel fabricated closed cabin type, and air conditioned,fireproof construction h)One No. Suitably rated window Air conditioner.	As per mechanical specification Ch 28, clause 28.3 (n), cabin is open type hence air conditioning is not applicable	Please follow specifications as per Clause 28.3(n) of Ch-28 at Sheet 5 of 13 in Vol-III. Air Conditiong of open type cabin is not applicable.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
464	Volume IV	Ch 18 : Electricals of Elevator, EOT cranes & Hoists	20 of 28	18.02.10(i)	The operator's cabin shall be steel fabricated .....fireproof construction	For maintenance duty cranes of power plant fire proof construction of cabin is not required. Adequate number of CO2 fire extinguishers shall be provided. Kindly accept.	Noted.
465	Volume III	Ch 28: Cranes & Hoists	7 of 13	28.4.3	The design code for EOT crane shall be IS: 3177 latest edition. However, the speed for the various motions shall be as follows: Main hoist - 1.6 m/min Trolley Travel (Cross Travel) - 4.0 m/min Crane Travel (Long Travel) - 10.0 m/min	Please note that speed of Aux hoist is not mentioned for crane other than TG hall. We understand that Aux hoist is not applicable for cranes other than TG hall EOT crane. Kindly give confirmation in line with above pre bid clarifications for BFP handling EOT crane and CW pump house EOT crane that aux hoist is not applicable.	Bid specifications to be followed.
466	Volume III Volume IV	Ch 28: Cranes & Hoists Ch 18 : Electricals of Elevator, EOT cranes & Hoists	11 of 13 17 of 28	28.6.4 (iii) 18.02.06 (iv)(b)	The remote unit shall communicate up to the distance of approximately 100 M. The system shall have capability to provide range of 1.5 times the long travel distance of the crane.	The requirement mentioned in two clauses are contradictory. We are considering that remote unit should communicate up to the distance of approximately 100 meters, which is suited for safe operation of crane as per EHS point of view.	Clause 28.6.4 (iii) at Sheet 11 of 13, Chapter-28, Vol-III be followed.
467	Volume III Volume VI Volume VI Volume III	Ch 33: Layout Requirements Ch 06: General Requirement of Buildings & Structures Ch 06: General Requirement of Buildings & Structures Ch 28: Cranes & Hoists	7 of 11 1 of 12 12 of 12 3 of 13	33.4 (21) 6.2 6.19 28.2.11	In TG bay at crane rail level, chequered plate walkway of minimum 600 mm clear width from face of the column to the hand rail on crane side to be provided for entire A-row & B-row column sectional depth for full length of the building. Continuous walkway at least 750 mm (Wherever occurs) wide shall be provided along the crane girder level with handrails, on both side of the building. Approach to EOT crane shall be ensured by Cage ladder or staircase. Provisions of safety, health and welfare according to Factories act shall be complied with at design stage. These shall include provision of continuous walkway (minimum 750 mm wide) along crane-girder at crane girder level on both sides of the building, comfortable approach to EOT crane. Cabin, railings, fire escape locker room for workmen, pantry, toilets, rest rooms etc. .....Access walkway of minimum 800 mm width with safety handrails shall be provided along the full span length of the building.	Contradiction in tender documents is found for width of walkway, Bidder is considering 500 mm walkway along the runway girder for double girder EOT Crane. For number of walkway for each crane (along with runway girder), Bidder propose the followings: - 1) For Cabin operated double girder EOT Crane (TG Building), Both side walkways(500mm) along the runway girder shall be considered for the safety of the operating personnel in operator's cabin. 2) For pendant operated double girder EOT Crane (Misc. area), One side walkway(500mm) along the runway girder shall be considered for the maintenance for crane. 3) For pendant operated single girder EOT Crane (Misc. area) and Underslung crane, Walkway along the runway girder is not envisaged as maintenance of crane cannot be carried out from top side. In this case, platform at the end of building (gable end) shall be considered for maintenance of the crane.	1) Access walkways to be provided shall be as under:- i) 800 mm clear walkway along long travel of TG Hall. ii) 500 mm (clear) on EOT crane bridge. 2) Noted. 3) Noted.
Elevator							
468	Volume III	Ch- 29: Elevator	8 of 15	29.12	iv)False ceiling:Powder coated	Since, elevator car, and ceilings shall be of Stainless steel, False ceiling shall be of Stainless steel accordingly. Hence, it cannot be powder painted. Confirm the acceptance.	Confirmed.
469	Volume III	Ch- 29: Elevator	6 of 15 8 of 15	29.10.2 29.12	Guide rails complete with supporting brackets for the car and counter weights. Bidder to take care of granite tiles (approx. 80 Kg) to be provided for cabin flooring in selecting counter weights. i)Flooring of cabin:Vitrified ceramic tiles of mat finish	Discrepancy observed in referred clause. Owner to confirm type of flooring for cabin .	Specifications be followed as per Clause 29.10.2 of Ch-29 at Sheet 6 of 15 in Vol-III i.e. granite tiles flooring of cabin.
PIPING							
470	Volume III,	Chapter 27	8 of 31	27.6.4	Pipelines of NB 50 size and below are regarded as field run piping. It is bidder's responsibility to plan suitable layouts for these system insitu. Bidder shall prepare drawings indicating the layout of field run pipe work. These drawings shall be approved for the installation of the field run pipe work. Based on these approved layouts, the bidder shall prepare the BOQ of field run-pipe and submit to Employer for approval.	For site routed pipes (50Nb & below), routings are decided & done at site suitably to suit site conditions. Hence, as per bidder's practice no layout drawings are made. But necessary guidelines for site routed piping will be issued to our site counterpart at contract stage. Kindly confirm.	Bid specifications to be followed.
471	Volume III,	Chapter 27	10 of 31	27.9.4	Mitre bends are not acceptable in case of rubber lined mild steel	Bidder intend to use miter bends with rubber lining for LP piping. Same is being practiced in other executed projects. Therefore Employer is requested to allow usage of same.	Bid specifications to be followed.
472	Volume III,	Chapter 26	32 of 59	D. OTHER VALVES (65 NB & Above) 6.(e) Springs	For Alloy Steel Valve -Stainless steel or Tungsten steel	Bidder aditionally proposes Chromium Alloy as Spring material for valves	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
473	Volume III,	Chapter 24 Chapter 24	55 of 66 17 of 31	F. VALVES AND SPECIALTIES C.I. Gate Valves 1.3 A & B C-I Check Valves 3.3 i, ii, iii, iv 27.15.2 Valve Body Material	Body CI IS: 210 Gr FG 260 Bonnet CI IS: 210 Gr FG 260 Body CI IS: 210 Gr. FG 260 Cover CI IS: 210 Gr. FG 260 Disc CI IS: 210 Gr. FG 260 Valve body material for various services shall be as follows: Valve body material for water application like circulating water, Secondary circuit auxiliary cooling water of ECW system, Raw water, Ash water make-up, service water, clarified water, DM cooling water (pH corrected) & drinking water shall be cast iron for sizes 65 NB and above; gun-metal for sizes 50 NB and below.	Alternatively bidder intend to use ASTM A216 Gr. WCB material for the said application. Request owner to accept the same.	Noted
474	Volume III,	Chapter 24	54 of 66	F. VALVES AND SPECIALTIES C.I. Gate Valves 1.1	Type : Rising spindle type (For Above ground Piping and Non Rising Spindle type for Underground piping) IS-14846 for sizes 65 mm NB to 300 mm NB.	Alternatively bidder intend to use Rising spindle type for underground piping. IS-14846 standard covers Sluice Gates. Bidder proposes to use BS or ASTM/API standard for Gate valve. Request owner to accept the same.	Bid specifications to be followed.
475	Volume III,	Ch 15: CW & ACW System	33 of 37	DATA SHEET FOR RUBBER EXPANSION JOINTS	7 (i) Axial Compression 25 mm Max & 15mm Min 9 Controls unit to be provided: Yes	Bidder understands for tied in expansion joints with control rods will not allow any axial movements. Request owner to relook into the requirement.	Noted.
Coal Handling Plant							
476	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 6 of 120	1.1.8 (26)	Rail mounted Bidirectional Stacker-cum-Reclaimer Machine(SCR) # 3SR-1A (Bucket Wheel Type) with on-board Dry Fog Dust Suppression System	Bidder proposes plain water dust suppression system mounted on SCR machine instead of Dry Fog Dust Suppression system. The same is being followed in all NTPC and SUBs Projects including Buxar. Please confirm acceptance.	Bid specifications to be followed.
477	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 6 of 120	1.1.8 (43)	Bull dozer with one coal blade & one earth blade	Bidder requests Owner to share the details of coal and earth blade of Bull Dozer.	Coal and earth blades shall be according to the model of Bull Dozer supplied by the Bidder.
478	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 8 of 120	1.1.8 (58) Scope of Work (Mechanical Works) M-2 CHUTES (2.0) Data sheet: Chutes	All chute liners shall be of stainless steel Material of chute Parent Plate :20 mm thk. SAILHARD/equal	The referred clauses are contradictory regarding MOC of Chute. Bidder understands that MOC of chute shall be 20 mm thk. SAILHARD/equal inline with referred "M-2 CHUTES (2.0) Data sheet: Chutes" Please confirm Bidder's understanding.	Bidder's understanding is correct.
479	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 12 of 120	1.3 (7) Performance Guarantee Requirements	Ring Granulator with By-pass facility	Owner to note that there is no provision at ring granulator machine for bypassing the incoming material as per OEM. Hence, Owner is requested to review the reequipment and delete the by-pass facility in Ring Granulator.	Requirement of Bypass facility of Ring Granulator is deleted.
480	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 14 of 120	1.5.13 Junction Towers/ Crusher Houses/ Sampling Tower	One (1) external Independent steel staircase up to roof level [minimum1000 mm (clear) width] shall be provided for above buildings except crusher houses/ sampling tower with landing facility at all floors.	Bidder proposes to consider the internal staircase arrangement for all junction towers. Please confirm acceptance.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
481	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 25 of 120	4.0 CONVEYOR COMPONENTS [B] Idler Units	Return idlers shall be 2- Equal roll V-type x 100 Troughing.	Bidder propose to consider V type 10 deg return idler where length of conveyor is equal to 400 m or more. Please confirm acceptance.	Confirmed.
482	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 27 of 120	4.0 CONVEYOR COMPONENTS [C] Pulleys	All drive pulley shall have minimum 12 mm (4mm ceramic + 8mm rubber) thick Ceramic rubber lagging [Al2O3 (92%) ceramic tiles embedded into the natural rubber by vulcanizing process, Hardness=9 on Mohr's scale]. Coefficient of friction shall not be less than 0.7(Dry Conditions)/0.5(Wet condition) for the above lagging.	Bidder propose to consider all drive pulley with 16 mm thick natural rubber lagging instead of drive pulley with minimum 12 mm (4mm ceramic + 8mm rubber) lagging . Kindly confirm acceptance.	Bid specification to be followed

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
483	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 28 of 120	4.0 CONVEYOR COMPONENTS	Screw Take-up (if applicable) shall be hydraulic operated type.	Bidder propose that manually adjustable type screw take-up is acceptable in line Buxar Project. Please confirm acceptance.	Confirmed.
484	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 44 of 120	-	Schedule of Hoists with capacity,lift, quantity & type	Bidder understands that all hoist requirement (Type, lift & quantity) shall be based on the system and functional requirement of conveyor component/equipment. Please confirm Bidder's understanding.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
485	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 58 of 120	M-12 Travelling Tripper Design Requirement	The Contractor shall include in his proposal necessary electricals for travelling trippers. Adequate length of trailing cables (power & control) with festoon arrangement shall be supplied for each of the travelling tipper. Alternatively, drag chain arrangement may be provided for trailing cables (power & control) for each travelling tipper.	Bidder proposes monospiral composite cable drum for TTR machine as an alternative to drag chain arrangement. This in line with NTPC Projects.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
486	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 88 of 120	2.0 Data sheet: Bidirectional Stacker cum Reclaimer	Boom Length (distance between centre line of slew to centre line of bucket wheel) is 45m	Owner is requested to check the stacker reclaimer Boom length of 45 m which is on higher side and not required considering stockpile width of 50 m. Bidder proposes the boom length as 41m for SCR machine. This is in line with all NTPC Projects including Buxar Project. Please check and confirm the Bidder's proposal.	Confirmed.
487	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 75 of 120	3.0. Data Sheet: Crusher (Ring Granulator)	Type of crusher cleaning : Water jet type	Bidder understands that cleaning of crusher rotor assembly and inside crusher surfaces shall be done with help of service water system located on crusher deck floor. Hence no separate water jet cleaning is not required. This is in line with all NTPC Projects including Buxar Project. Please confirm acceptance.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
488	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 103 of 120	M-31 Coal sampling system	Auto coal analyser shall be installed for instant GCV monitoring of coal being fed into the units.	In absence of non clarity, Bidder understands that there is conventional type coal sampling system consisting of sampler, crusher, bottle collector etc. is envisaged in line NTPC Projects and Buxar Project and no Auto coal analyser are envisaged. Please confirm Bidder's understanding. If Auto coal analyser is envisaged instead of conventional coal sampling system, Bidder requests Owner to share the details of Auto coal analyser.	Coal analyzer shall be provided by Bidder as per Attachment-6
489	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 103 of 120	M-34 Bull Dozer	Four (4) nos. self - propelled crawler dozers shall be provided with a minimum of Net Power 242 kW (324HP)	Bidder request to share the details of blade capacity (both coal and earth blade) considering engine Power 242 kW (324HP).	Bid specification to be followed
490	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 103 of 120	M-34 Bull Dozer	Four (4) nos. self - propelled crawler dozers shall be provided with a minimum of Net Power 242 kW (324HP)	Owner to note that 4 numbers Bull Dozer are on higher side. also, Bidder proposes to exclude it from the Bidder's scope of work. Kindly review the numbers and exclude it from Bidder's scope o work.	Bid specification to be followed
491	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 19 of 120	1.8 List of Building required for CHP	Loco Shed & Dozer Shed	As the details of loco shed and Dozer shed is not available in Volume VI for civil, structural works, Owner is requested to provide the details of the same.	Loco shed shall be structural framed building with sheeting. Dozer shed shall be RCC framed building.For civil details refer Volume VI. Dozer shed shall be provided for accomodating 04 Nos. Dozers and 01 maintenance bay.
492	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 37 of 120	2.0 Data Sheet: Chutes (3.0) Tramp iron / Floor Cleaning Chutes	Floor cleaning chute shall be provided at all floors, which shall be suitably connected to a main down-coming chute. Suitable grating as necessary shall be provided at the chute opening in the floor for safety. Chute shall terminate outside the building about 1.5m above ground level. One (1) no. mobile trolley shall be provided for collection of tramp metal for each Magnetic Separator (ILMS & SEM) to dispose of tramp metal into tramp metal chute.	Bidder proposes one no of mobile trolley for the collection of tramped ferrous metal from each Magnetic Separator. This tramped metals will be disposed to ground level using floor cleaning chute located in building/crusher house instead of tramp iron chute. Please confirm acceptance.	Bid specification to be followed
493	Volume III - Mechanical Works	Ch 28: Cranes & Hoists	Sheet 4 of 13	28.2.13 Hoists and Trolleys with Monorails	items weighing less than 1000 kg, manual hoists shall be provided. For items weighing 1000 kg and more, electric hoists (lift & travel) shall be provided. In case the lifting height is more than 10M, electric hoist (lift & travel) shall be provided	As per standard practice followed in NTPC & Buxar Project. Bidder proposes that items weighing upto 2000 kg, manual hoists shall be provided. For items weighing more than 2000 kg , electric hoists (lift & travel) shall be provided. In case the lifting height is more than 10M, electric hoist (lift & travel) shall be provided irrespective of the weight. Please confirm acceptance.	Bid specification to be followed

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
494	VOLUME - VII TENDER DRAWINGS	-	-	Plot plan	Uncrushed coal stock pile	Bidder understands the uncrushed coal stock pile shown in plot plan is not in scope of Bidder. Please confirm.	1. Provision of Uncrushed coal stockepile stands deleted. 2. For feeding crushed coal from 800 MW Unit Coal stockpile to the existing Units of 2x300 MW or vice versa, the area around the proposed ERH & the existing ERH shall be RCC paved for movement of dozers.
495	VOLUME - VII TENDER DRAWINGS	-	-	Flow diagram		Bidder understands that the requirement of ILMS before bunker feeding at 3JT-7 & 3JT-8 (2 Nos each) is not required. 2 Nos of ILMS will be provided only at 3JT-8. Kindly confirm Bidder's understanding.	For side mill arrangement, ILMS shall be provided at both JTs before bunkers & in case of front mill arrangement, ILMS shall be provided at JT before bunkers.
496	-	-	-		General	Bidder requests Owner to share the existing mechanical GA of conveyors and transfer tower/junction house,ERH & crusher house details along with other facility drawing which may interface the CHP layout for proposed 1x800 unit..	Available drawings have already been shared with bidders. For any further information, Bidder may visit the site.
497	VOLUME - VII TENDER DRAWINGS Volume III Mechanical Works Volume III Mechanical Works	Ch:19 Coal Handling System Ch:19 Coal Handling System Chapter :19 Coal Handling System	Sheet 75 of 120 Sheet 78 of 120 3 of 120 64 of 120	M-18 Crusher [Ring granulator type] 3.0. Data Sheet: Crusher M-19 Vibrating Grizzly Feeder 2.0 Data Sheet: Vibrating Grizzly Feeder 1.1.3 11.0, 5	Rated capacity of Coal Handling Plant is 1200 TPH and belt width is 1400 mm. For Coal Handling, Belt speed of trough conveyors is 2.5 m/s. All conveyors including boom conveyors shall be designed for 110% of rated capacity. Crusher, Feeder: **1100 TPH(Rated)** Two(2)no of needed Belt conveyor streams in parallel (1W+ 1S) of **min 1200 tph** rated capacity each together with Auxiliary Equipment / dust control system are proposed to meet the requirement of the plant. Type of Wagons that can be Handled at a time:**BOX, BOXN, BOXNHA, BOXNLW, BOXNHL, BOXN25,DFC & other type of open wagons** for coal as per RDSO standard and design used by Indian Railways to move coal.	Owner to note there are 4 nos crusher (2W+2S) and 4 nos feeders (2W+2S) are envisaged, considering working of 2 nos crusher & feeders, rated capacity of crusher and feeder are not matching with rated capacity of conveyor stream (1200 TPH) (1no working stream). Owner is requested to check and mentioned the fixed rated capacity for both the conveyor streams as well as crushers & feeders considering handling of all type of wagons mentioned in the specification.	Rated capacity of belt conveyors (1W+1S) is revised to 1400 TPH. Thus, all associated equipments & systems of CHP shall be provided for 1400 TPH conveying capacity.
498	Volume I Conditions of Contract: Commercial & General	Section – I IFB	Sheet 3 of 76	2.0 Brief Scope of Work	Coal and Bio-Mass Handling System inside the Plant, Coal Conveying System, Fire Detection and Protection System	No details are provided in tender specification, hence, Bidder understands that Biomass handling system is not envisaged in this proposed 1x800 MW unit. Please confirm Bidder's understanding.	1) Biomass handling system is to be provided by the bidder. Biomass shall be fed through ERH of CHP. 2) Biomass storage of 500 tonnes shall be provided by bidder in a semi covered shed. Side wall shall be minimum 2 M height.
499	Volume III Mechanical Works	Ch:19 Coal Handling System	Sheet 6 of 120	1.1.8 (S. No.33)	Insertable type Bin Vent Filters for Coal Bunkers	Owner to note that it is not feasible to provide Insertable type Bin Vent Filters for Coal Bunkers in view of space constraints. Owner is request to allow for pulse jet type Bag filter system at coal bunkers area inline Buxar Project and not Insertable type Bin Vent Filters for Coal Bunkers. Please confirm acceptance.	Confirmed.
500	Volume III Mechanical Works	Ch:19 Coal Handling System	Sheet | 6 of 120	1.1.8 (S. No.35)	Dust Suppression System # DST-1 _Plain water DS system for Track Hopper complex	Bidder understands that Track Hopper is not envisaged in proposed unit, hence, referred clause for track hopper DS system is not applicable. Please confirm Bidder's understanding.	Confirmed.
501	Volume III Mechanical Works Volume VII TENDER DRAWINGS	Ch:19 Coal Handling System 111-12-3504	Sheet |17 of 120 -	1.5.22 -	Coal Yard Drainage System: Drainage canal around stockpiles to be constructed ultimately leading to a sump to take all the effluent water from coal stock yard (sprinkling water, rain water). Sump pumps shall be provided to pump the water from sump pit to the guard pond.	1) As per clause 1.5.22 - Effluent water from coal stock yard stock pile shall be fed to guard pond through sump pump. 2) As per NIT drg. no -111-12-3504, Effluent water from coal stock yard stock pile shall be fed to settling pond via garland channel by gravity. In view of above discrepancy, Bidder understands that Effluent water from coal stock yard stock pile shall be fed to settling pond via garland channel by gravity in line with referred drawing. This is inline with practice followed in NTPC Projects as well as in Buxar Project. Kindly confirm Bidder's understanding.	Effluent from coal stockpile shall be sent to coal settling pond by gravity and further pumped to ETP for treatment complying to zero discharge.
502	Volume III Mechanical Works	Ch:19 Coal Handling System	Sheet |17 of 120	1.5.22	Coal Yard Drainage System: Drainage canal around stockpiles to be constructed ultimately leading to a sump to take all the effluent water from coal stock yard (sprinkling water, rain water). Sump pumps shall be provided to pump the water from sump pit to the **guard pond.**	Bidder understands that the "guard pond" mentioned in the referred clause is means to " coal settling pond". Please confirm Bidder's understanding.	Effluent from coal stockpile shall be sent to coal settling pond by gravity and further pumped to ETP for treatment complying to zero discharge.
503	Volume III Mechanical Works	Ch:19 Coal Handling System	Sheet | 19 of 120	1.8. (S. No.4)	Pump house building # 3PMH- 1A/1B/ 2/3A/3B/4 & compressor house #3ACH-1	Bidder understands that numbers of CHP Pump House/compressor house shall be decided by Bidder as per design calculation & layout requirement. Please confirm Bidder's understanding.	Minimum 03 Nos. Pump houses shall be provided and their location shall be finalized during detailed engineering.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
504	Volume III Mechanical Works	Ch:19 Coal Handling System	Sheet 89, 90 of 120	M-23 -Cl. No.1.6	Each Sprinkler is connected to main header pipeline through Globe Valve & Solenoid Valve (Globe Valve for controlling flow & Solenoid Valve for starting/ stopping of flow). The spraying will be started / stopped through Solenoid Valve manually as per requirement to spray water in selected area. One (1) no Globe Valve will be provided at inlet of each sprinkler to By-Pass the Solenoid Valve. Stockpile will be wetted by operating one (1) no. sprinkler on each side of any one stockpile [Two (2) nos. sprinklers will be operating at a time for any one of stockpile]. A pair of sprinklers will be started/ stopped manually as per requirement from control panel.	As per NIT specification a pair of sprinklers will be started/ stopped manually. Bidder proposes that Solenoid valve & control panel may be omitted from specification for simplifying the system in line with standard practice followed in NTPC Projects and Buxar Project. Please confirm Bidder's understanding.	Bid specifications to be followed.
505	Volume III Mechanical Works Volume VII TENDER DRAWINGS	Ch:19 Coal Handling System 111-11-5100	Sheet | 96 of 120 -	M-27 (S. No.1.2.6.c) Flow diagram-Coal Handling Plant	a) On hood of Grizzly feeder / On Discharge chute from Grizzly feeder to Crusher b) Receipt points (skirt) of Conveyor below Crusher. [One D.E. point shall be provided for each loading point of above conv.] 	Bidder understands that DE system shall be applicable at following area at Crusher House. i) Discharge chute of Vibrating Grizzly feeder ii) Receipt & discharge point of Belt Feeder. DFDS system shall be applicable at receipt points (skirt) of out going conveyor at Crusher House. Please confirm Bidder's understanding.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
506	Volume VII TENDER DRAWINGS Volume III Mechanical Works	111-11-5100 Ch:19 Coal Handling System	- 5 of 120 & 46 of 120	Flow diagram-Coal Handling Plant 1.1.8, 8, 9 & 10 & 53	 Scope of Work (Mechanical Works): Tripper belt Conveyor# 3TBC-1A/ 1B/ 2A/ 2B :4 Travelling Tripper# 3TRT-1A/ 1B/ 2A/ 2B with two way discharge chute having flap gate: 4 Belt sealing arrangement# 3BSA-1A/ 1B/2A/2B: 4 Fixed Tripper (Discharge Pulley) of Conv. # 3BC-9A/9B:3	As per CHP flow diagram, side mill arrangement is shown, Bidder understands that front mill arrangement is also acceptable in line with NTPC projects as well as in Buxar Project. Please confirm Bidder's understanding. Also, in case of front mill, Bidder understands the following: 1) 2 nos of Travelling Trippers instead of 4 nos Travelling Trippers 2) 2 nos of Tripper Conveyors instead of 4 nos Tripper Conveyors 3) 2 nos of belt sealing arrangement instead of 4 nos belt sealing arrangement. 4) Fixed Trippers are not applicable Please confirm Bidder's understanding.	Bid specifications be followed. However, if the bidder is offering front mill arrangement, then the flow diagram shall be finalized during detailed engineering.
507	Volume III Mechanical Works	Ch:19 Coal Handling System	6 of 120	1.1.8, 30	Belt Vulcanizing Machine# 3BVM-1/ 2	Bidder understands that in case of N-N type belt, one number belt vulcanizing machine shall be provided. Please confirm Bidder's understanding.	Confirmed.
508	Volume III Mechanical Works	Ch:19 Coal Handling System	7 of 120 8 of 120	43. 44. 56. 57.	Bull dozer with one coal blade & one earth blade: 4 nos Payloader: 3 nos Diesel Locomotives: 4 nos Dumpers: 2 nos	The equipment (Bull dozer, Payloader, Diesel Locomotives & Dumpers) as mentioned in referred clause, Owner to note that these are bought items for Bidder and there is no value addition by Bidder and Owner can purchase these equipment directly from OEMs, hence, Owner is requested to exclude these equipment from Biddder's scope of work. Please confirm acceptance.	Bid specifications to be followed. However, requirement of diesel locomotives shall be 03 nos.
509	Volume III Mechanical Works	Ch:19 Coal Handling System	119 of 120	M-41, 1.0	Dumpers Two (2) – BEML Make BH 35 Rear Dump Truck for handling coal in the yard. The dump truck shall have the following features	Owner to note that dumpers of single make will lead to monopoly, hence, Bidder understands thar Dumpers of other reputed makes are also acceptable. Please confirm Bidder's understanding.	2nd coulmn of Table M-41 against S.No. 1.0 of Ch-19 at Sheet 119 of 120, Vol-III be read as:- "Two (2) – BEML Make BH 35 Rear Dump Truck or equivalent reputed make for handling coal in the yard. The dump truck shall have the following features"
510	Volume III Mechanical Works	Ch:19 Coal Handling System	14 of 120	1.5, j.	Bulk Density of crushed & compacted coal (in stockpile): 1200 kg/m3 (for design of Bucket Wheel Reclaimer)	Bidder proposes to consider 800 kg/m3 bulk density for design of Bucket wheel Reclaimer in line with NTPC Projects and Buxar Project. Please confirm acceptance.	Bid specifications to be followed.
Ash Handling Plant							

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
511	III	1 21	43 of 186 3 of 21	1.17 21.3.4	Ash Handling System The height of boiler shall be fixed in such way that the entire ash handling arrangement underneath does not go underground. No underground installation below boiler shall be allowed. Accordingly sufficient clearance shall be maintained below boiler and after bottom ash seal plate. The bottom ash hopper associated equipment shall be located above ground for ease in maintenance. Jet pumps and piping may be below FFL in a trench in bottom ash hopper area.	There is discrepancy in stated boiler and AHP tender specification for location of jet pump and BA slurry pipe location below BA hopper. In view of above, Bidder understands that jet pump arrangement and BA slurry piping shall be located underground locally in BA hopper area. However, for rest of the area BA slurry piping shall be routed above ground. Please confirm Bidder's understanding.	Confirmed but routing of BA slurry piping for rest of area shall be above ground on piperacks.
512	III	21 33 21	3 of 21, 9 of 11 5 of 21	21.3.4 38 21.7.3	Jet pumps and piping may be below FFL in a trench in bottom ash hopper area. Further the pipes shall be routed on a pipe rack. Ash slurry pipe lines shall be routed on pedestals except at road/rail crossings where pipe culverts shall be provided. Ash slurry pipes shall be routed from proposed ash disposal pump house on pipe rack/RCC pedestals.	There is contradiction in referred tender clauses. In view of this, Bidder understands that BA slurry piping shall be routed as follows. 1) Below BA hopper, BA slurry pipe shall be routed in trench. 2) In boiler area and other area, BA slurry pipes shall laid on RCC pedestals. However, for road crossing, shallow trenches or humps are envisaged. 3) For combined ash slurry disposal from ash slurry pump house to ash pond, ash slurry pipes shall laid on RCC pedestals except at road/rail crossings where pipe culverts shall be provided. 3) Fly ash slurry pipes from FAE tower to ash slurry sump shall be laid on pipe rack. For other area, pipe rack is not envisaged for laying ash slurry pipes. Please confirm Bidder's understanding.	1) Below BA hopper, BA slurry pipe shall be routed in trench. 2) BA slurry pipes upto ash slury sump shall be routed above ground on pipe racks. 3) For combined ash slurry disposal from ash slurry pump house to ash pond, ash slurry pipes shall be laid on pipe rack upto plant boundary/RCC pedestals except at road/rail crossings where pipe culverts shall be provided. 4) Fly ash slurry pipes from FAE tower to ash slurry sump shall be laid on pipe rack.
513	III	1 21	48 of 186 7 of 21	3.0 (l) 21.10.1	Furnace Bottom hopper Design of Boiler and its supporting structure shall be considering 50% ash/clinker loading in furnace bottom hopper and corresponding to ash density of 1600 Kg/M3. Ash collection at various points expressed in percentage shall be considered as follows for ash handling system design: Bottom ash collection including economizer ash: 25%	In absence of clarity, Bidder understands that ash distribution rate shall be as mentioned in AHP tender specification (ch:21) of vol-III for BA system design. Please confirm Bidder's understanding.	Confirmed.
514	III II III	21 8 21	7 of 21 39 of 57 13 of 21	21.9.1 5.32, A) 1.3	The bottom ash and economizer ash shall be evacuated once in a shift in two hours fifteen minutes considering 3 jet pumps working simultaneously. ....The total time for evacuating eight (8) hour collection of bottom ash from a unit corresponding to collection rates specified shall not exceed 135 minutes... Storage capacity of ash : 8 hours bottom ash generated while firing worst coal (minimum)	Bidder envisages to consider bottom ash cleaning twice in a shift of eight (8) hours. Accordingly, Bidder envisage five (5) hour bottom ash hopper effective storage capacity. The same is being followed by NTPC for 660 & 800 MW Projects and also followed in Buxar Project. Please confirm acceptance.	Bid specifications to be followed.
515	III	21	7 of 21	21.10.1	Ash collection at various points expressed in percentage shall be considered as follows for ash handling system design: Bottom ash collection including economizer ash : 25% Ash collection in SCR, APH/Duct hoppers : 5% Ash collection in ESP hoppers : 85%	In absence of clarity, Bidder understands that ash handling plant shall be designed considering ash distribution as mentioned in stated tender clause while firing worst coal at BMCR condition. Please confirm Bidder's understanding.	Bid specifications to be followed. However, ash collection in SCR/APH/Duct hopper together shall be 10% instead of 5%.
516	III	1 21	136 of 186 7 of 21	13,iv) 21.10.1	13) Cyclone Separator Ash separated from flue gas in the cyclone separator shall be collected in the hoppers at its bottom. Ash hoppers shall have a storage capacity of minimum of eight (8) hours at 100% BMCR flow with worst coal. Ash collection at various points expressed in percentage shall be considered as follows for ash handling system design: Bottom ash collection including economizer ash : 25% Ash collection in SCR, APH/Duct hoppers : 5% Ash collection in ESP hoppers : 85%	Bidder understands that as per AHP specification (ch-21), cyclone separator hopper is not envisaged for ash handling system design, hence, cyclone separator hopper ash as per boiler ch-1, is not applicable. Please confirm Bidder's understanding.	Noted.
517	III	21 111-13-5202	19 of 21	25.1	Coarse Ash Tank One (1) – 50 M3 capacity 10 mm thick mild steel to IS: 2062 fabricated coarse ash tank shall be provided to collect coarse ash slurry from feeder ejectors. Flow diagram of coarse ash handling system	Considering 800 MW boiler, coarse ash slurry piping laying would be complex and require lot of bends to convey slurry from SCR, APH and duct hoppers for finally terminating into single coarse ash tank. To avoid chocking issues, it is envisaged to provide total two sets of coarse ash tanks per boiler i.e. on both the sides of Boiler along with associated coarse ash slurry pumps (2x100%) for each coarse ash tank. Owner is requested to relook and issue amendment.	Noted.
518	III	21	7 of 21	21.9.2	The coarse ash shall be evacuated once in a shift in one (1) hour considering 3 or 4 feeder ejectors working simultaneously.	Bidder understands that simultaneous operation of feeder ejectors will be decided by AHP OEM to optimize the water consumption and auxiliary power consumption of water pumps meeting the stipulated cleaning time requirement for coarse ash conveying. Please confirm Bidder's understanding.	Noted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
519	III VII	21 Flow di no: 111-13-5203	3 of 21 17 of 21	21.5.1, 21.5.6 17	Adequately rated oil free, lobe/helical type Conveying Air Blowers shall be provided to supply compressed air required for conveying fly ash from buffer hoppers to fly ash silos. Conveying Air Blowers datasheet	Considering high qty of fly ash conveying and considering high distance conveying, alternatively please allow Bidder to select oil free, scree type, water cooled screw compressors for conveying of fly ash from ESP/ Buffer hopper to main fly ash silo. Please confirm acceptance.	Clause 21.5.6 of Chapter 21 at Sheet 4 of 21 in Vol-III be read as: "Six (6) (3W+3S) transport air compressors (TAC) of suitable capacity with necessary accessories shall be provided for conveying fly ash from the ash vessels (below buffer hoppers) to Fly Ash silos. TAC shall be oil free screw compressors and the specification of the screw compressors shall be in line with the compressors described in Chapter 23 clause 23.6 Vol-III. The capacity and pressure shall be selected as per ash handling requirement.Temperature of 80 deg C of fly ash at silo outlet/loading end shall be ensured and demonstrated at the time of performance test."
520	III	21	19 of 21 3 of 21	23 21.3.5	23.0 Flushing Apparatus 23.2 Removal capacity- By bidder 21.3.5 The removal rate of each Flushing apparatus shall be 4 TPH.	There is a contradiction in stated tender clauses. In view of this, Bidder understands that the Flushing Apparatus ash removal capacity shall be decided as per AHP OEM proven system design. Please confirm Bidder's understanding.	Removal rate of each flushing apparatus shall be minimum 4 TPH.
521	III	21	5 of 21	21.7.1	Each pumping series shall be provided with a disposal pipeline up to ash disposal area including garlanding. Each disposal pipe length shall be considered as 7 KM from the pump house.	In absence of clarity, Owner is requested to furnish actual pumping distance to be considered for ash slurry pump head selection.	For head and flow, 10% margin shall be considered for fixing the capacity and head of the pump. For selecting no. of pumps in series for Ash disposal pumps, total length of 7KM including garlanding and 15M static rise shall be considered.
522	III	21	-	-	Existing ash pond area GA drawing	Bidder requests Owner to furnish the following area/facilities GA drawings. "Existing ash pond area GA drawing including sectional drawings."	Supplied to bidders.
523	III	21	5 of 21	21.7.4	Each ash dyke shall be having 3 discharge point for all the three lines.	As the existing dyke drawing is not available, Bidder requests Owner to provide the location of 3 discharge point in existing dykes so that the same can be taken care to estimate the ash slurry pumping head.	Supplied to bidders.
524	III	-	-	-	Scope not defined for ash pond area ash water recovery system, its clarification system including electrical,civil and instrumentations.	In absence of clarity, Bidder understands that complete ash pond area ash water recovery system, its clarification system including electrical, civil and instrumentations are excluded from Bidder's scope. Please confirm Bidder's understanding.	Confirmed.
525	III	21	5 of 21 18 of 21	21.7.2 20.4	First stage ash disposal pump shall be provided with variable speed fluid coupling and gearbox. Variable speed fluid coupling shall be designed for (+) 10% and (-) 40% speed variation of the rated pump speed. pumps in the series shall be provided with belt drives. Speed variation +10%/ - 45% with respect to rated design point in case of ash slurry disposal pumps and + 20% in case of B.A. slurry transportation pumps	i) In absence of clarity, Bidder understands that Speed variation +10%/ - 45% with respect to rated design point in case of first stage ash slurry disposal pumps only whereas rest of the ash slurry pumps shall be provided with belt drives in line with referred clause 21.7.2. Please confirm Bidder's understanding. ii) Request owner to please clarify whether any speed variation is envisaged for coarse ash slurry disposal pump located near to coarse ash tank.	(i) First stage ash disposal pump shall be provided with variable speed fluid coupling and gearbox. Variable speed fluid coupling shall be designed for (+) 10% and (-) 40% speed variation of the rated pump speed. Balance pumps in the series shall be provided with belt drives. (ii) Speed variation is not envisaged for coarse ash pumps.
526	VII III	Flow dia: 111-13-5204 21	- 7 of 21	- 21.9.4	3 nos. ash slurry disposal pumps are shown in "flow dia of ash slurry and water system" Number of pumps in each series shall be decided based on the frictional losses and static rise in the ash disposal system.	In absence of clarity, Bidder understands that the number of ash slurry pumps as shown in flow diagram is for reference only. However, total number of ash slurry pumps shall be decided by AHP bidder based on actual pumping head required based on pumping distance specified and static height in ash pond. Please confirm Bidder's understanding.	Confirmed.
527	III	21	9/10 of 21	21.12.1.2	All the water piping to bottom ash hopper area, coarse ash, fly ash area and silo area from the pump house shall be routed in the overhead pipe rack.	In absence of clarity, Bidder understands that ash water piping shall be routed on pipe rack from ash water pump house to nearest boiler column. However, in Boiler area and ESP area ash utility pipes shall be supported from respective boiler and ESP columns. Please confirm Bidder's understanding.	Confirmed.
528	III	21	17 of 21	18.2	Capacity: 2500 m3	In absence of clarity, Bidder understands that 2500 m3 is total storage volume inside FA storage silo. Please confirm Bidder's understanding.	2500 m3 is effective storage volume inside each FA storage silo.
529	III	21	8 of 21 18 of 21	21.10.5 20.3	BA Overflow pumps, Coarse ash pumps and Ash disposal pumps shall have 10% margin over pipe frictional losses. Parameter (Head & Flow) 10% margin shall be considered over and above the total straight pipe length and bends.	In absence of clarity amongst the stated tender clauses, Bidder understands that BA Overflow pumps, Coarse ash pumps and Ash disposal pumps shall have 10% margin over pipe frictional losses. Please confirm Bidder's understanding.	Confirmed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
530	VII	111-12-3504	-	-	RO rejects are shown terminating into ash water sump	It may please be noted that the turbidity level of clarifier reject and the salinity level of RO reject will be higher and hence, it is not advisable to use in ash water pumps which may choke the High pressure water head / jet. Bidder proposes to dispose the same off at ash slurry sump. Please confirm acceptance.	Confirmed.
531	III	33	8 of 11	VI	Wherever ash handling pipes are routed on the trestle, grating platform all along the length and width of the trestle shall be provided.	Bidder envisage grating on pipe racks where ash pipe are laid. However, Bidder does not envisage any grating on pipe rack where ash utility pipes are laid. Owner is requested to relook and confirm bidder's understanding.	Confirmed.
532	Vol-VII	-	57 of 120	Tender Drawings	Plot Plan:	In absence of clarity, request owner to mark the corridor on which ash slurry pipes shall be routed for disposal upto ash pond.	Bidder may visit site for the requiste information.
533	Vol-III	33	08 of 11	33.4 (29) vi	Wherever ash handling pipes are routed on the trestle, grating platform all along the length and width of the trestle shall be provided. Further, one walkway of 600mm width shall be ensured on the tier meant for routing the ash handling pipes.	Bidder envisage following. Request owner to review and confirm bidder's understanding. 1. We understand that required grating will be provided only on the tier containing ash conveying (FA & BA) pipes. No grating is envisaged on the tier where water and air pipes will be installed. 2. Suitable grating will be provided only at the location of coupling /pipe joint .	Gratings shall be provided on the tier containing ash conveying pipes. No gratings are envisaged on the tier where only water and air pipes are routed. Gratings shall be provided on the tier containing for ash conveying pipes (Bottom ash, coarse ash, FA & ash slurry) for the entire length
PT PLANT							
534	Vol-III Vol-VII	Chapter- 5 (Water treatment plant) Flow diagram - filtered water system-111-12-3500	2 of 14 -	5.2.1 g) -	Coagulant(Alum) Dosing system consisting of three (3) dosing tanks having minimum total effective capacity of 24 hours requirement with 20% margin and 2x100% capacity dosing pumps complete with associated piping and valves. Alum Dosing Tanks: 2 nos.	Discrepancy is observed between vol -III and tender drawing regarding numbers of alum dosing tanks. As per the tender drawing No. 111-12-3500 (Flow diagram - filtered water system), there are two alum dosing tanks whereas as per specification clause, three (3) numbers are mentioned. Kindly check and confirm the number of alum dosing tanks.	Confirmed that two coagulant (Alum) dozing tanks shall be provided as per tender drawing No. 111-12-3500 Rev2.
535	Vol-III Vol-VII	Chapter- 5 (Water treatment plant) Flow diagram - filtered water system-111-12-3500	2 of 14 -	5.2.1 h) -	Lime Dosing system consisting of three (3) dosing tanks having minimum total effective capacity of 24 hrs requirement with 20% margin and 2 x 100% capacity dosing pumps complete with associated piping and valves	Discrepancy is observed between vol -III and tender drawing regarding numbers of lime dosing tanks. As per the tender drawing No. 111-12-3500 (Flow diagram - filtered water system), there are two lime dosing tanks whereas as per specification clause, three (3) numbers are mentioned. Kindly check and confirm the number of lime dosing tanks.	Confirmed that two lime dozing tanks shall be provided as per tender drawing No. 111-12-3500 Rev2.
536	Vol-III Vol-VII	Chapter- 5 (Water treatment plant) Flow diagram - filtered water system-111-12-3500	4 of 14 -	5.3 (7) -	Three (3) nos. flow transmitters, one each at parshall flume, DM feed pump & RGF back wash pump discharge header shall be provided RGF & RGF Backwash Pump: Not shown	No details provided in referred drawing for Rapid gravity Filter, filter back wash pumps, filter air blower ..etc are not shown, hence, Bidder understands that RGF, back wash pumps and its blowers are not envisaged in line with Buxar Project. Please confirm Bidder's understanding. If RGF is envisaged, please update the drawing with showing backwash pump and blower.	Rapid gravity filter and filter air blowers are included in bidder's scope as per Chapter 5 Volume III. Filter backwash pumps, if required, shall be 2 x 100% and MOC shall be similar to other pumps installed in the filtered water pumphouse. The back wash pumps (if required) and blowers shall be installed in the filtered water pumphouse. Flow transmitters as specified shall be provided accordingly.
537	Vol-III	Chapter- 5 (Water treatment plant) Rise rate of Clariflocculator	6 of 14	5.0 (g) Data sheet	Rise rate of Clariflocculator mention as 1.2 Cu.M/hr/m2.	For all NTPC specification and SJVN Buxar Project, the reactor clarifier is accepted instead of Clarifloculator. Hence, Bidder understands that reactor clarifier (HRSCC) is also accepted as an alternative to Clarrifloculator in view of space constraints and better performance. Please confirm Bidder's understanding.	Confirmed, further specifications of reactor clarifier shall be as per attachment-17

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
538	Volume III Mechanical Works Volume III Mechanical Works Volume III Mechanical Works Vol-VII	Chapter- 5 (Water treatment plant) Chapter- 8 (DM plant) Ch 5 : Water Treatment Plant Ch 5 : Water Treatment Plant Flow diagram - filtered water system-111-12-3500	13 of 14 3 of 15 3 of 14 13 of 14 -	15 Data sheet 8.1.2 s) j) 14.0 -	Filter Air Blower a. Number required No. Two (2) (1 W + 1 S) One (1) no. filter water tank along with 2 no. pumps for each filter. j) Six (6) Rapid Gravity Filters (4W+2S) of adequate capacity with dual media filtering material as per specification along with the necessary valves and instrumentation. Rapid Gravity Filter (Dual Media) RGF: Not shown	As per referred flow diagram, Rapid Gravity Filters are not envisaged, hence, Bidder understands that Rapid Gravity Filters, filter water tanks, filter air blower as mentioned in referred clauses are also not applicable. Kindly confirm Bidder's understanding.	Rapid gravity filter and filter air blowers are included in bidder's scope as mentioned in Chapter 5 Volume III. Filter backwash pumps, if required, shall be 2 x 100% and MOC shall be similar to other pumps installed in the filtered water pumphouse. The back wash pumps (if required) and blowers shall be installed in the filtered water pumphouse. Flow transmitters as specified shall be provided accordingly.
539	Volume II General & Schedules	Ch 4: Provenness	12 of 42	4.4.9	Water Pre-treatment Plant & Liquid Effluent Treatment Plant: The Bidder/its sub-vendor should have designed, supplied, erected and commissioned at least two (2) numbers water/waste water treatment plants, each with a capacity of not less than **1500 M3/hr**, comprising of clarifiers/tube settlers/ thickeners or a combination thereof including civil works. The plants should have been in successful operation for at least two (2) years prior to the date of Techno- Commercial bid opening.	For all NTPC tenders, the provenness criteria asks for two nos. Water / waste water plants, each with capacity not less than 1000 cum./hr. Hence, Bidder requests Owner to allow the capacity of water / waste water treatment plant as 1000 cum./hr instead of 1500 cum./hr. Please confirm acceptance.	Clause 4.4.9 of Chapter-4 at Sheet 12 of 42, Vol-II be read as under:- "The Bidder/its sub-vendor should have designed, supplied, erected and commissioned at least one (1) water/waste water treatment plant, with a capacity of not less than 1000 M3/hr, comprising of clarifiers/tube settlers/ thickeners or a combination thereof. The plant should have been in successful operation for at least one (1) year prior to the date of openning of techno commercial bid."
DM PLANT							
540	Vol-VII	Tender drawing 111-12-3100			As per the tender drawing, 5 m3/h DM potable water is required.	Owner is requested to clarify requirement of DM potable water quantity of 5 m3/h in plant. Requests Owner to recheck the requirement of the same.	Stands deleted as potable water is to be supplied from filtered water reservoir at RGF outlet.
541	Vol-III Vol-VII	Chapter- 8 (DM plant) Flow diagram - DM plant-111-12-3501	15 of 15	9.0 & 10.0	Over head Filter Water Tanks - 1 No. Pumps - 2 Nos. Overhead filter water tank: 50 m3	Bidder understands that supply of service water for DM plant shall be from service water network, hence, separate overhead filter water tank is not required. Please confirm Bidder's understanding.	Confirmed.
542	Volume II General & Schedules Vol-III	Ch 2 : Project Information Flow diagram - DM plant-111-12-3501	4 of 10 -	7 -	Raw Water Analysis Colloidal Silica: 4.2 (mg/l) No post DM Ultra Filtration is evisaged	Owner to note that colloidal silica shown in referred Raw Water Analysis is on higher side for which post DM UF may be required. However, the same is not mentioned in DM Plant specification as well as in flow diagram. Owner is requested to check whether post DM UF is required or not. If Yes, please furnish the UF specification and show in tender drawing.	DM UF shall be provided as per Attachment-7.
543	Volume III Mechanical Works	Ch 8: DM Plant	4 of 15	m.	The uniformity co-efficient of resins shall be less than 1.2	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.
544	Volume III Mechanical Works Volume II General & Schedules	Ch 8 : DM Plant Functional Guarantee & Liquidated Damages	8 of 15 43 of 57	- 5.35 b),4	S.No. Description Outlet Parameters 1. SAC Outlet Sodium Leakage ppm as <0.5 ..... 3. SBA Outlet Reactive Silica ppm as SiO2 <0.1 Conductivity Micromho < 5 Total Electrolyte ppm < 1 4. Effluent from the anion exchanger shall be guaranteed as follows at rated capacity throughout the period between two regenerations: i.) Reactive silica not to exceed: Not to exceed 0.2 ppm as SiO2 ii.) Conductivity at 25 deg.C : Not more than 10 micro mhos/cm iii.) Sodium leakage through cation shall not exceed 2 ppm as CaCO3 throughout the period between two regenerations.	Owner to note that two clauses are mentioned for Guarantee of DM Water. Due to discrepancy, bidder will follow Clause no. 5.35 b) 4. mentioned in Volume-II, Chapter-8 (Functional Guarantee & Liquidated Damages). Please confirm.	Guaranteed Effluent Quality from DM Plant shall be as per Chapter 8, Volume III of specification except for S.No.-4 (at Sheet 8 of 15). "Total Silica ppm as SiO2 < 0.01 " in 3rd & 4th Coulmn against S.No.-4 of Table at Sheet 8 of 15 be read as:- "MB Outlet Reactive Silica ppm as SiO2 < 0.01 MB Outlet Colloidal Silica ppm as SiO2 < 0.01".

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
545	Volume III : Mechanical Works Ch 8 : DM Plant Volume II General & Schedules	Ch 8 : DM Plant Ch 8: FG & LD	8 of 15 43 of 57	- 5.35 b), 3	Guaranteed Effluent Quality from DM Plant : S.No. Description Outlet Parameters 4. MB Outlet Reactive Silica ppm as SiO2 <0.01 Total Electrolyte ppm <0.05 Total Hardness Nil Conductivity Micromho ≤ 0.1 at 250C pH value at 25 Deg.C 6.8 – 7.2 3. Effluent from the mixed bed unit shall be guaranteed to meet the following requirements, at rated capacity, throughout the period between two successive regenerations: i.) Reactive Silica not to exceed - 0.01 ppm as SiO2 ii.) Iron as Fe - Not detectable as per ASTM (ASTM-D-1068) iii.) Total Hardness - Not detectable iv.) pH Value - 6.8 - 7.3 v.) Conductivity - Not more than 0.1 micromhos/cm at 25 deg.C.	Owner to note that two clauses are mentioned for Guarantee of DM Water. Due to discrepancy, bidder will follow Clause no. 5.35 b) 3. mentioned in Volume-II, Chapter-8 (Functional Guarantee & Liquidated Damages). Please confirm.	
ETP PLANT							
546	Vol-III Vol-VII	Chapter- 11 (Effluent treatment plant) Flow diagram - Effluent treatment plant-11-12-3504	6 of 23 -	11.4.3 -	Three (3) clarified water pumps to pump the clarified water to DMF. Two (2) clarified water pumps	Discrepancy is observed between tender drawing and chapter-11 regarding clarified water pumps. As per the tender drawing no. 111-12-3504 (Flow diagram - Effluent treatment plant), there are two DMF feed pump which contradicts with referred tender clause of chapter-11. Kindly check and confirm.	Confirmed that 2 x 100% clarified water pumps shall be provided as shown in drawing 111-12-3504 Rev-0
547	Vol-III Vol-VII	Chapter- 11 (Effluent treatment plant) Flow diagram - Effluent treatment plant-11-12-3504	6 of 23	11.4.4	Three (3) Dual Media Fillers with all accessories Two (2) Dual Media Fillers	Discrepancy is observed between tender drawing and chapter - 11 regarding Dual Media Fillers. As per the tender drawing no. 111-12-3504 (Flow diagram - Effluent treatment plant), there are two DMF which contradicts with referred tender clause of chapter-11. Kindly check and confirm.	Confirmed that 2 x 100% dual media filters shall be provided as shown in drawing 111-12-3504 Rev-0
548	Vol-III Vol-VII	Chapter- 11 (Effluent treatment plant) Flow diagram - Effluent treatment plant-11-12-3504	6 of 23	11.4.7	Three (3) (2W +1S) RO feed pumps. Two (2) RO feed pumps	Discrepancy is observed between tender drawing and chapter - 11 regarding RO feed pumps. As per the tender drawing no. 111-12-3504 (Flow diagram - Effluent treatment plant), there are two RO feed pump which contradicts with referred tender clause of chapter-11. Kindly check and confirm.	Confirmed that 2 x 100% RO feed pumps shall be provided as shown in drawing 111-12-3504 Rev-0
549	Vol-III Vol-VII	Chapter- 11 (Effluent treatment plant) Flow diagram - Effluent treatment plant-11-12-3504	6 of 23	11.4.8	Three (2W + 1S) nos. Micron Cartage Filler Two (2) Micron Cartage Filler	Discrepancy is observed between tender drawing and chapter - 11 regarding Micron Cartage Filler. As per the tender drawing no. 111-12-3504 (Flow diagram - Effluent treatment plant), there are two Micron cartridge filter which contradicts with referred tender clause of chapter-11. Kindly check and confirm.	Confirmed that two cartridge filters (1 for each RO stream) shall be provided as shown in drawing 111-12-3504 Rev-0
550	Vol-III Vol-VII	Chapter- 11 (Effluent treatment plant) Flow diagram - Effluent treatment plant-11-12-3504	6 of 23	11.4.9	**Three (2)** (2W + 1S) nos. HP Feed Pumps. Two (2) HP feed pumps	Discrepancy is observed between tender drawing and chapter - 11 regarding HP feed pumps. As per the tender drawing no. 111-12-3504 (Flow diagram - Effluent treatment plant), there are two High pressure pump which contradicts with referred tender clause of chapter-11. Kindly check and confirm.	Confirmed that 2 x 100% HP feed pumps shall be provided as shown in drawing 111-12-3504 Rev-0

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551	Vol-III Vol-VII	Chapter- 11 (Effluent treatment plant) Flow diagram - Effluent treatment plant-11-12-3504	6 of 23	11.4.11	One (1) Degasser system including one (1) tower, two (2) (1W+1S) air blower, one (1) Degassed water sump (RO Permeate) alongwith level gauge, switch etc. Two (2) Degasser Tower	Discrepancy is observed between tender drawing and chapter - 11 regarding Degasser Tower. As per the tender drawing no. 111-12-3504 (Flow diagram - Effluent treatment plant), there are two degasser tower which contradicts with referred tender clause of chapter-11. Kindly check and confirm.	Provide two degasser towers and one degassed tank as as shown in drawing 111-12-3504 Rev-0.
552	Vol-III Vol-VII	Chapter- 11 (Effluent treatment plant) Flow diagram - Effluent treatment plant-11-12-3504	6 of 23	11.4.12	Three (3) (2W+1S) RO permeate transfer pumps Two (2) RO permeate transfer pump	Discrepancy is observed between tender drawing and chapter - 11 regarding RO permeate transfer pumps. As per the tender drawing no. 111-12-3504 (Flow diagram - Effluent treatment plant), there are two RO permeate transfer pump which contradicts with referred tender clause of chapter-11. Kindly check and confirm.	Confirmed that 2 x 100% RO permeate transfer pumps shall be provided as shown in drawing 111-12-3504 Rev-0.
553	Volume III Mechanical Works Volume III Mechanical Works	Chapter- 11 (Effluent treatment plant) Ch 5 : Water Treatment Plant	19 of 23 7 of 14	9.01.03 6.0 (c	Chemical House: Chemical storage for effluent-treatment Plant Chemical House: Chemical storage for PT Plant for 30 days (min.) and Raw Water Chlorination System	Bidder understands that common chemical house for Pre treatment plant and effluent treatment plant is also acceptable instead of separate chemical house. Please confirm Bidder's understanding.	Confirmed.
554	Vol-III	Chapter- 11 (Effluent treatment plant)	4 of 23 13 of 23	11.2.7 3.01.01 datasheet	Each chamber shall be sized to treat maximum rainfall water run off from the coal pile. The rain intensity for one (1) hour peak rainfall shall be considered. Coal Settling Ponds Effective capacity - 500 m3 (Each Compartment)	In view of contradiction in referred clauses, Bidder will consider coal settling pond with each compartment capacity 500 m3. Please confirm acceptance.	Effective capacity of each compartment of coal settling pond shall be 500 m3 or maximum rainfall water run off from coal pile area corresponding to one (1) hour peak rainfall, whichever is higher.
555	Volume VI Volume III	Ch 02: Scope of Work Ch 11: Effluent Treatment Plant	3 of 7 4 of 23	2.6 11.2.7	2.6 (28). RCC coal settling ponds and tube settler Rainfall cum normal run off from coal piles shall be collected by a drainage system around the coal pile and led by gravity to a coal particle settling basin.	Discrepancy observed in referred clauses. Bidder understands that coal settling basin shall be provided for coal area effluent only and no separate tube settler. Please confirm bidder's understanding.	Drainage around coal stockpile shall be led to coal settling pond.
CONDENSATE POLISHING UNIT							
556	Vol-III	Chapter- 9 (CPU)	7 of 15	9.5.1 ii)	This tank shall be provided with burn out protection, pressure relief valve, level switches, temperature indicator etc. The temperature switches provided on the tank shall control the heater. The heaters shall be sized for heating the water from a temperature of 15 to 50 deg. C at the outlet of ejector	Bidder understands the term burn-out protection is referred to tank insulation for personnel safety. But Insulation is not required for hot water tank as the temperature of the water inside the tank will be not exceed more than 50 °C. Hence, the burn out protection is not applicable for Hot water tank. Kindly confirm Bidder's understanding.	Noted.
557	Vol-III Vol-VII	Chapter- 9 (CPU) Condensate polishing unit-111-12-3512	10 of 15	2)i Data sheet	No. of condensate polisher service vessel - Three (3 x 50% Full flow condensate polishing Two service vessels	Discrepancy is observed between tender drawing and chapter-9 regarding numbers of CPU service vessels. As per the tender drawing no. 111-12-3512 (Condensate polishing unit) there are two service vessel (2W+0S) which contradicts with referred tender clause of chapter-9. Kindly check and confirm the numbers of CPU service vessels.	Confirmed that 2x50% service vessels to be provided as per clause 9.1.1 at Sheet 2 of 15 of Chapter 9 in Volume III.
558	Vol-III Vol - III	Chapter- 9 (CPU) Chapter - 8 (DM plant)	12 of 15 3 of 15	3.3 i) Data sheet 8.1.2 q)	ALKALI DILUENT WATER HEATING TANK (HOT WATER TANK) Number - One (1) One (1) no. of hot water tank complete with all accessories common for DM & CPU regeneration	There is a discrepancy between referred clause. Bidder understands that Hot Water Tank for DM Plant and CPU is common in line with referred clause 8.1.2 q) of vol- III, Ch-08, DM plant. Please confirm Bidder's understanding.	Clause 8.1.2 q) at sheet 3 of 15 in Chapter 8 of Volume III to be followed. The tank shall be in line with details indicated in Table against S.No. 3.3 at Sheet 12/13 of 15 of Chapter 9 in Volume III.
559	Vol-III Vol-VII	Chapter- 9 (CPU) Condensate polishing unit-111-12-3512	2 of 15	9.1.3 (ii)	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. No prefilters are shown	As per CPU flow diagram and 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.	Bidder to take action in order to ensure results as per clause 9.1.3 at Sheet 2 of 15 of chapter 9, Vol-III.

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560	Vol-III	Chapter- 9 (CPU)	4 of 15	9.2 (xiv)	The polisher units shall be provided at common inlet and each outlet unit with a minimum of following analytical on line analysers. - pH Analyser - Conductivity Analyser - Cation Conductivity Analyser - Sodium Analyser - Silica Analyser - Chloride Analyser	Bidder understands that Sodium Analyser and Chloride Analyser shall be of Multi-Channel type inline with NTPC Projects. Please confirm Bidders understanding.	Noted
561	Vol-III Vol-VII	Chapter- 9 (CPU) Condensate polishing unit- 111-12-3512	4 of 15	9.2 (xiv)	The polisher units shall be provided at common inlet and each outlet unit with a minimum of following analytical on line analysers. - pH Analyser - Conductivity Analyser - Cation Conductivity Analyser - Sodium Analyser - Silica Analyser - Chloride Analyser Chloride Analysers are shown at outlet of each CPU vessel and at common outlet header.	Bidder understands that Chloride Analyser at outlet of CPU vessel is not required separately as the condensate quality will be analyzed 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 specifications to be followed.
562	Vol-III	Chapter- 9 (CPU)	3 of 15	9.1.7 Sl no. 9	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.	Bid specifications to be followed.
CHLORINE DI-OXIDE GENERATION SYSTEM & CW TREATMENT							
563	Vol-III Vol-VII	Chapter- 17 (Chlorine Di-Oxide Generation System & CW Treatment System) drawing no. 111-12-3507, .111-12-3506, 111-12-3505.	3 of 20	1.3 (i)	The ClO2 will be used as an alternative to chlorine gas, or sodium hypochlorite plus organic / inorganic biocide. Chlorine Dioxide (ClO2) to be used for this purpose shall be generated at site from the reaction of Hydrochloric acid and Sodium chlorite solutions HCL dosing not shown	Hydrochloric acid dosing details are not shown in the tender drawing no. 111-12-3507, .111-12-3506, 111-12-3505. Owner is requested to check and update the drawings for CLO2 system.	Please refer Flow Diagram of DM Regeneration, Drg no. 111-12-3501 sheet 2 of 3 for HCL storage & unloading.
HVAC - Air conditioning and Ventilation							
564	Volume II General & Schedules	CHAPTER – 8 / FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS	23 of 57	Cl. No. 3.9.1 / Unit Auxiliary Power Consumption	(xxxviii) Power consumption of fans, water pumps, exhausters of Air washer units for TG building and whole main plant area at its rated duty point.	Bidder understands that power consumption shall be guaranteed for centrifugal fans & pumps of all air washer units and roof exhaust fans serving TG building only. Term "whole main plant area" here is understood as TG building only. Please confirm.	Being single unit the Unit auxiliary power consumption and Station auxiliary power consumption will be same.
565	Volume II General & Schedules	CHAPTER – 8 / FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS	23 of 57	Cl. No. 3.9.1 / Unit Auxiliary Power Consumption	(xxxviii) Power consumption of fans, water pumps, exhausters of Air washer units for TG building and whole main plant area at its rated duty point. (xli) Air conditioning and ventilation system	Owner to note that there is ambiguity in list of equipment for Ventilation system under unit auxiliary power consumption. As per referred point (xxxviii) defines selected ventilation equipment whereas point (xli) defines "Air conditioning and ventilation system" in general. Bidder understands that ventilation system equipment as depicted in point (xxxviii) shall be followed for Aux power guarantee i.e. "fans, water pumps, exhausters of Air washer units for TG building and whole main plant area at its rated duty point." and not as per sr no (xli). No other building's ventilation equipment are envisaged for Unit Auxiliary power guarantees. Kindly confirm Bidder's understanding.	Being single unit the Unit auxiliary power consumption and Station auxiliary power consumption will be same.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
566	Volume II General & Schedules	CHAPTER – 8 / FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE TESTS	23 of 57 vs 26 of 57	Cl. No. 3.9.1 / Unit Auxiliary Power Consumption vs Cl. No. 3.9.2 / Station Auxiliary Power	Cl. 3.9.1 / Point (xli) Air conditioning and ventilation system vs Cl. 3.9.2 / b) Air Conditioning & Ventilation System - Duty Factor 1.0 Power consumption at motor input terminals of working units (i.e., excluding stand-by) at its rated duty point of Chilling machines, Chilled water Pumps, Condenser water Pumps, Air handling unit (AHU) fans,.....mechanical ventilation system of GIS building.	Owner to note that there is ambiguity in list of equipment for air conditioning system under station auxiliary power consumption. Bidder understands that station auxiliary power consumption for HVAC package shall be guaranteed as per referred clause 3.9.2 / b) and not as per clause no 3.9.1. No other building A/C equipment are considered for aux power guarantees. Kindly confirm Bidder's understanding.	Being single unit the Unit auxiliary power consumption and Station auxiliary power consumption will be same.
567	Volume II General & Schedules	CHAPTER – 8 / FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND PERFORMANCE GUARANTEE	23 of 57 vs 26 of 57	Cl. No. 3.9.2 / Station Auxiliary Power Consumption	Cl. 3.9.2 / b) Air Conditioning & Ventilation System - Duty Factor 1.0 Power consumption at motor input terminals of working units (i.e., excluding stand-by) at its rated duty point of Chilling machines, Chilled water Pumps, Condenser water Pumps, Air handling unit (AHU) fans, for the Air conditioning system of main plant building, FGD control room, ESP control room of unit, AHP control room, service building, administrative building.	Bidder understands that administrative building is not envisaged in proposed 1x800 MW unit, hence, power consumption for administrative building is not applicable. Please confirm Bidder's understanding.	Confirmed.
568	Volume II General & Schedules	CHAPTER – 4 / PROVENNESS	11 of 42	Cl. No. 4.4.7 / Ventilation System	The bidder/ its sub-vendor should have designed, supplied, erected, and commissioned at least two (2) numbers ventilation systems including air washer units having individual fan capacity of 1,25,000 Cum./Hr. or more at each ventilation system, in Industrial / Commercial installations. The systems should have been in successful operation for at least two (2) years prior to the date of techno- commercial bid opening.	As per past project experience, Air washers units of upto 1,00,000 cmh air flow capacity are provided in similar projects. HPGCL is requested to lower the limits upto 1,00,000 cmh in line with NTPC Projects.	In clause 4.4.7 of Ch-4 at Sheet 11 of 42, Vol-II, following changes are made:- a) The word (figure) "two (2)" shall be read as "one (1)". b) Figure "1,25,000" shall be read as "80,000".
569	Volume III Mechanical Works	CHAPTER – 3 / HYDROGEN GENERATION PLANT	8 of 19	Cl. No. 3.5 / AIR CONDITIONING AND VENTILATION	I. AC System - Sr. No. : 1 - Premises Served : H2 PLC / Plant Control Room - System envisaged : Air conditioning system with split air conditioner. - Description of equipment : Split air conditioner consisting of outdoor condensing & indoor air handling units (AHU) cooling capacity of each split AC=2TR (minimum) - Quantity : 2 Nos. (1W+1S)	Bidder understands that standard Hi-Wall / Cassette / Ductable type Split AC units shall be provided for H2 plant control room. Term "air handling units (AHU)" here is considered as indoor units of standard split AC i.e Hi-wall / Cassette / Ductable type. Please confirm bidder's understanding.	Hydrogen Generation Plant indicated in Chapter-3, Vol-III stands deleted. Associated activities like H2 Generation plant building, Air-conditioning for H2 Generation control room etc. also stands deleted. However H2 and CO2 cylinders storage shed shall be in bidders scope as described else where.
570	Volume III Mechanical Works	CHAPTER – 1 / STEAM GENERATOR & AUXILIARIES	9 of 186 & 113 of 186	Cl. No. 1.10.10 & Cl. No. 16.0	Pressure Reducing Station for supply of steam to Air Conditioning Plant consisting of (if applicable): a) ……., b) ……., c) ……., d) ……. & Auxiliary Steam Pressure Reducing & Desuperheating Station In addition to the above, a pressure reduction station shall also be provided to supply steam at required parameters for Owner's Air Conditioning plant requirements. The pressure reducing station shall draw steam from a tap off provided on low temperature auxiliary steam station header.	As per Chapter 25 : Air conditioning & Ventilation System; water cooled chillers are to be provided for areas with central AC system requirement. Hence there is no requirement of auxiliary steam for "Owner's Air Conditioning plant". Please confirm and update in relevant clauses.	Steam for HVAC is not applicable. Accordingly 4th para of Clause 16.1 at Sheet 113 of 186 of Ch-1, Vol-III stands deleted.
571	Volume III Mechanical Works	CHAPTER – 1 / STEAM GENERATOR & AUXILIARIES vs CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	118 of 186 vs 13 of 36	Cl. No. 18.0 vs Cl. No. 25.6.6	Elevators 13. Machine room and lift Shaft : Pressurized dust proof or Air conditioned machine room as per the requirement of lift manufacturers. vs Specific Requirements vi. For elevator machine room, filtered air shall be supplied by supply air fan. Exhaust shall be through gravity dampers.	Bidder considers to provide mechanical dry ventilation for elevator machine room with the help of supply air fans and back draft dampers / PRD for elevator machine room in line with chapter 25 / AC & Vent / Clause 25.6.6 Please confirm.	Split AC shall be provided for elevator machine room

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572	Volume III Mechanical Works	CHAPTER – 19 / COAL HANDLING SYSTEM vs CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	103 of 120 vs 6 of 36	Cl. No. 1.10 / Technical Specifications vs Cl. No. 25.4.1 / Design Criteria for Ventilation System	M-33 Exhaust Fans 1.4) Air changes /hr 20 (For Battery Room & All Toilets) 15 (For all Pump House Buildings) vs 25.4.1 : The number of air changes per hour in evaporative/mechanically ventilated areas shall be as follows : iii. Various pump houses - 20 ACPH v. Battery Rooms - 30 ACPH	There is contradiction in ventilation air change rates as mentioned in these two clauses. Bidder considers to follow ventilation air change rates as given in chapter 19 dedicated to all building coming under CHP area. Accordingly, 15 ACPH for all pump houses and 20 ACPH for battery rooms / Toilets / pantry in CHP area shall be provided. ACPH rates given in Chapter 25 shall be applicable to other building in plant which are not part of CHP. Please confirm.	Air changes shall be as per Chapter 25 of Volume III.
573	Volume III Mechanical Works vs Volume II General & Schedules	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM vs CHAPTER - 2 / PROJECT INFORMATION	2 of 36 vs 9 of 10	Cl. No. 25.3.1 / Design ambient conditions vs Climatological Table	Design ambient conditions : Summer : DBT - 44ºC / WBT - 26ºC Monsoon : DBT - 33ºC / WBT - 27ºC Winter : DBT - 23ºC / WBT - 8ºC vs Climatological Table : - Annual mean lowest temp : 2.1ºC	Bidder considers to follow ambient design conditions as per Chapter 25 Clause 25.3.1. Accordingly for winter lowest temperature is considered as DBT - 23ºC for sizing HVAC system. Please confirm.	In the table against Clause 25.3.1 of Ch-25 at Sheet 2 of 36, DBT readings in 2nd Coulmn be read as 47.8, 40.6 & 29.4 and WBT readings in 3rd column be read as 23.2, 27.3 & 11.5.
574	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	3 of 36	Cl. No. 25.3.6	The occupancy for general area shall be minimum one person per 3 M2 and for conference room the same shall be one per 1.5 M2. In the control rooms, control equipment rooms etc., the occupancy may be one person per 20 M2 (Minimum).	Occupancy in particular rooms can be considered based on Architecture layouts where in seating arrangement are indicated at actual. Owner is requested to allow Bidder to consider occupancy as per Architecture layout. Please confirm acceptance.	Bid specifications to be followed.
575	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	3 of 36	Cl. No. 25.3.7	In air conditioning system, the return air shall be through ducts and use of plenum space for return air shall be avoided, further, for service building where various floors are air conditioned and no intermediate or intervening floor are left non air conditioned, the space above false ceiling shall be used as return air plenum.	Bidder understands that, the referred clause shall be applicable to Administrative building also. Please confirm Bidder's understanding.	Administrative Building is not envisaed for the project
576	Volume III Mechanical Works vs Volume VI Civil, Structural & Architectural Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM vs CHAPTER - 17 / ARCHITECTURAL WORKS	3 of 36 vs 16 of 21	Cl. No. 25.3.13 vs Cl. No. 17.7.11	Underdeck insulation of 50 mm nominal thickness of glass wool (32 kg/cum) or rock wool (48 kg/cum) shall be provided if : i) Non A/ C area is located just above the A/C area. In this case, underdeck insulation shall be provided underneath the ceiling of A/C area. ii) Non A/ C area is located just below the A/C area. In this case, underdeck insulation shall be provided underneath the ceiling of Non A/C area. vs Under deck insulation(under side of roof slab and under side of floor slab of air conditioned area) shall comprise of 50 thick PUF material of density 36 kg/cubic meter . This mat shall be backed with 0.05 mm thick aluminium foil and 24 Gx25 mm wire mesh netting. They shall be fixed to ceiling or wall as the case may be with 100x50x6mm slotted mild steel plate welded to M.S. plate inserts embedded at the soffit of the slab at 600 mm c/c and 14 G steel wire drawn through slots and fixed to wire netting	There is contradiction in under deck insulation material between the referred clauses. Bidder understands that under deck insulation is part of architecture / civil work, same shall be followed as per Architecture chapter - 17, clause 17.7.11. Owner is requested to confirm the material for underdeck insulation.	Specifications be followed as per Chapter 25, Volume III.
577	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	4 of 36	Cl. No. 25.3.15	A minimum design margin of 10 % shall be considered in design of AC Plant capacity for each area, 20% design margin shall be considered for the cooling tower capacity over the selected A/C capacity provided. Head of the pumps shall take into account minimum 10% margin on friction head. For pumps continuous motor rating (at 50ºC ambient) shall be at least 10% above the maximum load demand of the pump in the entire operating range.	It is understood that 20% design margin for cooling tower selection, shall be on calculated load. Selected AC system capacity will already include 10% design margin. And if above this 20% is added, total capacity will include 30% margin for cooling tower above calculated load. Thus effectively, cooling towers shall be selected for 10% design margin above the final selected AC system capacity which includes 10% design margin above calculated load. Please confirm bidders understanding.	Bid specifications to be followed.

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578	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	4 of 36	Cl. No. 25.3.16	For areas like ESP control rooms, water system control room, where A/C load is of the order 25-60 TR, direct expansion (D-X) type condensing unit shall be provided depending on the availability of space/layout etc. For areas where A/C load is of the order of 8-25 TR, ductable split/ packaged A/C shall be provided. Smaller areas which are away from the D-X type condensing unit/ central chilling units which may require air conditioning < 8 TR rating shall be served with Hi–Wall split/Cassette air conditioner units (5 star rating) as per requirement. For static excitation control room (if applicable) precision air conditioners of required capacity shall be provided.	Static excitation control room (located inside) TG building shall be provided with chilled water AHUs instead of Precision AC as mentioned. It is difficult to stretch refrigerant piping from IDUs in static excitation room to ODUs outside due to larger distance. Please, allow chilled water AHU as an alternative option also.	Chilled water AHU is also acceptable.
579	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	4 of 36	Cl. No. 25.3.18	Air conditioning system for service building & administration building shall be designed with ECBC code to make it "Green Building". Mandatory requirements of ECBC to be followed for A/C equipment of service building & administration building:	Civil specifications of the project does not mention Service Building as Green Building. Accordingly, Bidder understands that Service Building shall be as standard building and not a GREEN BUILDING. Please confirm Bidder's understanding. Also, administrative building is not applicable for this proposed unit. Please confirm.	Confirmed.
580	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	5 of 36	Cl. No. 25.3.20	Redundancy of Equipment b) ESP Control Building - Water Cooled/Air Cooled Condensing units/ Precision Air Conditioners - 2 x 100% - Condenser water pumps - 2 x 100% (if applicable) - FRP cooling towers (with VVFD Fan)- 2 x 100% (if applicable) - Secondary Chilled Water Pumps (with VVFD)- 2 x 100% - Air handling units- 2 x 100% AHU shall be variable voltage frequency driven (VVVFD).	Bidder understands that "ESP control building" mentioned here in this clause is Main ESP control cum Switchgear building and not ESP Rapper Panel Control room. Please confirm Bidder's understanding.	Noted, however separate air conditioning shall be provided for ESP Rapper panel control room.
581	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	6 of 36	Cl. No. 25.4.1	Design Criteria for Ventilation system The number of air changes per hour in evaporative/mechanically ventilated areas shall be as follows : v) Battery and battery charger rooms and other hazardous areas where gaseous fumes are generated - 30 ACPH	Bidder understands that Battery charger rooms are normally air conditioned. Hence, the referred clause is not applicable. Please confirm Bidder's understanding.	Confirmed.
582	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	7 of 36	Cl. No. 25.4.2	However in areas producing lot of heat, the temperature shall be the criteria, as follows: - Inside temperature shall be minimum 3 ºC below the design ambient temperature during summer for evaporative cooled areas. - Inside Temperature shall be maximum 3 ºC below the design ambient temperature during summer for mechanically ventilated areas. The criterion which gives higher number of air changes/higher quantity of air in either of the conditions as mentioned above shall be the basis for selecting the required air flow for that area.	For area with dry mechanical ventilation, inside temperature shall be maximum 3ºC above the design ambient temperature during summer. Please confirm and update this clause.	In second bullet point of clause 25.4.2 of Ch-25 at Sheet 7 of 36 in Vol-III, the word "below" be read as "above".
583	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	7 of 36	Cl. No. 25.4.3	All ventilation system shall operate on 100% fresh air. All mechanically ventilated areas shall be positively ventilated by means of supply air fans fitted with filters and/or gravity operated back draft dampers and exhaust fans. MCC/Switchgear rooms and cable gallery shall be provided with gravity operated back draft dampers in association with supply air fans in order to maintain positive pressure. Battery rooms & other fumes/ odour generating areas shall be negatively ventilated by means of exhaust air fans/ roof exhausters. Supply air fan catering for electrical areas (MCC & switchgear rooms) shall be provided with pre filters and fine filters and for other areas shall be provided with pre-filter only	Bidder understands that for mechanically ventilated areas (dry type) to be maintained positive, ventilation system having supply air fans for air intake and gravity operated back draft dampers for exhaust are acceptable to owner as an alternative. Thus exhaust fans are not mandatory if gravity dampers are provided. Please confirm bidder's understanding.	Bid specifications to be followed.
584	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	8 of 36	Cl. No. 25.4.10	REDUNDANCY OF EQUIPMENT - Air Washer Units and Unitary Air Filtration Systems shall be multiple units without any standby. - Pumps for each Air Washer Unit shall be 2 x 100% - Pumps for each Unitary air filtration system shall be 2 x 100%. - Fans for each air washer unit shall be 2x50% capacity while for unitary air filtration unit shall be 1x100% capacity. - Supply air fans/Exhaust air fans/roof exhausters shall be in multiplicity.	As per past project experience, Air washers upto 1,50,000 cmh can be provided with single centrifugal fans. Considering the layout of TG building, it may not be feasible to accommodate unit with 2x50% blower and provide maintenance space on both side of units. Bidder requests to allow an alternative option to use 1x100% fan for each air washer unit also inline with Buxar Project. Please confirm acceptance.	Bid specifications to be followed.

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585	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	9 of 36	Cl. No. 25.5.2.1	Ventilation System The areas to be ventilated by Evaporative Cooling system are as follows: a) All floors and area of turbine hall (TG building) other than the areas which are air conditioned. b) Switchgear rooms and cable gallery areas of turbine building. c) Any other evaporative area where equipment heat load is high and requires ventilation of evaporative cooling spaces.	Bidder understands that this clause is specifically applicable to TG building only. No other building in plant is provided with evaporative cooling via air washer units. Please confirm Bidder's understanding.	Confirmed.
586	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	10 of 36	Cl. No. 25.6.1.4	The distribution plate shall be fabricated out of 180 G galvanized steel sheet & galvanized steel angle supports with minimum 50% free area.	Bidder understands that it shall be 18 G galvanized steel sheet for distribution plate. Please confirm Bidder's understanding.	In clause 25.6.1.4 of Ch-25 at Sheet 10 of 36 in Vol-III, the figure "180 G" be read as "18 G".
587	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	11 of 36	Cl. No. 25.6.1.10 vs Cl. No. 25.6.2.2	The specification for centrifugal fans shall generally be as indicated below. However the fan shall be of DIDW type for TG building and SISW for ESP building. vs All equipment, components used in unitary air filtration system shall be in line with the specification requirements stipulated in air washer units above except the fans may be of SISW type.	Bidder understands from clause 25.6.2.2, that for UAF serving ESP control building, fans can be DIDW also as an acceptable alternative option. Moreover, as the clause 25.6.2.2 depicts when UAF is completely similar to Air Washer units, all components shall be housed inside a cabinet made up of 10 G MS sheets. Thus SISW is technically not recommended for closed cabinet operations. Kindly confirm Bidder's understanding and allow use of DIDW fans for both AWU and UAF.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
588	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	13 of 36	Cl. No. 25.6.6	Specific Requirements viii. Online non- chemical type scale preventer shall be used to avoid formation of scale in the Air washer / UAF water circuit to reduce the blockage in nozzles.	Non-chemical scale preventers are not required in Air washer units and UAF. This system is being used in numerous similar projects in past as well at present and there is no need of Non-Chemical Scale preventers. Makeup water supplied to AWU / UAF is clarified water which is already treated and is suitable for direct use. Moreover, adding scale preventers increases size of units as these are to be fixed in line of circulating water with certain recommended length requirements which is technically not feasible Bidder request to allow direct use without Non chemical scale preventer.	Bid specification to be followed.
589	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	15 of 36	Cl. No. 25.7.4	Air Handling Unit (AHU) c) Face and bypass dampers (motor operated for DX type plant) of opposed blade type shall be provided. Dampers shall be made of 16 gauge G.S sheet metal (class 275 of IS: 277). The area of the bypass section shall be minimum 30% of the coil face area. Damper operating linkage and the operating motor shall be located outside the casing. Each AHU shall be provided with motorized volume control damper at air discharge.	Face and bypass dampers are applicable only for AHU with DX coils (refrigerant based) and are generally used to control air temperature and humidity by mixing treated air with some amount of by pass untreated air. Latest technology provides various better solutions to control supply air parameters without use of these dampers. Bidder requests to allow avoiding use of face and bypass dampers for DX AHU when advanced solutions are available.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
590	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	17 of 36	Cl. No. 25.7.8	HI- Wall Split/Cassette/Precision air Conditioners	As per clause 25.3.16, Bidder understands that ductable split AC units are also acceptable. Please confirm.	Confirmed.
591	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	21 of 36	Cl. No. 25.7.10	a) Pre Filter Location : 1) At the suction of each AHUs 2) At the suction of each Fresh air fan 3) At suction of each supply air fan 4) at suction of air washer & UAF (Water repellent nylon type)	For fresh air fan and supply air fan filters are provided at discharge side in a filter plenum box. Fan is fixed on wall and accordingly fan size opening is provided which is technically feasible to accommodate. It is not feasible to provided filter size opening on wall, in case filters are provided in suction. Hence HPGCL is requested to update this clause allowing pre filters also at discharge for fresh air and supply air fans.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
592	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	22 of 36	Cl. No. 25.7.12	Non- Chemical Type Scale Preventer The unit shall be a non-chemical on-line type scale preventer not requiring any chemicals. Non-chemical water treatment system shall prevent the formation of hard scale in cooling circuits of air conditioning equipment. It shall work with a combination of Adsorption, and Turbulence. The inner core shall be able to convert the hardness salts into colloidal particles. The unit shall not require any electricity or any other source of energy. The unit shall not have any recurring, operating and maintenance cost. The size of the unit shall be determined based on the water quality and water flow rate. The unit shall be installed in the condenser water circuit. The outer casing shall be of stainless steel. The method of checking the performance of system through computer simulation shall be provided.	Non-chemical scale preventers are not required in condenser water circuit. This system is being used in numerous similar projects in past as well at present and there is no need of Non-Chemical Scale preventers. Makeup water supplied to condenser cooling water circuit is clarified water which is already treated and is suitable for direct use. Moreover, adding scale preventers increases size of system as these are to be fixed in line of circulating water with certain recommended length requirements which is technically not feasible Bidder request to allow direct use without Non chemical scale preventer.	Bid specifications to be followed.

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593	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	27 of 36	Cl. No. 25.7.14.1	Thermal & Acoustic Insulation / Type of Insulation & Finish - Surfaces : Supply & Return air duct of AC system - Insulation Material : Resin bonded glass wool or closed cell elastomeric Nitrile rubber - Insulation form : Roll/ Slab Sheet - Thick (mm) : 50 - Finish (mm) : F-3	For elastomeric nitrile rubber, 50mm thickness is not applicable. It shall be 19mm thick for nitrile rubber insulation. Please confirm and update	Against S.No. 1 in 5th coulmn of Table against Clause 25.7.14.1 at Sheet 27 of 36 in Vol-III, Thickness "50" be read as "19".
594	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	27 of 36	Cl. No. 25.7.14.1	Thermal & Acoustic Insulation / Type of Insulation & Finish - Surfaces : Exposed air duct - Insulation Material : Resin bonded glass wool - Insulation form : Roll - Thick (mm) : 50 - Finish (mm) : F-4	Bidder understands that exposed air ducts mentioned here are supply and return air ducts of Air conditioning system only. Please confirm Bidder's understanding.	This clause specifies the type of insulation finish for exposed duct for air conditioning.
595	Volume VI Civil, Structural & Architectural Works	CHAPTER - 11 / BUILDING DESCRIPTION	12 of 18	Cl. No. 11.15	AIR WASHER ROOM This shall be a single/double storied steel framed building adjoining to the Turbo generator bay. Roof shall be of RCC supported on colour coated trough shaped permanent decking supported on steel beams. Side cladding shall be by brick supported on concrete encased steel beams. Internal wall surfaces shall receive cement mortar plastering mixed with water proofing compound. Water tank and RCC supporting structures for louvers, filter and foundation for equipment such as fans and pumps are also included in the scope. Proper drainage of the floor has to be provided for. Doors shall be of flush welded steel and they shall be made airtight. Rolling shutter of adequate size should be provided for taking the equipment inside and truck with compressor. The roof framing shall support an underslung crane of adequate capacity. Compressor foundation shall be isolated from the grade slab. Air receiver and Air drier can be supported from RCC grade slab. All trenches shall be sloped towards drain sumps. Trenches shall be provided with chequered plate cover. Steel glazed windows shall be provided for ventilation and natural lighting. A minimum of 2 flush type steel door shall be provided for movement of personnel. Dimension of the building shall be decided by the CONTRACTOR to suit the dimension of the equipment he is supplying duly taking into account maintenance requirements.	There is no Air washer room envisaged in this project. As per Chapter-25 / AIR CONDITIONING & VENTILATION SYSTEM, all air washer units serving TG building are modular air washers made up of MS sheets. Thus, modular air washer units in multiple numbers installed at different floors of TG building shall cater TG building evaporative cooling requirement. Accordingly, Bidder understands that the referred clause is not applicable. Please confirm Bidder's understanding.	Confirmed.
596	Volume III Mechanical Works vs Volume IV Electrical Works	CHAPTER - 28 / CRANES & HOISTS vs CHAPTER - 18 / ELECTRICAL OF ELEVATOR, EOT CRANES & HOISTS	05 of 13 vs 20 of 28	Cl. No. 28.3 vs Cl. No. 18.02.10	TURBINE HALL EOT CRANE (n) Operator's cabin and platform (a) Open type for indoor service to be located at B-row column. Cabin shall be designed as per IS3177 so as to have unrestrictive view of load from operator's cabin. vs Operator's Cabin The operator's cabin shall be steel fabricated closed cabin type, and **air conditioned,** fireproof construction and complete with light, fan and seat. The cabin shall be located on one end of the crane bridge and on the opposite side of Down Shop Lead (DSL) and under one of the bridge girders, so that it is offset to one side. The cabin shall be provided with guarding handrails and the floor shall be covered with electric insulating carpet. A clear headroom of 2000 mm shall be ensured within the cabin.The cabin shall be well braced in order to provide adequate strength and rigidity. The outside surfaces of the cabin and floor beams shall present smooth and pleasing appearance.	As per clause 28.3, operator's cabin shall be open type for indoor services. Thus air conditioning system is not applicable. Please confirm.	Confirmed.
597	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	02 of 36	Cl. No. 25.3.3	All air conditioned areas like control room, control equipment rooms, service building, administrative building shall be maintained as per conditions indicated below: - Dry bulb temperature : 24 ± 1.0 - Relative humidity : 50 ± 5%	For areas catered with Hi-wall, Cassettes and Ductable type split AC units, humidity control is not feasible. Only temperature control shall be provided. Please confirm.	Noted, however humidity control shall be provided in ductable type split AC units.
598	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	17 to 20 of 36	Cl. No. 25.7.8.3	Precision Packaged Air Conditioners vi. Refrigerant piping shall be heavy gauge copper or IS: 1239 heavy class seamless MS pipe complete with thermostatic expansion valve, liquid line shut-off valve, high and low pressure gauges.	As per latest industry practice PACU units are generally provided with HP & LP sensors / transducers / switches (As per OEM standard design) which are further synchronized with controller of PAC. Analogue gauges for HP and LP are not in standard industry practice. In view of above, Precision Packaged Air Conditioners shall be provided as per OEM standard as followed in Buxar Project. Please confirm acceptance.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.

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599	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	17 to 20 of 36	Cl. No. 25.7.8.3	Precision Packaged Air Conditioners vii. Refrigeration Circuit: The circuit shall be direct expansion type. It shall include a manual reset HP and auto reset LP switch, filter drier, charging port, electronic expansion valve, sight glass etc.	As both HP and LP alarms are associated with compressor safety, same shall be as per OEM design and recommendation. As functional requirement is also fulfilled, Switch reset facilities shall be as per OEM standard. In view of above, Precision Packaged Air Conditioners shall be provided as per OEM standard as followed in Buxar Project. Please confirm acceptance.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
600	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	18 of 36	Cl. No. 25.7.8.3	Precision Packaged Air Conditioners vii. Cabinet Constrution : The frame & panel shall be constructed of heavy gauge Zinc annealed corrosion resistant sheet steel. The fan section shall be insulated with fire retarded insulation. The cabinet shall be powder coated and have a textured finish.	Construction of cabinet material varies from OEM to OEM. However, all OEM using corrosion resistant sheet steel MOC (GI Sheet) and treatment of powder coating are equivalent from protections point of view of unit. Moreover, these PACU units are housed inside the PAC rooms. This OEM standard practice shall be acceptable for this equipment. In view of above, Precision Packaged Air Conditioners shall be provided as per OEM standard as followed in Buxar Project. Please confirm acceptance.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
601	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	19 of 36	Cl. No. 25.7.8.3	Precision Packaged Air Conditioners Controls : The controls shall be of microprocessor based programmable with PID (Proportional, integral and derivative control logic) controller. The controller shall have a LCD display screen, which shall be visible from the front of the unit without removing any covers/external panels. This LCD display screen should show the following information / data: b) Simultaneous graphical displays of set temperature and actual temperature and set Relative Humidity and actual Relative Humidity. h) 48 Hours temperature and relative humidity graph display menu.	Set and Actual values for Temperature and Relative Humidity shall be displayed on controller screen for 48 Hours. However, Graphical representation / trend may not be available on PACU screen. So this feature shall be accepted as per OEM standard design. In view of above, Precision Packaged Air Conditioners shall be provided as per OEM standard as followed in Buxar Project. Please confirm acceptance.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
602	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	19 of 36	Cl. No. 25.7.8.3	Precision Packaged Air Conditioners Controls : The controls shall be of microprocessor based programmable with PID (Proportional, integral and derivative control logic) controller. The controller shall have a LCD display screen, which shall be visible from the front of the unit without removing any covers/external panels. This LCD display screen should show the following information / data: e) Backup battery charge status display on the controller screen	Most of the OEM design does not provide back up battery feature in Precision ACs. However, all parameters are stored in non-volatile memory hence there is no requirement of batteries backup in the controller. Parameters remain saved in controller in the event of power failure conditions. Hence this feature shall be acceptable as per OEM design. In view of above, Precision Packaged Air Conditioners shall be provided as per OEM standard as followed in Buxar Project. Please confirm acceptance.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
603	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	19 of 36	Cl. No. 25.7.8.3	Precision Packaged Air Conditioners Safety Protections: The unit shall also incorporate the following protections: a) High pressure trip- Manual reset for each compressor b) Low pressure trip- Manual reset for each compressor. c) Single phasing preventers. d) Reverse phasing e) Phase imbalancing f) Phase failure g) Overload tripping (MPCB) of all components	As per point viii. of this clause, electronically commutated type fan are provided. These EC fans are usually provided with inbuilt motor protection. MCB is provided for additional protection. MPCB is not in standard industry practice and most of the OEMs does not provide this. Hence this feature shall be as per OEM standard design. In view of above, Precision Packaged Air Conditioners shall be provided as per OEM standard as followed in Buxar Project. Please confirm acceptance.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
Fire Protection & Detection System							
604	Vol-III	Ch 24 : Fire Detection, Alarm & Protection.	PAGE 4 of 66	24.4.2 (XIV)	24.4.2 DESIGN PHILOSOPHY FOR HYDRANT SYSTEM Hydrant system protects the following building/facilities: xiv) Raw Water Intake Pump House.	Bidder understands that Raw water intake pump House is a existing facility and no new hydrant system is envisaged. Please confirm Bidder's understanding.	Confirmed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
605	Vol-III	Ch 24 : Fire Detection, Alarm & Protection. & Ch 6: Filtered Water	PAGE 4 of 66 & 2 of 5	24.4.2 & 6.2.2	24.4.2 The Water for Spray and Hydrant System shall feed through separated headers. One (1) isolation Valve with a non-return valve shall be employed in between Hydrant Pumps and Spray pumps so that the water from hydrant pumping system shall feed to spray header in case of emergency. & ix) Lot Fire water pumps as follows: a. Three (3) (2W+1S) vertical motor driven fire water Hydrant/spray pumps with VFD Drives. b. Three (3) (2W+1S) vertical diesel engine operated fire water Hydrant/spray. c. Two (2) (1W+1S) vertical fire water jockey pumps	As per Cl. No. 6.2.2 , Bidder understands that there will be common pumping system for spray and hydrant system is envisaged with common hydrant/spray piping network. Accordingly, Bidder understands that separate spray and Hydrant network as per Cl. No. 24.4.2, is not applicable. Please confirm Bidder's understanding.	Please follow Clause 24.4.2 of Vol.-III
606	Vol-III	Ch 24 : Fire Detection, Alarm & Protection.	PAGE 7 of 66	24.4.2	24.4.3 DESIGN PHILOSOPHY FOR SPRAY SYSTEM. Automatic HVW Spray Protection shall be provided for the following equipment: -Turbine generator under-deck area (Oil Canal)	Turbine Generator Under-Deck area (Oil Canal instead pipe in pipe is provided) is not applicable in Bidder's design, hence, the same is not envisaged. Please confirm.	Noted
607	Vol-III	Ch 24 : Fire Detection, Alarm & Protection.	PAGE 7 of 66	24.4.2 (b)	The open conveyors installed shall also be provided with MVW spray system. It may be noted that full length of each conveyor both top and bottom belt shall be protected with MVW Spray System.	Bidder understands that Open conveyor located in Coal Yard is having moving Stacker Reclaimer, hence fixed spray piping and nozzle is not possible, MVWS system shall only provided for open conveyor except the length of machine movement. The same philosophy is being followed in all the past projects. Please confirm Bidder's understanding.	Noted
608	Vol-III	Ch 24 : Fire Detection, Alarm & Protection.	8 of 66	24.4.2	f) In **cable galleries** the water spray shall cover the exposed area of both the forward and return conveyors and idlers. In transfer points, crusher house, wagon tippler, pent house etc thewater spray shall cover the drive equipment, pulleys,	Bidder understands "Cable galleries" shall be read as "Coal Conveyor". Please confirm Bidder's understanding.	In clause 24.4.2 (f) of Ch-24 at Sheet 8 of 66 in Vol-III, the words "cable galleries" be read as "coal conveyor".
609	Vol-III	Ch 24 : Fire Detection, Alarm & Protection.	11 of 66	24.4.4.4	f) The minimum effective capacity of each foam concentrate tank and foam pumps shall be designed considering the following: ☐ Simultaneous protection of LDO day tank and operation of two hydrants for 60 minutes or ☐ Minimum capacity if specified elsewhere. ☐ A design margin of atleast 10% shall be considered over the calculated foam concentrate capacity, tank capacity and discharge capacity of the foam discharge pumps.	Considering 100% foam concentrate tank as per the principle of fire case that is, one largest capacity tank internal fire protection on the common dike area and operation of 2 hydrants, along with that additionally 10 % margin will be included for selecting actual capacity of 100% foam concentrate tank. Duration of fire protection for tank internal protection will be 60 minutes and Duration of usage for fixed Hydrant will be used only for 30 minutes operation. The design philosophy is followed as per NFPA 2001. Portable foam monitor shall have its individual foam tank. Please confirm.	Design shall be of simultaneous protection of LDO day tank along with 02 Nos. of foam hydrant each for 60 minutes with 10% deisgn margin. The foam hydrant line for dyke shall be fed separately by individual proportioner.
610	Vol-III	Ch 24 : Fire Detection, Alarm & Protection.	PAGE 9 of 66	24.4.3	e) A strainer ('Y' type) shall be provided at upstream of deluge valve. Strainer Body shall be constructed of mild steel as per IS: 2062 (tested quality). Strainer wires shall be of stainless steel **AISI: 316, 18 BWG, 30 mesh.** Blowing arrangement shall be provided with removable plug at the outlet. Screen open area shall be at least 4 times pipe cross-sectional area at inlet.	As per specification of strainer, required 30 Mesh size with 18 BWG is impractical to supply as OEMs. Therefore only 30 mesh size without 18 BWG shall be applicable. The same approach accepted in Buxar Project during execution stage. Kindly confirm the acceptance.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
611	Vol-III	Ch 24 : Fire Detection, Alarm & Protection.	PAGE 13 of 66 & 15 of 66	24.4.5.2 & 24.4.5.4	(v) The discharge time period shall be such that the design concentration shall be achieved within 60 second. The flow calculations shall establish this criteria. & (f) The discharge time period shall be such that the design concentration is achieved within time duration specified in NFPA-2001 (latest edition). Flow calculations shall also establish this criteria.	In view of contradiction in referred clauses, Bidder understands that discharge time shall be considered as per NFPA 2001 latest addition. Kindly confirm Bidder's understanding.	Specifications be followed as per clause 24.4.5.4 (f), Chapter 24, Sheet 15 of 66.
612	VOLUME - III, MECHANICAL Work	Ch 24 : Fire Detection, Alarm & Protection. DATA SHEET FOR FIRE WATER PUMPS & 24.4.6 Fire Water Pumps &	PAGE 52 of 66 & 17 of 66	Technical Data sheet & 24.4.6	**C. FIRE WATER JOCKEY PUMPS** Sr. no. 1.5 Qty 1 no for Motor Driven Jockey pump indicated & iii) Two (2) (1W +1S) vertical turbine jockey with drive motors and all other accessories as per TAC as specified elsewhere.	Discrepancy observed red between referred clause and in drawings regarding numbers of Jockey Pumps Owner is requested to confirm the numbers of jockey pumps are to be provided.	2 x 100% jockey pumps shall be provided as per Clause 24.4.6 of Ch-24, Vol-III.
613	VOLUME - II, General and Schedules	Ch 8: FG & LD	PAGE 41 of 57	5.33	**FIRE DETECTION AND PROTECTION SYSTEM** Performance test of each of systems such as Hydrant, HVW Spray, MVW Spray, Foam Injection system, Inert gas extinguishing system of control room and control equipment rooms, fire detection and alarm system, Fire extinguishers and Fire monitors as per the design parameters/ standards/TAC	Bidder understands that for inert gas system performance test shall be done for Smallest room. Please confirm Bidder's understanding.	It is clarified that:- 1) Discharge test- for smallest room as per NFPA. 2) Functional test- flow test using Nitrogen.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
614	SECTION - VII	BOOK 1 OF 3 (PART-1)	PAGE 5 of 9	6	**Milestone Schedule for Balance of Plant (BOP) Systems** C. The following schedule is suggested for award of various major Balance of Plant packages: 6 Fire Detection & Protection System, Fire tender and Fire Station Equipment	Bidder understands that fire tender and fire station equipment are not envisaged for this tender, hence the referred clause under mistestone schedule is not applicable. Please confirm Bidder's understanding.	Confirmed.
615	Vol-II	Chapter-8 (FG & LD)	26 of 57	3.9.2 (c)	c) Water System Pumps (Working Pumps) - Duty Factor 1.0 i.) Raw Water Pumps for PT Plant ii.) AHP Make up pumps iii.) AC & Ventilation system make-up pumps iv.) DM water make up pump v.) Potable water pumps vi.) Service water pumps. vii.) Clarified water feed pumps for DM plant viii.) Degassed water pump ix.) Waste water transfer pumps x.) Jockey Pumps for fire-fighting system xi.) CT makeup pumps xii.) CW and ACW pumps xiii.) CW treatment system & Chlorination plant xiv.) Sludge transfer pumps in PT Plant, Centrifuge and thickened sludge transfer pumps xv.) Pumps (for ETP system, zero discharge system) xvi.) Any other pump/drive required for continuous running of the station.	As per specifications, "Working pumps" to be considered in the Station aux power system. Hence, Bidder understands that certain pumps from the referred list (e.g. ETP pumps, waste water transfer pumps, DM plant feed pumps, raw water pumps for AHP, potable water pumps, service water pumps, degassed water pumps, jockey pumps, etc.) will not be working continuously and shall not be considered for guaranteed Auxiliary Power Consumption. Please confirm Bidder's understanding.	In clause 3.9.2 (c) of Ch-8 at Sheet 26 of 57 in Vol-II, pumps at S.No. ix), x), xiv) & xv) stand deleted.
Hydrogen Generation Plant							
616	Volume III	CHAPTER – 3	2 of 19	3.3) viii)	viii) Dew point : (-) 70 degree C (after drier)	Bidder would like to clarify that Dew Point Temp of H2 gas at Manifold shall be (-)50 Deg C instead of (-) 70 Deg C as per bidder's proven practice. Please confirm the acceptance.	Hydrogen Generation Plant indicated in Chapter-3, Vol-III stands deleted. Associated activities like H2 Generation plant building, Air-conditioning for H2 Generation control room etc. also stands deleted. However H2 and CO2 cylinders storage shed shall be in bidders scope as described else where.
ESP							
617	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	165 of 186	2.01.01	The Bidder shall perform model study (Physical scale modeling) to achieve an optimum size and layout of the ducting, uniform flue gas distribution….	Since CFD analysis shall be conducted, physical model study of ESP is not envisaged.	Bid specifications to be followed.
618	Volume III Mechanical Works, Section 1 : Scope	Ch 1: SG & Auxiliaries	162 of 186	1.01.08	Opacity monitors complete with all accessories at the outlet of each pass (gas stream) of ESP but upstream of the ID Fan i.e. six (6) no's per ESP serving one steam generator.	Opacity monitors complete with all accessories at the outlet of each **Unit** of ESP but upstream of the ID Fan i.e. **One (1)** no's per ESP serving one steam generator shall be provided as per general practice. Kindly confirm.	Bid specifications to be followed.
619	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	167 of 186	5.01.00	Each plate shall be shaped in one piece construction...	The offered technology has collecting electrodes (modulokTM) that are modular, assembled and Interlocked with each other that are welded to tadpoles at top and bottom. This is as per our standard offering which are installed in various plants in India and working efficiently.	Bid specifications to be followed.
620	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	168 of 186	7.03.00	Necessary lubrication system shall be provided for the rapping mechanism.	Lubrication is not required for ESI rappering system.	Noted.
621	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	169 of 186	8.03.00	All heaters on each level shall have same wattage and be capable of maintaining internal hoppers temperature in excess of 140 deg.C and capacity selection of these heaters shall be as per Purchaser's approval.	Bidder requests to modify the clause as: 'All heaters on each level shall have same wattage and be capable of maintaining internal hoppers temperature in excess of **120** deg.C and capacity selection of these heaters shall be as per Purchaser's approval.'	Bid specifications to be followed.
622	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	173 of 186	11.00.00 point 6.0	Design Point - Inlet Dust Burden - 90 % of ash or actual predicted whichever is higher being carried forward to ESP while firing specified worst (maximum ash) coal.	The referred specification results in, over design of hoppers. Bidder requests to modify clause as follows: 'Inlet Dust Burden - 85 % of ash or actual predicted whichever is higher being carried forward to ESP while firing specified worst (maximum ash) coal', which is as per standard of practice in various TPPs by major clients.	In last coulmn against S.No.-6 of Table at Sheet 173 of 186 of Ch-1, Vol-III, the figure ""90% " be read as "85%".
623	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	174 of 186	11.00.00 point 6.1	ESP Dust Collection loading at outlet, when all fields of each pass are in service - <17 mg/Nm3 or as per MOEF requirement whichever is more stringent.	Bidder requests to modify the clause as: ESP Dust Collection loading at outlet, when all fields of each pass are in service <17 mg/Nm3 or as per MOEF requirement **as on 15 days prior to bid submission date**, whichever is more stringent	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
624	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	174 of 186	11.00.00 point 6.2	ESP Dust Collection loading at outlet, when first field of each pass out of service. (mechanical collection efficiency of first field not exceeding 20% or actual, whichever is lower) - <30 mg/Nm3 or as per MOEF requirement whichever is more stringent.	Bidder requests to modify the clause as: ESP Dust Collection loading at outlet, when first field of each pass out of service. (mechanical collection efficiency of first field not exceeding 20% or actual, whichever is lower) <30 mg/Nm3 or as per MOEF requirement **as on 15 days prior to bid submission date,** whichever is more stringent.	Noted
625	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	174 of 186	11.00.00 point 6.3	Minimum specific collection area 260 m2/m3/ sec (at Design and Guarantee point).	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.	Noted
626	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	174 of 186	11.00.00 point 6.3	Minimum specific collection area 260 m2/m3/ sec (at Design and Guarantee point).	Bidder understands that this requirement is at collecting electrode spacing of 300 mm. In offered technology which has extensive global references, collecting electrode spacing is 400 mm for all fields. Same is accepted by all major power utilities including NTPC. Hence bidder shall offer minimum SCA of 195 m2/m3/ sec (at Design and Guarantee point) with 400 mm spacing considering all field working condition.	Noted as per OEM design.
627	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	177 of 186	11.00.00 Point 9 (k	Spacing between the collecting electrodes (Centre line to centre line) transverse to the gas flow - 300 MM	In offered technology which has extensive global references, collecting electrode spacing is 400 mm for all fields. Same is accepted by all major power utilities including NTPC. Hence bidder shall offer minimum SCA of 195 m2/m3/ sec (at Design and Guarantee point) with 400 mm spacing considering all field working condition. Bidder request owner to kindly accept the same.	Noted as per OEM design.
628	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	169 of 186	8.02.00 & 9.02.00	8.02.00: Hoppers shall be in welded steel plate construction with 5 mm minimum plate thickness. 9.02.00 : The precipitator casing shall be fabricated from all welded reinforced, 6 mm minimum thickness, carbon steel plates conforming to ASTM A36 / IS: 2062.	Bidder request to modify the clause as - 8.02.00: Hoppers shall be in welded steel plate construction with 6 mm minimum plate thickness. 9.02.00 : The precipitator casing shall be fabricated from all welded reinforced, 5 mm minimum thickness, carbon steel plates conforming to ASTM A36 / IS: 2062.	Bid specifications to be followed.
629	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	170 of 186	8.05.00	Hopper baffles shall be designed to be capable of withstanding the unbalance of pressure created when one side of the hopper is filled with fly ash and the other side is empty. All bracing and stiffening shall be on the external side of the hoppers. Internal bracing, stiffening etc., shall not be accepted.	Bidder understand that, hopper baffles if required then shall be designed….	Bid specifications to be followed.
630	Volume III Mechanical Works,	Chapter 29: Elevators	2 of 15	29.1.2.11	Any other building/control room/ MCC room apart from the elevators listed above and having more than two floors (>G+2) shall also be provided with 680 kg passenger elevator.	We recommended for 408 kgs/ 6 passenger elevator which is inline with our other projects where ever elevators are provided. The reason for this proposal is to keep the elevator within funnel outlet flange to avoid fouling with back end structure. Also, the proposed capacity is adequate enough for small control room to be located at >(G+2) level.	Bid specifications to be followed.
631	Volume VII Tender Drawings	Tender Drawings	57 of 120		Dwg. No. 111-29-0200_Rev_03	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
	Volume III Mechanical Works, Section 1 : Scope	Ch 1: SG & Auxiliaries	103 of 186	13.2 I (b)	On each inlet and outlet to each ESP stream (there being at least six ESP streams, with twelve inlets and twelve outlets)		
632	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	170 of 186	8.07.00	Each dust hopper shall be provided with a high level and a low level dust level monitor operating on proven Radio frequency measurement principle.	Bidder understands that only RF type level switch (low and high level) is to be considered for each ESP dust hopper as per Volume III, Ch 1: Steam Generator & Auxiliaries, Clause 8.07.00. 3D Type acoustic wave level transmitter is not applicable for ESP Hoppers. Owner to please confirm Bidder's understanding.	Noted, RF type level switch (low and high level) is to be considered for each ESP dust hopper.
	Volume V Instrumentation & Control Works	Part B/Ch 2: Field & Measuring Instruments	49 of 64	2.19.06	3 D TYPE ACOUSTIC WAVE LEVEL TRANSMITTER Application: each ESP Hopper (First Field),…		
633	Volume IV Electrical Works	Ch 30: Electrostatic Precipitator	7 of 13	30.10.01	ii) The EPMS shall include, but not be limited to, the following features for each unit : a) The EPMS shall also be of same family DDCMIS	Bidder understands that EPMS shall be microprocessor based system as per Volume IV, Ch 30: Electrostatic Precipitator, Clause 30.10.01 as per our standard & proven practice. Hence, Volume IV, Ch 30: Electrostatic Precipitator, Clause 30.10.01, ii), a) is not applicable.	EPMS shall be PLC based system. However, EPMS may not be necessarily of same faimily as that of DDCMIS.
	Volume IV Electrical Works	Ch 30: Electrostatic Precipitator	6 of 13	30.10.01	The control system shall be designed for automatic and manual local/ remote operation. ESPs serving one boiler shall be provided with a complete control system consisting of microprocessor based Electrostatic Precipitator Management System (EPMS),...		
634	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	167 of 186	6.00.00	The high tension discharge electrodes shall be spiral type design	In offered technology which has extensive global references, Discharge Electrode will be with Rigid Pipe with spike/pin (MOC will be as per proven design practise) and same is accepted by all major power utilities including NTPC. Hence request owner to kindly accept the same.	Bid specifications to be followed. However, issue may be discussed during detailed engineering.
635	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	168 of 186	7.01.00	The rapping mechanism shall be tumbling hammer type.	In offered technology which has extensive global references, rapping mechanism shall be of Electric Impact type and same is accepted by all major power utilities including NTPC. Hence request owner to kindly accept the same.	In Clause 7.01.00 of Ch-1 at Sheet 168 of 186 of Vol-III, the words "tumbling hammer type" be read as tumbling hammer type / ëlectric impact type"

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
636	Volume - IV ELECTRICAL	Ch 30: Electrostatic Precipitator	2 of 13	30.01.01	Adequate number of roof mounted transformer-rectifier (TR) sets……..Transformers shall be mineral insulated oil filled type class ONAN cooling type.	Bidder understands that Transformers insulating oil (mineral oil) shall conform to IS 335.	Noted.
	Volume - IV ELECTRICAL	Ch 30: Electrostatic Precipitator	3 of 13	30.01.09	The transformer oil shall be non-toxic and shall have high flash point (above 300 deg C)…….		
Package : FGD							
A	**PROCESS**						
637	Volume III Mechanical Works	SECTION - 3	Sheet | 23 of 93	a)	The absorber shall be sized considering 100% BMCR (Design condition) Operation with design coal firing. However, Bidder to note that absorber shall be able to accommodate 115% of BMCR flow (Peak Condition) and all its equipment's / parts accessories shall be suitably designed to accommodate this flow.	FGD will be sized considering 100% gas flow only. 115% oversizing criteria for absorber is not followed for absorber as well as for its accessories, however suitable margin is considered for all the accessories & equipments. 115% more gas flow have considerable impact on absorber size as well as its accessories, hence we recommend to design absorber only for 100% BMCR condition, please confirm.	Standard OEM practice shall be followed for sizing of FGD.
638	Volume III Mechanical Works	SECTION - 3	Sheet | 24 of 93	-	DESIGN LIMESTONE ANALYSIS (TYPICAL) 4. CaCO3 70.0 85-89	1. Please confirm which limestone analysis is applicable to each design case as well as guarantee case and part load cases. 2. CaCO3 content in the limestone typically 89% at GP and 79% for DP in ongoing FGD projects, please check and provide specific limestone analysis for FGD Design and Guarantee point.	1. Refer Attachment-4 for Limestone Analysis. 2. For FGD design, CaCO3 content by weight in the limestone shall be taken as 89% for GP and 79% for DP.
639	Volume III Mechanical Works	SECTION – 4	Sheet | 32 of 93	1.10.8	1.10.4 Pressurization Fans The auto regulating dampers shall be capable of being operated between 20% to 80% opening as per the optimal requirements of control systems to achieve stable, steady and smooth automatic control of the plant and processes under all operating conditions.	This clause is not applicable as no regulating operation of damper in our FGD system. FGD will be bypassed through on-off damper whenever required.	Standard OEM design provisions shall prevail
640	Volume III Mechanical Works	SECTION – 2	Sheet | 20 of 93	6	The FGD auxiliaries (like. agitator(s) in absorber and limestone slurry tanks, flue gas dampers, agitator(s) in absorber, process water (as applicable), mist eliminator wash pump(s) (if applicable), lube oil system of mills etc.) which may impact serious damage to the FGD System shall be connected to the emergency power supply system for total power failure condition. Bidder shall furnish a list of all such Auxiliaries in their bid proposal.	List of emergency power auxiliaries will be provided as applicable during detailed engineering. Agitators in limestone slurry tanks does not require emergency Power, Since the agitator blades will be located well above the slurry settling height and can work even after a long duration shut down.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
641	Volume III Mechanical Works	SECTION - 3	Sheet | 33 of 93	1. a	FGD Inlet Damper (Absorber Inlet) - Type of Damper - Biplane Damper	Biplane damper is required only in bypass duct for quick opening and closing. FGD inlet and outlet damper will be guillotine gate type.	Noted.
	Volume III Mechanical Works	SECTION - 3	Sheet | 33 of 93	2. a	FGD Outlet Damper (Absorber Outlet) - a.Type of Damper - Biplane Damper		
642	Volume III Mechanical Works	SECTION – 8	Sheet | 68 of 93	2	7.0 Waste Water System Secondary hydrocyclone feed tank shall be sized to provide a minimum storage of minimum two (2) hour of primary hydro-cyclone overflow of the unit with unit operating at Design Point and no outflow from the tank	Secondary hydrocyclone feed tank minimum storage will be 1 hour as per our past projects experience at DVC / NTPC.	Bid specifications to be followed.
643	Volume III Mechanical Works	SECTION – 1	Sheet | 4 of 93	1.1	Bidder will conduct CFD model of the FGD system gas path.	Spray Tower: We shall carry out the CFD for inlet duct from IDF to inlet of absorber and outlet duct from ME outlet to chimney. CFD for the inside of spray tower is not required, however it will decided during detailed engineering. JBR : Since JBR technology is a proven technology worldwide, Bidder will conduct CFD model of the FGD system gas path excluding absorber	Bid specifications to be followed.
644	Volume III Mechanical Works	SECTION – 5	Sheet | 38 of 93	1.5	Homogeneity shall be ensured, if the deviation from the average is less than ±10%.	This requirement is too strict and cannot be met. Homogeneity shall be less than ±30%.	Bid specifications to be followed.
645	Volume III Mechanical Works	SECTION - 2	Sheet | 21 of 93	1.7	Noise level a) Wet Mill $\leq$ 90dB(A) & b) Crusher $\leq$ 90 dB(A).	Noise levels for the WBM and crusher shall be as below based on our OEM design and our past experience: Wet Ball Mill: 90 dB (A) Crusher: 105 dB(A)	Last two lines of Clause 1.7 of Ch-30 at Sheet 21 of 93, Vol-III be read as: "a) Wet Mill $\leq$ 90dB(A) & b) Crusher $\leq$ 100 dB(A)"
646	Volume III Mechanical Works	SECTION – 6	Sheet | 57 of 93	2	All the slurry pumps shall be provided with motorized suction & discharge valves. In addition flushing water lines with motorized/ pneumatic valves shall be provided for each pump for automatic flushing after each shut down. The flushing water shall be taken from process water pumps.	Bidder request to accept pneumatic operated suction and discharge valves for all the slurry pumps. Same is being followed in all our ongoing projects.	In clause-8.0 (2) at Sheet 57 of 93 of Ch-30 in Vol-III, the word "motorised" be read as "motorised / penumatic".
647	Volume III Mechanical Works	SECTION – 7	Sheet | 64 of 93	2	All the pipes handling slurry shall be provided with replaceable rubber lining of proven quality. **The Bidder can provide slurry pipes of size lower than 3" made up of FRP material if it has previous experience of providing the same.**	Bidder proposes to provide FRP pipes upto 400NB, above 400 NB CSRL material will be considered as per our ongoing and past project experience. For pipe size more than 400 NB CSRL pipe with 5 mm rubber lining is proposed, with addition of 2 mm rubber lining at the bends.	Clause 5.0 (2) at Sheet 64 of 93 of Ch-30, Vol-III be read as:- "Slurry pipes of all sizes shall be of FRP material and these pipes shall be coated internally with minimum 2.5 mm SiC coating. Pipes which are coming in contact externally with slurry / treated flue gas shall be coated externally also with minimum 2.5 mm thick SiC coating."

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
648	Flow diagram - Absorber System	111-12-5210			Flow measurement station	The P&ID provided is indicative however we would like to comment as below, 1. FT quantity indicated will be optimised during detailed engineering as per our proven practice. 2. We recommend minimum number of valves and instruments in the RC pump discharge side. Flow control is not required in dedicated RC pump for each slurry level, hence FT is not required. 3. Typical pneumatic valve stations (at inlet) shown along with bypass station is not necessary same will be provided as per our proven practice.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
649	Volume III Mechanical Works	SECTION – 5	Sheet | 40 of 93	6	Walkways shall be arranged and also measures shall be taken as appropriate to permit the internal components to be disassembled and reassembled during repairs without the necessity for time-consuming preparatory work. The headroom shall have a height of more than 2200 mm. 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.	The headroom of 2200 mm mentioned for Mist eliminator is based on Roof type arrangement; However, bidder clarifies that minimum headroom of 1500 mm will be provided (Similar to Spray bank header distance) for flat type Mist eliminator design. The walkway of 300 mm wide mentioned for Mist eliminator is based on Roof type arrangement; However bidder clarifies that there will not be any specific walkway & the complete mist eliminator modules shall be used for handling / walking for flat type Mist eliminator design.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
650	Volume III Mechanical Works	SECTION – 6	Sheet | 56 of 93	7	**Limestone Slurry Pumps** iv) Margins Flow 10% (minimum) Heads 15% (minimum)	The margin on **frictional head** shall be 15% as per standard design practice. Bidder request owner to accept.	Noted.
		SECTION – 5	Sheet | 37 of 93	1.3	Gypsum Bleed Pump iv) Margins a) Flow 10% b) Head 15%		
651	Volume III Mechanical Works	SECTION – 5	Sheet | 39 of 93	6	Three stage chevron type Mist Eliminators (ME) made of polysulfone or polypropylene or stainless steel or FRP shall be provided at the exit of the absorber.	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. Hence, bidder request owner to consider 2 stage ME for JBR.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
652	Volume III Mechanical Works	SECTION – 8	Sheet | 69 of 93	5	The emergency absorber tank shall be made of minimum 7 mm thick carbon steel with 4 mm thick rubber lining of best quality bromine butyl rubber and shall also be equipped with all necessary pumps,	Emergency absorber tank shall be provided with 4mm thick rubber lining as per clause 5 referred here. Same is followed in all ongoing FGD projects. Glass flake lining is not considered as mentioned in table referred here.	Bidder to provide Emergency absorber tank with glass flake lining in line with Chapter 30, Sheet 73 of 93, Volume III.
			Sheet | 73 of 93	-			
653	Volume III Mechanical Works	SECTION – 2	Sheet | 18 of 93	1.1.01	FGD System Service Conditions The Steam Generator is designed to burn pulverised coal having properties as indicated in subsequent chapter of tender specification. Also LDO shall be used during startup and at low loads for warm up and flame stabilization	Bidder recommends to by-pass the FGD system during oil firing.	Bid specifications to be followed.
654	Volume III Mechanical Works	SECTION – 2	Sheet | 20 of 93	7	Bidder shall ensure 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 in case of shutdown/outage period. 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, only critical items in contact with limestone/gypsum slurry shall be provided automatic draining and flushing arrangement.	Bid specifications to be followed.
655	Volume III Mechanical Works	SECTION – 5	Sheet | 37 of 93	3		In JBR technology head requirement of oxidation blower is much less than 3500 mmWC as per ongoing projects. Hence, 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 to be followed. The issue can be discussed during detailed Engineering.
656	Volume III Mechanical Works	SECTION – 5	Sheet | 40 of 93	10	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 case of 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.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
657	Volume III Mechanical Works	SECTION – 5	Sheet | 40 of 93	11 13 15	The absorber vessel shall be made of minimum 7 mm thick carbon steel. The absorber oxidation tank, absorber tower & absorber outlet duct shall be provided with 2 mm (minimum) thickness lining / cladding / wall paper of Alloy C276 / Alloy 59 or better material with the exception of use of rubber material. Cladding/ wall paper shall be by explosion bonding or hot rolling. All internal members shall be lined with minimum 2 mm Alloy 59/ C276. All metallic fasteners which are provided inside the absorber/absorber wet-dry interface ducting shall be of Alloy 59/ C276. The other bridges (supports) shall be lined with minimum 2 mm Alloy 59/ C276.	As per the bidders' collaborator experience and proven practice, the complete absorber vessel shall be made of minimum 7 mm thick carbon steel with 2 mm thick flake glass lining. And also all internal members and other bridges shall be lined with 2mm thick flake glass lining. Please confirm.	Bid specifications to be followed.
658	Volume III Mechanical Works	SECTION – 8	Sheet | 68 of 93	8.0 (1)	1. It should be possible to discharge the absorber into emergency absorber tank within 2 hrs.	JBR Technology: Please note that time required to empty absorber using gypsum bleed pump and by gravity shall be around 8 to 15 hours. Draining of absorber using a dedicated pumping system is possible between normal slurry level and minimum slurry level within 2 hrs. The balance slurry will be drained to the drain sump by gravity.	Clause 8.0 (1) at Sheet 68 of 93 of Ch-30, Vol-III be read as:- "Bidder to ensure that draining of absorber between normal slurry level and minimum slurry level using a dedicated pumping system is done within 2 hours."
659	Volume III Mechanical Works	SECTION – 5	Sheet | 42 of 93	25	At the heads of the absorber two manholes shall be provided to reduce the draught of stack during outage.	Kindly note, this clause is applicable only for spray type absorber and hence not considered for JBR.	Noted if it is as per Standard OEM design.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
660	Volume III Mechanical Works	SECTION – 5	Sheet | 46 of 93	7.4.4	Slurry duty pump	As shaft shall never come in contact with the medium of flow, hence, the shaft shall be of EN8 instead of stainless steel 410. Please confirm.	Bid specifications to be followed.
661	Volume III Mechanical Works	SECTION – 7	Sheet | 63 of 93	7	To prevent mechanical blocking and load start-up after standstill of pumps, piping and agitators for slurries shall be applied with C-hose connection.	In case of JBR technology 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 is not envisaged.	Noted if it is as per Standard OEM design.
662	Volume II General & Schedule,	Appendix-II	Sheet | 5 of 10	-	COAL QUALITY PARAMETERS	Chloride % and fluride % are not mentioned in the Coal analysis. Hence, Owner is requested to provide standard concentration of HCL and HF for designing of FGD system and proper estimation of purge water flow.	For FGD design and guarantee conditions:- HCL (ppm) wet - 45 HF (ppm) wet -12 may be considered.
	Volume III Mechanical Works	Section-3	Sheet | 22 of 93	Table I	Flue Gas parameter, Note -		
663	Volume III Mechanical Works	Section-3	Sheet | 22 of 93	Table I	5. Gas Temp. at terminal point (inlet to FGD)±5 Deg.C (+5 deg.C considered over predicted value)	Flue gas temperature requirement specified with 5°C positive and negative tolerance as well as with positive 5°C additional on predicted value. The requirment is contradictory. Owner shall clearly specify the requirement.	Consider ±5 Deg.C over predictive value.
B	**PIPING**						
664	Volume III Mechanical Works	Chapter 30 / Section – 7	Sheet | 64 of 93	5.0	2) All the pipes handling slurry shall be provided with replaceable rubber lining of proven quality. The Bidder can provide slurry pipes of size lower than 3" made up of FRP material if it has previous experience of providing the same.	Bidder proposes FRP (with SiC coating inside piping) as alternative material for all sizes of all slurry service piping. Please confirm.	Clause 5.0 (2) at Sheet 64 of 93 and clause 7.0 (3) at sheet 56 of 93 of Ch-30, Vol-III be read as:- "Slurry pipes of all sizes shall be of FRP material and these pipes shall be coated internally with minimum 2.5 mm SiC coating. Pipes which are coming in contact externally with slurry / treated flue gas shall be coated externally also with minimum 2.5 mm thick SiC coating."
665	Volume III Mechanical Works	Chapter 30 / Section – 7	Sheet | 56 of 93	7.0	3) The limestone slurry pipes shall be sized to minimize erosion and avoid settling of the limestone at part load operation. The slurry pipes shall be lined with replaceable rubber lining of 10 mm thickness. Additional thickness of 2 mm rubber lining shall be provided at bends.		
C	**MATERIAL HANDLING**						
666	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	21 of 93	1.5 Layout Consideration	The Bidder shall offer the best design to accommodate the Flue Gas Desulphurisation (FGD) System and Lime stone & Gypsum handling & storage system within the confines of the space available in layout. The indicative layout of FGD System has been indicated in the plot plan. FGD bidder is expected to offer most compact layout accommodating the entire scope of supply and meeting all functional requirements.	Bidder understands that, bidder can optimize the overall FGD layout along with LHP/ GHP as per their system design complying to the technical specification requirements . Bidder shall maintain the functionality of the entire system as per the specifications. This shall include addition/deletion of TPs/ conveyors etc. from the tender flow diagram/ layout (if not applicable as per bidder's layout design).	Bid specifications to be followed, however overall FGD layout may be finalised during detailed design engineering.
667	Vol-VII	-	-	Layout- FGD Plan	Limestone and Gypsum Storage shed are shown together in the layout drawing.	Bidder understands that bidder can envisaged combined or two separate sheds for limestone and gypsum storage as per the bidder's layout design.	Confirmed
668	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	7 of 93	1.2 (19) Limestone Handling & Grinding System	Dry type Dust extraction (DE) system.	Bidder has not consider any Dust control system at limestone shed. However Dry type dust extraction system considered in Crusher house and Day bin #1,2 Kindly confirm.	Confirmed
669	Vol-VII	-	-	Layout- FGD Plan	The Bulk Receiving Unit/ Surface feeder is shown inside the Limestone Storage Shed.	Bidder understands that the Bulk Receiving Unit/ Surface feeder shall be located adjacent to the Limestone Storage Shed and not necessarily inside the Limestone Storage Shed. For Bulk receiving unit, there will be long ramp which could not be placed within the shed. Please confirm	Confirmed
670	Vol-VII	-	-	Limestone Flow Diagram	Limestone feeding from Surface Feeder SF-1A/1B to BCN-1A/1B is shown within the Limestone storage shed	Bidder understand that no such requirement is envisaged. Bidder can offer feeding arrangement as per their layout design. Conveyor BCN-1A/1B shall be placed outside the shed & completely overground. Kindly confirm.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
671	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	6 of 93	1.2 Limestone Handling & Grinding System	Limestone Handling System	Bidder request owner to furnish complete tender specification detail of Limestone handling system as shown in tender LHS flow diagram including conveyor and its associated equipments, similar to gypsum handling systems. Kindly provide the same	Specifications of LHS is as per Attachment-5
672	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	7 of 93	1.2 (24) Limestone Handling & Grinding System	Limestone Storage Shed with 15 days storage minimum capacity	Kindly provide the minimum clear height of Limestone Storage Shed to be considered for truck unloading inside the shed and also space required for vehicle movement inside the shed.	Minimum clear height of Limestone Storage Shed shall be 09 meter from finished floor level.
673	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	7 of 93	1.2 (24) Limestone Handling & Grinding System	Limestone Storage Shed	Angle of repose to be considered for limestone stockpile at limestone storage shed. Kindly provide the same.	38° angle of repose be considered.
674	Vol-VII	-	-	Limestone Flow Diagram	Self tippling truck	Bidder understand that self tippling truck are not in scope of bidder. Kindly confirm	Confirmed
675	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	07 of 93	1.11 Buildings	Limestone Sampling System	Bidder understand that limestone sampling system is not shown in tender flow diagram of limestone handling system and hence same is not in the scope of the bidder. Kindly confirm.	Limestone Sampling System is in the bidder's scope as per S.No. 22 of table at Sheet-7 of 93 , Ch-30, Vol-III.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
676	Vol-VII	-	-	Limestone Flow Diagram	Rod Gate and Rack & Pinion Gate	Bidder understands that rod gate & rack-pinion gate shall be considered between the discharge chute of BCN-1A/1B to inlet of VGF-1A/1B. Kindly confirm.	Confirmed.
677	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	6 of 93	1.2 (7) Limestone Handling & Grinding System	Fixed tripper# FT-1A/1B/2A/2B mounted above day bin	Kindly confirm if bidder can also consider limestone feeding to day silo using Flap Gate or Reversible Belt Feeder (RBF) arrangement in place of fixed tripper as per the bidder's layout design.	Query withdrawn by bidder in pre bid meeting.
678	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	6 of 93	1.2 (8) Limestone Handling & Grinding System	Discharge chute	Bidder proposes to use 12 mm thk. (Min.) SAILHARD/ TISCRAL/ SAILMA/Equivalent. /Equivalent in LHS & GHS. Kindly confirm.	Confirmed
679	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	6,7 of 93	1.2 (6) Limestone Handling & Grinding System	Belt conveyors	The troughing angle of idlers for conveyors shall be as per bidders design/ requirement. Kindly confirm.	Confirmed
680	Volume III Mechanical Works	Ch 28: Flue Gas Desulphurisation System	4 of 13	28.2.13 Hoists and Trolleys with Monorails	items weighing less than 1000 kg, manual hoists shall be provided. For items weighing 1000 kg and more, electric hoists (lift & travel) shall be provided. In case the lifting height is more than 10M, electric hoist (lift & travel) shall be provided irrespective of the weight.	items weighing upto 2000 kg, manual hoists shall be provided. For items weighing more than 2000 kg , electric hoists (lift & travel) shall be provided. In case the lifting height is more than 10M, electric hoist (lift & travel) shall be provided irrespective of the weight.	Bid specifications to be followed.
681	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	14 of 93	1.13 Air Conditioning and Ventilation System	Air Conditioning and Ventilation System	Kindly confirm requirement of ventilation system for Limestone Storage Shed, Gypsum Storage Shed, travelling tripper floor etc. In case ventilation is applicable for these areas, kindly provide type of ventilation system and minimum air changes to be considered	Bid specifications as per Clause No.25.4 of Vol-III to be followed.
682	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	12 of 93	1.9 Gypsum Storage & Handling System	Gypsum will be feed directly from the gypsum dewatering system to the gypsum storage yard through gypsum transfer conveyor. Conveyors & travelling trippers shall be provide for handling gypsum.	Bidder request owner to furnish gypsum handling flow diagram drawing showing with capacity details of each equipments. Kindly provide the same	To be finalised during detailed design engineering.
683	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	12 of 93	1.9 Gypsum Storage & Handling System	Adequate space inside shed for truck movement shall be provided. Dozer (1 No.) and Pay loader (1 no.) required for gypsum storage and loading into the truck, road connectivity, shall be included in the Bidder's scope	Kindly share the details of Dozer & payloader used in gypsum storage shed.	1. Bucket capacity of tyre mounted payloader - 2.5 m3. 2. Dozer Capacity - not less than 134KW (180 hp) @1850 rpm
684	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	75 of 93	1.2 Design & Constructional Features 1.3 Scope of supply	4.0 M high RCC wall for stacking gypsum considering 15 days gypsum storage shall be provided. The gypsum storage shed shall be sufficient to store gypsum equivalent to gypsum generation of minimum 7 days at Design point.	The storage capacity mentioned in these two statements are contradictory. Kindly review and clarify.	Gypsum storage capacity shall be minimum 15 days.
685	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	12 OF 93	1.9 Gypsum Storage & Handling System	Operator room/Maintenance area/maintenance storage room with arrangement required for the Dozer (1 No.) and Pay loader (1 no.) along with toilet shall also be included in Bidder's scope.	Kindly share the dozer shed details	To be finalised during detailed design engineering.
686	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	77 of 93	1.3 Data sheet of Gypsum conveyors	Belt width, mm: 800 mm x 20°tr. x 3-eq. roll	The troughing angle of idlers for conveyors shall be 35 degree. Kindly confirm	Noted if it is as per OEM design
687	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	75 of 93	1.2 Design & Constructional Features	Plain water dust suppression system for Gypsum storage area shall be provided.	Kindly provide detailed design specification for the Plain Water Dust Suppression System to be considered for Gypsum Stockpile.	Plain water dust suppression system be supplied as per OEM design.
688	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	75 of 93	1.2 Design & Constructional Features 1.3 Scope of supply	Plain water dust suppression system for Gypsum storage area shall be provided. Complete dust extraction system for control of fugitive dust in gypsum storage shed.	The two statements for dust control system inside the gypsum storage shed are contradictory. Kindly review and clarify.	Dust extraction system is not required for gypsum storage shed. Plain water dust suppression system to be considered.
689	Volume III Mechanical Works	Ch 30: Flue Gas Desulphurisation System	6 of 93	1.2 (5) EOT Crane# EOT-1	CRANES AND HOISTS Electric hoist shown in Limestone Storage Shed	Bidder has not considered any hoist/ EOT crane in the Limestone Storage Shed as there are no equipment inside the shed. Kindly confirm.	Requirement of Electric hoist in Limestone Storage Shed is deleted.
690	Vol-VII	-	-	Limestone Flow Diagram			
691	Volume III Mechanical Works			General query		Please provide maximum surface moisture content for incoming limestone.	Available analysis has been furnished in the bid specification.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
692	Volume III Mechanical Works			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	Available analysis has been furnished in the bid specification.
693	Volume III Mechanical Works			General query		Furnish limestone sieve analysis for crusher, screen & other equipment sizing.	Available analysis has been furnished in the bid specification.
694	Volume III Mechanical Works			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.	Confirmed as per latest edition of IS:4776
695	Volume III Mechanical Works			General query		As tender flow diagram is indicative only, hence we understand there is flexibility of selecting alternative feasible options based on space availability in layout. Owner is requested to confirm the same.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
696	Volume III Mechanical Works	SECTION - 6	Sheet | 52 of 93	2.0. 6)	For dust free operation each silo should be provided with a self-cleaning bag filter system of suitably capacity containing blower, automatic/on-load cleaning system etc.	For Dust free operation, bidder understand Dust extraction system shall be provided here along with duct, damper, pulse set type Bag filter, fan/blower & automatic bag filter cleaning system through SOV at Silo area. Please confirm bidder understanding.	Confirmed.
697	Volume III Mechanical Works	SECTION - 1	Sheet | 7 of 93	1.2. Sl.No. 17	Sump Pumps# SP- 1A/1B/ 2A/2B complete with discharge piping upto nearest drain - As per flow diagram/ system requirement	In case of no underground/ over ground area where floor washing drainage water from inside drain of building can be fed to nearest outside drain by gravity easily, Sump pump is not necessary. Bidder request customer to accept bidder understanding.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
698	Volume III Mechanical Works	SECTION - 9	Sheet | 76 of 93	1.3. d)	Complete dust extraction system for control of fugitive dust in gypsum storage shed.	There are two separate system indicated in same location in specification. Bidder has considered plain water dust suppression system for Gypsum storage shed area. Please confirm.	Dust extraction system is not required for gypsum storage shed. Plain water dust suppression system to be considered.
699	Volume III Mechanical Works	SECTION - 9	Sheet | 76 of 93	1.2	Plain water dust suppression system for Gypsum storage area shall be provided. All the associated system such as pumps (1w+1s), spray nozzles covering the entire storage area, including electrical, instrumentation and control system shall be provided.		
700	Volume III Mechanical Works	SECTION - 9	Sheet | 75 of 93	1.2	Sump pit and 2 x 100% pumps shall be located in the covered shed to prevent any rain water from entering and Discharge point of the sump pump shall be indicated.	Bidder request to consider following points insider gypsum storage shed area. 1) As space constant inside of storage shed and to avoid obstruction of dozer movement as well as material storing , 4 no's sump pump with pit can be removed from inside shed. 2) In case of Dust suppression , DS water shall be absorbed by dry gypsum mostly . Source of drainage water is very less. 4 nos Sump pump set is not necessary. We propose cover slop drain , connected to nearby outside drain instead of sump pump arrangement. Please confirm bidder proposal.	Sump pit with 2 x 100% pumps outside gypsum storage shed shall be provided.
701	Volume III Mechanical Works	SECTION - 9	Sheet | 76 of 93	1.3. c)	Minimum four (4) Nos. sump pumps in gypsum storage shed complete with motors, local control panel, level switches, individual discharge piping with fittings and valves.		
702	Volume III Mechanical Works	SECTION - 1	Sheet | 7 of 93	1.2. Sl.No. 19	Dry Type Dust Extraction [DE] System - DE system shall be provided for LHS	As per bidder's scope Section-1,clause no-1.2. Sl.No-19, Bidder has considered Dry type DE system for complete Lime stone handling area as required. There is no DFDS system at Limestone storage silo area. Please confirm.	Noted
703	Volume VII TENDER DRAWINGS	111-13-5213	-	Flow diagram-Limestonel Handling System			
Steam Generator & Associate Auxiliaries							
704	Volume-I / Section-V / ECC	-	16 of 62	27.7	Fuel for Startup /Trial Run: The fuel (Coal & oil) and limestone as may be required for the initial starting-up/trial run of the plant equipment will be arranged by Owner.	We understand that apart from the fuel (Coal and oil) and limestone, Customer will also provide Ammonia as may be required to Bidder for pre-commissioning, commissioning, initial operation, trail run, etc. free of any charge.	Supply of Anhydrous Ammonia for pre-commissioning, commissioning, initial operation, trial run, etc of SCR system shall be in Owner's scope
705	Volume-II / General & Schedules	Chapter-1	7 of 10	4.4.1	The bidder's scope shall include all pre-commissioning and commissioning activities, materials and services as detailed in technical specifications including supply of all consumables (except coal and fuel oil for firing), temporary equipment and piping, instruments, labour/skilled manpower etc. The scope includes complete requirement of flushing oils including fresh oil refilling during the pre-commissioning and commissioning activities and subsequent initial operation.	We request Customer to kindly update this clause as mentioned below: The bidder's scope shall include all pre-commissioning and commissioning activities, materials and services as detailed in technical specifications including supply of all consumables (except coal, ~~and~~ fuel oil for firing **and** **Ammonia**), temporary equipment and piping, instruments, labour/skilled manpower etc. The scope includes complete requirement of flushing oils including fresh oil refilling during the pre-commissioning and commissioning activities and subsequent initial operation.	Supply of Anhydrous Ammonia for pre-commissioning, commissioning, initial operation, trial run, etc of SCR system shall be in Owner's scope
706	Volume-II / General & Schedules	Chapter-1	4 of 10	1.5	Steam Generator and Auxiliaries including,……. SCR system along with ammonia unloading, storage & handling system, cyclone separators etc.,	Customer is requested to note that cyclone separators are not required along with SCR system as per Bidder's standard design. Customer is requested to kindly delete the requirement of cyclone separator.	Noted as per OEM design.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
707	Volume III / Mechanical Works	Chapter-1	28 of 186	1.29.1	The scope of supply include design, engineering, manufacture, supply, erection, commissioning and testing of complete mechanical, electrical, C&I and associated civil foundation and structural work for Selective Catalytic Reduction (SCR) System along with ammonia unloading, storage and handling system, Cyclone Separators complete in all respects with all components and accessories etc., for one (1) steam generator as detailed in this specification. The SCR System is intended to reduce the emission of NOx in flue gas produced by coal being fired in boiler to the limits specified elsewhere in the technical specification.	Customer is requested to note that cyclone separators are not required along with SCR system as per Bidder's standard design. Customer is requested to kindly delete the requirement of cyclone separator.	Noted as per OEM design.
708	Volume III / Mechanical Works	Chapter-1	28 of 186	1.29.2	The scope of supply identified for SCR System along with ammonia unloading, storage and handling system, Cyclone Separators here are minimum requirements and unless excluded from the Bidder's scope, any equipment/system not included in the specification but integral to the system offered to meet the intent of this specification, shall also be included in the scope.	Customer is requested to note that cyclone separators are not required along with SCR system as per Bidder's standard design. Customer is requested to kindly delete the requirement of cyclone separator.	Noted as per OEM design.
709	Volume III / Mechanical Works	Chapter-1	31 of 186	1.29.7	Cyclone Separators i) Two (02) independently operated Cyclone Separators housed in independent casings shall be provided including outside shell, structural steel supports and frame work, stiffeners, bracings, access ladders, platforms, safety rails, stairways, walk ways, access doors, insulation etc. One (01) cyclone separator shall be provided in each stream of flue gas duct from economizer outlet to SCR reactor inlet. ii) Ash hoppers complete with level monitors and indicators, poke holes, access doors, walkways beneath the hoppers along with associated ash handling system shall be in the Bidder's scope. iii) Sampling ports for off-line measurement of ash concentration in flue gas at the inlet and outlet of Cyclone separators.	Customer is requested to note that cyclone separators are not required along with SCR system as per Bidder's standard design. Customer is requested to kindly delete the requirement of cyclone separator.	Noted as per OEM design.
710	Volume-II / General & Schedules	Chapter-1	4 of 10	3.3	(c) The plant shall be designed to operate on FGMO/RGMO as per requirement of Indian Electricity Grid Code (IEGC).	Bidder understands that this clause is for bidder's information only. The various system for this package shall be designed as per the design conditions specified in detailed tender specification provided for respective package. Kindly confirm the acceptance of our request.	Bid specifications to be followed.
711	Volume-II / General & Schedules	Chapter-4	3 of 42	4.3.1	f) Boiler start up drain recirculation pumps (Glandless pump with submerged type wet motor with external high pressure cooler) - Pump rating not less than that supplied for 800 MW or higher size super-critical unit.	Bidder requests Customer to modify this clause as per Bidder's suggestion mentioned below which is in line with the standard practice followed for various plants executed by Bidders for Central and State electricity boards: Boiler start up drain recirculation pumps (Glandless pump with submerged type wet motor with external high pressure cooler) - Pump rating not less than that supplied for ~~**800 MW**~~ **500 MW** or higher size super-critical unit.	In last coulmn against S.No. (f) of Table at Sheet 3 of 42 of Ch-4 in Vol-II, the figure "800 MW" be read as "500 MW".
712	Volume-II / General & Schedules	Chapter-4	3 of 42	4.3.1	g) Air pre-heaters (Rotary regenerative (Lung storm or approved equivalent)-Bisector type or Trisector type with vertical axis of rotation.) - Air pre-heater rating not less than that supplied for 800 MW or higher size unit.	Bidder requests Customer to modify this clause as per Bidder's suggestion mentioned below which is in line with the standard practice followed for various plants executed by Bidders for Central and State electricity boards: Air pre-heaters (Rotary regenerative (Lung storm or approved equivalent)-Bisector type or Trisector type with vertical axis of rotation.) - Air pre-heater rating not less than that supplied for ~~**800 MW**~~ **500 MW** or higher size unit.	In last coulmn against S.No. (g) of Table at Sheet 3 of 42 of Ch-4 in Vol-II, the figure "800 MW" be read as "500 MW".
713	Volume-II / General & Schedules	Chapter-4	3 of 42	4.4.11.1	Mill reject handling system offered by the Bidder shall be only from such manufacturer who has previous experience of manufacturing and supplying pneumatic type coal mill rejects handling systems of capacity 5 TPH or higher which are in successful operation in at least one (1) plant for a period not less than one (1) year prior to the date of Techno-Commercial bid opening.	Bidder requests Customer to modify this clause as per Bidder's suggestion mentioned below which is in line with the standard practice followed for various plants executed by Bidders for Central and State electricity boards: Mill reject handling system offered by the Bidder shall be only from such manufacturer who has previous experience of manufacturing and supplying pneumatic type coal mill rejects handling systems of capacity ~~**5**~~ **1.5** TPH or higher which are in successful operation in at least one (1) plant for a period not less than one (1) year prior to the date of Techno-Commercial bid opening.	Bid specifications to be followed.
714	Volume-II / General & Schedules	Chapter-4	35 of 42	7.6 b)	ii) Any structural steel fabrication works of quantity not less than 2500 MT in a single agreement in a year.	As structural steel fabrication works is a standard requirement for Boiler and its auxiliaries, Customer is requested to kindly change the specification requirement as mentioned below: Any structural steel fabrication works of quantity not less than ~~**2500 MT**~~ **1000 MT** in a single agreement in a year.	Bid specifications to be followed.
715	Volume-II / General & Schedules	Chapter-5	29 of 86	29.0	TRAINING OF OWNER'S PERSONNEL The scope of service under training of Owner shall include a training module in the areas of Operation & Maintenance. Total period for above training shall not be less than sixty (60) man-months at manufacturers' works & facilities.	Bidder understands that the training of Owner's personnel indicated in clause no. 29.0, Page 29 of 86, Chapter-5, Volume-II is indicative only. Bidder shall consider the training for Owner's personnel as per the training detail provided in Annexure-VII (Areas of Training Requirement), Page 65 of 86, Chapter-5, Volume-II. Kindly confirm the acceptance of our request.	Bid specifications to be followed.

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716	Volume-II / General & Schedules	Chapter-5	65 of 86	29.7	ANNEXURE-VII (AREAS OF TRAINING REQUIREMENT)	Bidder understands that the training of Owner's personnel indicated in clause no. 29.0, Page 29 of 86, Chapter-5, Volume-II is indicative only. Bidder shall consider the training for Owner's personnel as per the training detail provided in Annexure-VII (Areas of Training Requirement), Page 65 of 86, Chapter-5, Volume-II. Kindly confirm the acceptance of our request.	Bid specifications to be followed.
717	Volume-II / General & Schedules	Ch 8: FG & LD	7 of 57	3.1 (x)	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/ Hybrid (SCR+SNCR) efficiency for control of NOx emission reaches to a level of 70%, with ammonia slip not exceeding 3ppm at 6% oxygen (O2) content in flue gas on dry gas basis.	Customer is requested to note that the catalyst life guarantee is provided under Category-I as well as in Category-III. We request Customer to kindly delete the Catalyst life guarantee requirement from Category-III and consider this performance guarantee in category-I only. Kindly confirm the acceptance of our request.	Clause 5.14 (Catalyst life guarantee under Category - III) at Sheet 31 of 57, Chapter-8, Vol-II stands deleted. However, in clause 3.1 (x) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%".
718	Volume-II / General & Schedules	Ch 8: FG & LD	31 of 57	5.14	Catalyst Life The Bidder shall demonstrate NOx emission outlet at SCR shall not exceed 80 mg/Nm3 @ 6% O2 dry basis (with ammonia slip less than 2.5 ppm at 6% O2 dry basis) at the end of 16000 operation hours for range of coal(s) specified from 40% BMCR to 100% BMCR. Note: The 16000 hours as mentioned above for SCR catalyst life, shall be based on actual running hours of operation of SCR system counted from the date of successful completion of 'Initial Operation' of unit.	Customer is requested to note that the catalyst life guarantee is provided under Category-I as well as in Category-III. We request Customer to kindly delete the Catalyst life guarantee requirement from Category-III and consider this performance guarantee in category-I only. Kindly confirm the acceptance of our request.	Clause 5.14 (Catalyst life guarantee under Category - III) at Sheet 31 of 57, Chapter-8, Vol-II stands deleted. However, in clause 3.1 (x) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%".
719	Volume-III	Chapter-1 (Steam Generator & Auxiiaries)	Sheet 126 of 186	23.1.3 (3)	Catalyst modules : vii) The selected catalyst shall have minimum life of 16000 hours of continuous operation under any operating condition of the steam generator and range of coal specified.	Customer is requested to kindly review the requirement as per the change proposed by Bidder in trailing clause: " The selected catalyst shall have minimum life of 16000 hours of ~~**continuous**~~ operation **including the shutdown duration if any from first Gas in,** under any operating condition of the steam generator and range of coal specified. Kindly confirm the acceptance of our request.	Bid specifications to be followed.
720	Volume-III	Chapter-1 (Steam Generator & Auxiiaries)	Sheet 183 of 186	4.1.1.4 (Steam Blowing)	For the steam blowing operation, steam conditions like pressure, temperature etc. at the Steam Generator outlet shall be so selected that a minimum cleaning ratio/ disturbance factor of 1.6 is achieved.	As per Bidder's experience, CFR of 1.4 is more than enough to achieve the required steam quality during steam blowing operation. Hence Bidder requests Customer to revise the CFR value to 1.4 from 1.6. Kindly confirm the acceptance of our request.	In the last para of clause 4.1.1.4 of Ch-1 at Sheet 184 of 186 in Vol-III, the figure "1.6" be read as "1.4".
721	Volume-III	Chapter-1 (Steam Generator & Auxiiaries)	Sheet 182 of 186	4.1.1.3 Chemical Cleaning of Pressure Parts	The cleaning procedure shall include final flushing and draining of the boiler under a nitrogen gas cap and/or filling the boiler with inhibited water or any other proven procedure recommended by the manufacturer for the preservation of the boiler which is acceptable to the Owner. The Bidder shall furnish a detailed procedure for boiler preservation during detailed engineering for Owner's approval. All equipment needed for such preservation including the nitrogen cylinders, interconnecting piping and any regulating equipment for N2 cap and other preservatives shall be provided by the Bidder for the each Steam Generator and the same shall also become the property of the Owner after completion of the chemical cleaning.	N2 Cylinders which shall be brought by Chemical cleaning vendor during boiler chemical cleaning shall be taken back by Chemical cleaning agency as those are rental cylinders. However permanent system shall consist of N2 piping & cylinders which shall be part of Project supply. Customer is request to kindly revisit the given requirement.	N2 cylinders for chemical cleaning of boiler can be taken back by the contractor however N2 cylinders for boiler preservation will remain with HPGCL.
Steam Generator & Associate Auxiliaries - Mechanical							
722	Volume II General & Schedules	Ch 2 : Project Information/Vol-II	5 of 10	1.0	**Appendix – II: Coal Quality Parameters**	1. Moisture content specified under proximate analysis seems to be on lower side compared to Indian coals. Customer is requested to kindly check and confirm. 2. Sum of constituents specified under proximate analysis is not equal to 100% for Performance/Design fuel. Customer to check. 3. Ash constituents is not available for Performance/Design fuel 4. Arsenic in coal has not specified in the given coal analysis, same is required for the design/selection of Steam generator & Auxiliary equipment. 5. Kindly provide the ash fusion temperature for performance/design fuel	1. Details shown are correct. 2. Consider volatile matter as 22% and fixed carbon as 25%. 3. Available ash constituents enclosed with the tender specification. 4. Data not available. 5. Ash fusion range for design coal shall be 1100-1400 deg C. Ash fusion temperature for design coal shall be 1310 deg. C. Already available in appendix II, sheet-5, Chapter-2 of Vol-II.
723	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages/Vol-II	7 of 57	3.1, ix)	**SCR Efficiency for Control of NOx emission** Contractor shall guarantee and demonstrate that at the end of 16000 hrs of operation and with the originally installed catalyst (i.e. without the use of future layer of catalyst) the SCR efficiency for control of NOx emission (from thermal as well as fuel) shall not be less than 80% at 6% oxygen (O2) content in flue gas on dry gas basis and ammonia slip not exceeding **3ppm** at 100% TMCR load condition, when firing any coal from the range of coal(s) specified.		Ammonia slip after last catalyst layer (ppm at 6% O_2 on dry basis) be read as: - Guarantee Point < 3 - Design point < 2.5 ***

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724	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages/Vol-II	7 of 57	3.1, x)	**Catalyst Life** Contractor shall guarantee and demonstrate minimum SCR catalyst life of 16000hrs. The catalyst shall be deemed to have exhausted its life as and when SCR/ Hybrid (SCR+SNCR) efficiency for control of NOx emission reaches to a level of 70%, with ammonia slip not exceeding **3ppm at 6% oxygen (O2)** content in flue gas on dry gas basis.	There is a contradiction in ammonia slippage value among different clauses in the tender document. Hence bidder has considered ammonia slip not exceeding <3ppm in all the respective tender clauses. HPGCL/DESEIN to confirm the same.	Note: Following changes have also been incorporated in the Tender specifications: Functional Guarantees under category-I 1) In clause 3.1 (ix) at sheet 7 of 57, Chapter-8, Volume-II, figure "80%" shall be read as "84%". 2) In clause 3.1 (ix) (4th and last line of second stanza) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%". 3) In clause 3.1 (x) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%". Functional Guarantees under category-III 1) In clause 5.12 at sheet 31 of 57, Chapter-8, Volume-II, "2.5 ppm" shall be read as "3 ppm".
725	Volume III Mechnical	Section 2 : Design Basis of SG & Auxiliaries and SCR/Ch 1: SG & Auxiliaries/Vol-III	155 of 186	23.1.23, B), 9)	**Ammonia Slip after last catalyst layer (ppm at 6% O2 on dry basis)** Guarantee Point & Design Point = <2 ppm		
726	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages/Vol-II	7 of 57	3.1, ix)	**SCR Efficiency for Control of NOx emission** Contractor shall guarantee and demonstrate that at the end of 16000 hrs of operation and with the originally installed catalyst (i.e. without the use of future layer of catalyst) the SCR efficiency for control of NOx emission (from thermal as well as fuel) shall not be less than 80% at 6% oxygen (O2) content in flue gas on dry gas basis and ammonia slip not exceeding 3ppm at 100% TMCR load condition, when firing any coal from the range of coal(s) specified.	Bidder would like to consider following points for catalyst design. 1. Actual NOx predicted by the bidder at SCR inlet shall be considered instead of 500mg/Nm3. 2. As per MOEF guideline, SCR outlet NOx of 100mg/Nm3 shall be considered instead of considering 80% efficiency for catalyst design. Hence bidder request HPGCL/DESEIN to remove the NOx efficiency guarantee of 80% and SCR inlet NOx limit of 500mg/Nm3.	Major Design and Guarntee point parameters for designing of SCR system shall be as under:- 1) NOx at SCR Inlet (mg/Nm3 at 6% O2 on dry basis, keeping ammonia slip within the maximum limit): - Guarantee Point: Limited to 500 (shall be increased from actual level by adjustment of air staging and other measures) - Design Point: 500 2) SCR efficiency for control of NOx Emission (%) (keeping ammonia slip within the maximum limit): - Guarantee Point: 84 - Design Point: 84 (after 16000 operational hours) 3) Ammonia slip after last catalyst layer (ppm at 6% O2 on dry basis) be read as: - Guarantee Point < 3 - Design point < 2.5 4) NOx emission at SCR outlet shall not exceed 80 mg/Nm3 (with Ammonia Slip less than 3 ppm at 6% O2 dry basis) at the end of 16000 operation hours for range of coal(s) specified from 40% TMCR to 100% BMCR. *** Note: Following changes have also been incorporated in the Tender specifications: Functional Guarantees under category-I 1) In clause 3.1 (ix) at sheet 7 of 57, Chapter-8, Volume-II, figure "80%" shall be read as "84%". 2) In clause 3.1 (ix) (4th and last line of second stanza) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%". 3) In clause 3.1 (x) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%". Functional Guarantees under category-II In clause 4.1.1 at sheet 28 of 57, Chapter-8, Volume-II, "100 grams of NOx (from themal as well as fuel) per giga joule of heat input (at 6% O2 level and as per equivalent NO2) to the boiler" shall be read as "80 mg/Nm3 (at 6% O2 level and as per equivalent NO2)". Functional Guarantees under category-III 1) In clause 5.12 at sheet 31 of 57, Chapter-8, Volume-II, "2.5 ppm" shall be read as "3 ppm". 2) Clause 5.14 at Sheet 31 of 57, Chapter-8, Vol-II stands deleted.
727	Volume III Mechnical	Section 2 : Design Basis of SG & Auxiliaries and SCR/Ch 1: SG & Auxiliaries/Vol-III	155 of 186	23.1.23, A), 4)	a) NOx at SCR Inlet (mg/Nm3 at 6% O2 on dry basis, keeping ammonia slip within the maximum limit) Actual but limited to Guarantee Point - 500mg/Nm3 Design Point - 500mg/Nm3		

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728	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages/Vol-II	17 of 57	3.6, (ii) c	Corrected flue gas temperature at air preheater outlet (at 55% & 100% TMCR) - 115Deg C or as predicted by the Bidder whichever is higher	Please note that discrepancy observed in the referred clause about the following parameters a. Flue gas temperature at air-heater outlet (corrected) - 115 Deg C or 125 Deg C b. boiler load - 55% TMCR & 100% TMCR or 100% TMCR & 105% TMCR Kindly clarify	Flue gas temperature at air preheater outlet at 55% TMCR shall be 115° C or as predicted by the Bidder whichever is higher. The same at 100% TMCR & 105% TMCR shall be 125 deg. C (min).
729	Volume III Mechnical	Section 2 : Design Basis of SG & Auxiliaries and SCR/Ch 1: SG & Auxiliaries/Vol-III	39 of 186	1.7	(2) Flue gas temperature at air-heater outlet (corrected) at TMCR (800 MW) load & 105% TMCR load - 125 Deg C		
730	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages/Vol-II	17 of 57	3.6, (ii) c	c. Unburnt fuel at all efficiency load at 105% & 100% TMCR load - 1.0 % (min)	Loss due to unburnt carbon shall be as per bidder predicted value instead of 1%(minimum). Kindly confirm the same. Further bidder requests to keep the description of the cl.no 3.6, (ii) same as cl.no 1.7 for better clarity	Bid specifications to be followed.
731	Volume III Mechnical	Section 2 : Design Basis of SG & Auxiliaries and SCR/Ch 1: SG & Auxiliaries/Vol-III	39 of 186	1.7	(3) Loss due to unburnt carbon in ash at all loads - 1% (minimum) or the quoted value whichever is higher		
732	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages/Vol-II	18 of 57	3.7 g	The guaranteed steam generator efficiency shall be without any heat credit.	Bidder shall guarantee steam generator efficiency as per ASME PTC 4, considering heat credit(if any), as applicable in code(ASME PTC 4)	Bid specifciations to be followed.
733	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages/Vol-II	18 of 57	3.7 i	Correction to tested efficiency shall be applicable for variation in following parameter only:	Corrections applicable for steam generator tested efficiency shall be considered as per ASME PTC 4	
734	Volume II General & Schedules	Ch 9 : Mandatory Spares	Sheet 8 of 103	10	**Coal Burners/Coal Pipe Bends** a) Coal compartment assembly - 1 set** d) Coal nozzle castings - 1 set** e) Adjustable coal nozzle tips - 1 set**	Bidder clarify that requirement for replacing whole Coal compartment assembly may not arise as operational life of Coal nozzle and adjustable Coal nozzle tips differ. Replacing whole compartment may not be the best practice in-terms of effective utilization of spares. Bidder request customer may check the actual spare utilization practice across the industry and to omit the Coal Compartment assembly from the spares list .	Bid specifciations to be followed.
735	Volume II General & Schedules	Ch 9 : Mandatory Spares	Sheet 14 of 103	-	Air & Gas Duct Dampers (for each type & size) a) Complete dampers along with drives - 1 no. b) Gasket - 1 set c) Nut & bolts - 1 set	a) Note that Mandatory spare for complete dampers along with drives -1 nos are not envisaged. b) Note that Damper to duct shall be seal welded to avoid air/gas leakage/Ingress due to high pressue.hence gasket is not envisaged. c)Noted. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however the requirement of Air Duct damper alongwith drive is deleted.
736	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 18 of 186	1.15.10	On line fuel measurement facility for accurate measurement of coal mass flow rate/air fuel ratio in each pulverized fuel (PF) pipe for coal pulveriser. The equipment shall comprise of sensors working on micro wave technology. The error in measuring. For the purpose of the above fuel measurement, each PF pipe shall be provided with two no's of tapping points of suitable size, with necessary plugs/dust proof dummies etc. as required.	On-line adjustment for equalizing the flow through the coal pipes is not feasible as reliable adjustable orifices are not available. Accordingly, fixed ceramic-coated orifices are provided. The fixed orifices are selected to achieve the equalization in the fuel pipes based on design stage calculation. Since on-line adjustment for equalizing the fuel flow through pulverized coal pipes is not possible, on-line flow measurement does not provide any improvement. The reliability and capability of the measurement devices are also not known and the number of vendors is very limited. Hence measurement using microwave technology and variable orifice, etc., is not envisaged.	Bid specifications to be followed.
737	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 18 of 186	1.15.11	Adjustable valve/orifice of erosion resistant/ceramic coated material suitable for highly abrasive pulverised coal applications. The adjustable valve/orifice shall be provided on each P.F. pipe at pulveriser outlets and shall enable onload adjustment of coal flow in PF pipelines.		
738	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 18 of 186	1.15.8.1	Rota probe type coal sampling system for obtaining samples from PF outlets of all the mills using the methods specified in ISO 9931 "Coal sampling of pulverized coal conveyed by gases in direct fired coal system". The minimum number of coal sampling systems to be provided for steam generator & shall be equal to at least the number of PF pipe outlets from one coal pulveriser.	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.	Bid specifications to be followed.

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739	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 23 of 186	1.2	A garbage chute of minimum 600 mm diameter and made from minimum 10 mm thick mild steel pipe shall be provided for Steam Generator.	A garbage chute of minimum 500 mm diameter and made from minimum 5 mm thick mild steel pipe shall be provided for Steam Generator. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
740	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 29 of 186	1.29.6.1	iii) SCR reactor shall include, but not limited to the following: a) Inlet and outlet hood with guide vanes.	iii) SCR reactor shall include, but not limited to the following: a) Inlet hood and outlet duct with guide vanes, if required, as per bidder's standard and proven practice. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed. However, the issue may be discussed during detailed Engineering.
741	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 48 of 186	3.0	l) Furnace Bottom hopper Design of Boiler and its supporting structure shall be considering 50% ash/clinker loading in furnace bottom hopper and corresponding to ash density of 1600 Kg/M3.	Furnace bottom hopper Boiler and its supporting structure shall be designed as per bidder's standard and proven practice and corresponding to ash density of 1600Kg/m3. Customer is requested to kindly confirm acceptance to our request.	For design of Boiler and its supporting structure, ash density of 1350 kg/m^3 shall be considered instead of 1600 Kg/m^3.
742	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 53 of 186	4.0	b) The casing/pent house and its supporting system shall be capable of taking additional loads due to accumulations of ash upto 300 mm height or actual expected (in between two overhauls of the unit), whichever is higher. This additional load is over and above other loads considered for casing design. The ash density for the purpose of ash loading shall be at least 1600 kg/m^3.	The casing/pent house and its supporting system shall be designed as per bidder's standard and proven practice. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
743	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 77 of 186	10.5	**XIX. For pulverized coal sampling for fineness and distribution:** a) Provide tapping points on each PF pipe at mill outlet suitable for coal sampling as per ISO 9931. b) Ensure that the coal sampling provisions are complete with screwed plugs, compressed air purging connections at tapping points, heating arrangement and other requirements as required for ISO 9931 sampling. c) Provide Rota Probe for coal sampling as per ISO 9931 and ASME respectively. Four (4) nos. Dirty Pitot tubes shall be provided for each steam generator for measurement of coal-air velocity in coal pipes. d) Provide convenient approach/access for above coal sampling/measurement points, from nearest platform floor.	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.	Bid specifications to be followed.
744	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 79 of 186	10.6	**Pulverised Coal Pipes** xvi. Suitable devices shall be provided in each pulverized coal pipes to enable on load adjustment for equalizing flow.	Bidder understands that Adjustable orifice are not applicable if coal flow monitoring system is not being provided. However, in place of adjustable orifice bidder will provide fixed orifices as per OEM's proven practice.	Bid specifications to be followed.
745	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 79 of 186	10.6	**Pulverised Coal Pipes** xiii. The straight unlined PC pipe length shall be of mild steel having a thickness not less than 13 mm with a minimum wear allowance of 4 mm.	Bidder clarifies that 13 mm thickness is not the standard thickness as per IS codes for Piping. Bidder will provide 12.7 mm thick Unlined PC pipe which is sufficient for the application/process parameters as specified in all the relevant tender clauses. Also Bidder has supplied unlined coal pipe with 12.7 mm thickness in 19 units of 660 MW and Bidder requests customer to accept 12.7 mm thickness.	Noted
746	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 86 of 186	11.3	**Fuel Oil Preparation and Firing System** **3. The Light Diesel Oil (LDO) firing system, shall have following design features:** (b) For all in line items on fuel oil lines like pumps, flow meters, filters, control valves etc., required to be taken out for maintenance, following shall be provided both upstream and downstream sides: (1) Single isolation valve up to suction of pressurizing pumps. (2) Double Isolation valves from discharge onwards of pressurizing pumps	Bidder proposes to provide Single isolation valve from discharge onwards of pressurizing pump as per Tender Drawing (Flow Diagram LDO Firing System- 111-11-1301). Moreover, as per Bidder's and common industry practice Single isolation valve is being provided in the Fuel Oil system.	Single Isolation Valve shall be considered for pressure below 40 kgf/cm2.
747	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 89 of 186	9	**Fuel Oil Preparation and Firing System** d) Oil gun cleaning station and the facility for blow off of the oil guns using **auxiliary steam** at each firing floor. For this purpose auxiliary steam tapping with necessary isolation valves and necessary hose connection shall be provided.	Bidder will provide the cleaning station with Compressed Air tapping for Oil Gun cleaning purpose as the fuel oil is LDO. It may be noted that auxiliary steam is required for Heavy Fuel Oil Guns. Bidder request the customer to accept the compressed air cleaning medium.	Noted
748	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet 91 of 186	11.4	**Fuel oil drain & condensate system** **II. Piping fitting and valves in fuel oil (LDO) firing system:-** **Type of valves (for oil services)** Plug type (metallic seated), leak proof, fire safe as per the requirement of API 6FA	Bidders proposes to provide Firesafe soft seated ball valves for the fuel oil application as per bidders proven practice and it has been working satisfactorily in 11 Units of 660 MW. Bidder is experiencing huge difficulty in executing on going projects in terms of schedule and delivery due to unavailability of reliable vendors. Hence, Bidder requests to accept Fire safe soft seated ball valve for the fuel oil application.	Bid specification to be followed. However, the issue may be discussed during detailed Engineering.

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749	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	98 of 186	13.1/II.c	Horizontal ducts to be designed for minimum 245 kg/m² additional fly ash loading on the surface or for one fourth of duct full of ash or for maximum possible accumulation of ash in the ductwork, under all normal, upset or abnormal operating conditions, whichever is higher. For flue gas ducts downstream of ESP, additional fly ash loading on the surface or for one tenth of duct full of ash or for maximum possible accumulation of ash in the ductwork, under all normal, upset or abnormal operating conditions, whichever is higher. The ash accumulation considered for economizer bypass duct (if provided) upto Guillotine gate shall be 100% filled with ash. The ash density for the purpose of loading shall be at least 1600 kg/m3.	Based on bidder experience and proven practice , Flue gas ash loading shall be followed as as per bidder's standard practice ,Further The ash density for the purpose of loading shall be followed 1300 kg/m3 inline with executed projects. Customer is requested to kindly confirm acceptance to our request.	For design of Boiler and its supporting structure, ash density of 1350 kg/m^3 shall be considered instead of 1600 Kg/m^3.
750	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	98 of 186	13.1/III	All flue gas duct, air ducts and the wind boxes shall also be designed for +/- 660mmWC or maximum conceivable pressure of the relevant fans, whichever is higher, at 67% of yield strength of material.	Based on bidder experience, All flue gas duct, air ducts and the wind boxes shall also be designed for +/- 660mmWC at 67% of yield strength of material or maximum conceivable pressure of the relevant fans, whichever is higher. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
751	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	98 of 186	13.1/XI.a	Metallic type expansion joints suitable for the service conditions shall be provided. The expansion joint design shall conform to the requirements of the EJMA Standards.	Based on bidder experience and proven practice ,Bidder propose to use Non-metallic Expansion joint at all the locations. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
752	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	99 of 186	13.1/IV	Material of construction : (i) Duct plates, turning vanes perforated plates : ASTM A 36 or equivalent (For ducts operating above 400°C gas temperature, suitable Alloy Steel material shall be provided to Employer's approval) (ii) Structural shapes : ASTM A 36 or equivalent (iii) Pipe struts, trusses, bracing : ASTM A 53 or equivalent seamless steel pipe. (iv) Erection tools for ducts :ASTM A 307 or equivalent	Material of construction shall be as per IS standards : (i) Duct plates, turning vanes perforated plates : IS2062 Gr A/BR (ii) Structural shapes : IS2062 Gr A/BR (iii) Pipe struts, trusses, bracing : ASTM A 106 / IS1161 (iv) Erection tools for ducts :IS1367 -Gr 4.6	Bid specifications to be followed.
753	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	99 of 186	13.1/II.e	d) The following minimum load factors shall be applied to the design loads: Temperature (Deg C) 27 37 93 149 205 260 316 321 Loading factor 1.0 1.0 1.1 1.19 1.25 1.29 1.34 1.42	Kindly note that minimum Loading factor shall be applied inline with ASME code. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
754	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	99 of 186	13.1/III	Minimum 8 mm thick steel plates for gas ducts from APH outlet to ESP inlet.	Bidder propose to use 6 mm thick for Gas Duct inline with executed reference projects. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
755	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	101 of 186	13.1/XI.g	The expansion joints shall be tested as per requirements specified elsewhere in the Technical Specification.	The expansion joints shall be tested as per OEM's recommendation. Critical Expansion joint (1 qty) shall undergo performance testing inline with executed reference. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
756	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	105 of 186	13.2 /XI	Components of regulating dampers coming in the flue gas path, including gas biasing dampers (if applicable), shall be made of erosion resistant material, having minimum life of 16000 hours.	These gates and dampers shall be made up of as per OEM's recommendations/ based on bidder experience and proven practice the requirement of erosion resistant material is not envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
757	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	106 of 186	13.2/XVI.b.vi	Stuffing boxes shall be provided on all damper blade shafts.	The requirement of Stuffing boxes arrangement if any, shall be designed as per OEM'S standard design. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
758	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	107 of 186	13.1/XVI.l	Attachment of all louvers to the dampers spindles shall be by means of key fittings.	The requirement of key fittings arrangement if any, shall be designed as per OEM'S standard design. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
759	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	127 of 186	23.1.3	2) i) The reactor casing shall be fabricated from all welded reinforced, 6 mm minimum thickness, carbon steel plates conforming to ASTM A36.	The reactor casing shall be fabricated from all welded reinforced, 6 mm minimum thickness, carbon steel plates conforming to ASTM A36 or equivalent. Customer is requested to kindly confirm acceptance to our request.	Confirmed.
760	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	128 of 186	23.1.3	d) The reactor load shall be transferred from the reactor side walls, equally distributed via springs and external slide bearing pads, to the supporting steel structure.	The reactor load shall be transferred from the reactor side walls, equally distributed via external slide bearing pads, to the supporting steel structure as per bidder's standard and proven practice. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed. However, the issue may be discussed during detailed engineering.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
761	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	128 of 186	23.1.3	iii) Design Pressure: The reactor shall be designed for ± 660 mmWC or maximum conceivable pressure of the relevant fans, whichever is higher, at 67% of yield strength of material used for reactor frame/stiffeners/plates.	The reactor shall be designed for ± 660 mm w.c at 67% of yield strength of material used for reactor frame/stiffeners/plates or maximum conceivable pressure of the relevant fans, whichever is higher. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
762	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	128 of 186	23.1.3	iii) The SCR reactor and its supporting system shall be designed for the following: a) Capable of taking additional loads due to accumulations of ash upto 150mm height above catalysts for each layer including future layer. b) Catalyst modules including the future layer 50% filled with ash and ash hopper (if applicable) filled up to the top of the hopper partition plane. This additional load shall be considered over and above other loads considered for reactor casing and frame design. The ash density for the purpose of ash loading shall be at least 1600 kg/m³. c) Reactor support frame for catalyst module shall be suitable for holding/supporting modules with height higher than originally envisaged by the Bidder. Additional height of the module shall be suitable to accommodate 10% higher catalyst volume. Accordingly, the reactor structure shall have 10% margin in the total weight of the modules.	The SCR reactor and its supporting system shall be designed as per bidder's standard and proven practice. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed. However, ash density of 1350 kg/m3 shall be considered only for designing of Boiler and its supporting structure.
763	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	128 of 186	23.1.3	iv) Flow straightener/ flow rectifier of suitable erosion resistant material shall be installed between the inlet hood of the reactor and the reactor housing for directing the flue gas perpendicular to the plane of the catalyst.	Based on bidder experience and proven practice the requirement of suitable erosion resistant material for flow straightener/ flow rectifier installed between the inlet hood of the reactor and the reactor housing for directing the flue gas perpendicular to the plane of the catalyst is not envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
764	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	129 of 186	23.1.3	vi) Each catalyst elevation shall be provided with grated platform inside the reactor housing to support and place the catalyst modules. The opening of the grating shall be sufficiently large to prevent ash pluggage / accumulation. The elevation of platform outside the reactor shall match the elevation of inside the reactor platform to facilitate the easy removal/placement of catalyst modules.	Based on bidder experience and proven practice the requirement of grated platform inside the reactor housing to support and place the catalyst modules for each catalyst elevation is not envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however, the issue may be discussed during detailed engineering.
765	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	139 of 186	23.1.6	9) Components of ammonia injection system exposed to flue gas stream shall be constructed from suitable grade of stainless steel.	Based on bidder experience and proven practice the requirement of stainless steel material for components of ammonia injection grid exposed to flue gas stream is not envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
766	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	136 of 186	12/III	These gates and dampers shall be made up of erosion resistant material. In addition to the above the Specification requirements for dampers elsewhere in the specification shall also be applicable for SCR.	These gates and dampers shall be made up of as per OEM's recommendations/ based on bidder experience and proven practice the requirement of erosion resistant material is not envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
767	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	154 of 186	23.1.23	A) 10) SCR Supporting Structure Considering additional load of following a) Ash accumulation of 150mm height above each catalyst layer including future layer b) Each layer plugged with 50% ash including future layer c) Ash hopper completely filled with Ash	The SCR reactor and its supporting system shall be designed as per bidder's standard and proven practice. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed. However, ash density of 1350 kg/m3 shall be considered only for designing of Boiler and its supporting structure.
768	Volume III Mechanical Works	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	39 of 59	26.6.33	**INSULATION MATERIALS**	Please also add following notes under existing table for latest/better application practice and layout optimisation. **<u>Note-1</u>** Application of insulation on Steam Generator and other flat surfaces and equipment. Insulation to various areas shall be applied as under. (a) SG surfaces, hot air & gas ducts - Mineral wool block/Mineral wool blankets (b) All other surfaces/not enclosed by SG casing - Calcium silicate block or as per (a) above **<u>Note-2</u>** For piping systems with operating temperature 500 Deg.C and above, the first Layer of insulation shall be at least 75mm of Ceramic Fiber/ Biosoluble Fiber insulation, followed by subsequent layers of mineral wool can be used.	Bid specifications to be followed.
769	Volume III Mechanical Works	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	52 of 59	26.6.55	**Primer/painting schedule**	There is discrepancy in information given for structural painting scheme. Customer is requested to kindly inform the clause which is required to be followed for structural items.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
770	Volume VI Civil, Structural & Architectural Works	Ch 07: Material	Sheet | 1 of 2	7.1	Complete hopper including vertical and conical portion of bunker in mill building shall be provided with lining of atleast 6mm thick SS plate grade SS 316L .	Bidder proposes to consider Lining to be provided in only conical portion of bunker in mill building. And Lining will be of 4 mm thickness of SS plate grade SS304. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed. Thickness of plate be considered is 5 mm.
771	Volume VI Civil, Structural & Architectural Works	Ch 09: Steel Structure	8 of 28	9.9	**PAINTING** Finish paint shall be as follows:- a. All steel structures shall receive two primer coats and two finish coats of painting. First coat of primer shall be given in shop after fabrication before dispatch to erection site after surface preparation as described below. The second coat of primer shall be applied after erection and final alignment of the erected structures. Two finish coats shall also be applied after erection.	There is discrepancy in information given for structural painting scheme, Customer is requested to kindly confirm which one to follow for structural items.	Refer attached table for painting as Attachent-18.
772	Volume VI Civil, Structural & Architectural Works	Ch 11: Buildings Description	Sheet | 7 of 18	11.3	Stainless steel liners of thickness 5.14mm shall be provided in bunkers for the conical / hyperbolic as well as vertical portion of Bunker. The grade of SS liner shall be SS316L.	Bidder proposes to consider lining to be provided in only conical portion of bunker in mill building. Lining will be of 4 mm thickness of SS plate grade SS304. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed. However, the liner thickness shall be read as 5 mm.
Steam Generator & Associate Auxiliaries - Quality							
773	Volume II / Section-M1	Chapter 11	02 of 103	M1-2.0 (I) b	Each plate shall be subjected to a 100% normal ultrasonic at the mill to meet the minimum requirements of EN 10160 1999 / equivalent ASTM standards. Elevated temperature tensile tests shall also be carried out on plate material for each heat..	Bidder would like to clarify that Bidder usually use forged material as per pressure part schedule and design instead of plate material for water separator. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed Engineering.
774	Volume II / Section-M1	Chapter 11	02 of 103	M1-2.0 (I) g	All butt welds shall be subjected to 100% radiographic examination before stress relief.	Bidder proposes to use radiography/ PAUT/TOFD/Recordable UT Method for volumetric examination in line with Bidder's latest examination specification . TOFD/ PAUT also accepted by IBR. &ASME code case. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed Engineering.
775	Volume II / Section-M1	Chapter 11	02 of 103	M1-2.0 (I) k	After stress relieving (SR) all welds, all butt welds shall be subjected to 100% radiography.	Bidder proposes to use radiography/ PAUT/TOFD/Recordable UT Method for volumetric examination in line with Bidder's latest examination specification . TOFD/ PAUT also accepted by IBR. &ASME code case. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed Engineering.
776	Volume II / Section-M1	Chapter 11	03 of 103	M1-2.0 (II) b	All butt welds shall be subjected to RT examination. Also MPI after SR.	Bidder proposes to use radiography/ PAUT/TOFD/Recordable UT Method for volumetric examination in line with Bidder's latest examination specification . TOFD/ PAUT also accepted by IBR. &ASME code case. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed Engineering.
777	Volume II / Section-M1	Chapter 11	03 of 103	M1-2.0 (II) c	All full penetration nozzle and attachment welds shall be subjected to UT prior to stress relieving.	Bidder suggest UT shall be performed considering Nozzle Size ID More than 250 mm. Bidder would like to clarify that maximum area shall be covered. Some location full coverage not possible due to nearby Stubs, Hole, opening or nozzle. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed Engineering.
778	Volume II / Section-M1	Chapter 11	03 of 103	M1-2.0 (II) d & e	All nozzles, branches, stubs and load bearing attachment shall be examined by MPI techniques after the toes of the weld have been ground smooth and stress relieved Non-load bearing welds shall be examined by MPI techniques after the toes of the welds have been ground smooth and stress relieved.	Bidder proposes to use MT or PT. Wherever MPI (MT) is not feasible / practically impossible due to size limitation, location and joint configuration to conduct MPI(MT), PT shall be performed. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed Engineering.
779	Volume II / Section-M1	Chapter 11	03 of 103	M1-2.0 (III) c	All tubes/stubs/panels/coils shall be checked for clearance by steel ball test and for cleanliness by sponge passage.	For Steel Ball & Sponge test of Panels, there are constraint due to Y-pieces, Riffle tubes, 3-Dimensional Opening (3D) etc in WW panels. Bidder proposes to carry out Sponge & ball pass only for flat Panel & coils as per Bidder's standard practice. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed Engineering.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
780	Volume II / Section-M1	Chapter 11	04 of 103	M1-2.0 (III) f	Tubes and fabricated panels/coils shall be subjected to hydraulic pressure test excluding loose tubes but including burner panels, reheaters, superheaters & economizers.	Bidder proposes to perform the hydrotest on critical burner panel -100 % and 10 % for other water wall panels, Reheater, Economiser, super heaters & hydro test shall be excluding loose tubes and coils without butt joints. Customer is requested to kindly confirm acceptance to our request.	Noted.
781	Volume II / Section-M1	Chapter 11	04 of 103	M1-2.0 (IV) c	All bent pipes shall be checked for ovality and thinning by UT on first off lot & on random samples for subsequent pieces. Outer surface of bends shall be subjected to MPI/LPI.	Bidder proposes PT/MT on bend area for Hot Bends only as Per Bidder's standard practice. Bidder does not envisage PT/MT for Cold bends of pipes. Cold bending PT/MT will increase lead time. Based on past executed projects for Central and State Utilities in which zero indication were observed. Bidder propose to check ovality and thinning 100 % of production bend pipes. Eliminate the first off lot for bend piping as bidder has established bending parameters data and system to control the required dimensions. Customer is requested to kindly confirm acceptance to our request.	Noted.
782	Volume II / Section-M1	Chapter 11	04 of 103	M1-2.0 (IV) d	The edge preparation for shop and site welds in stainless steel /alloy steel shall be subjected to a dye penetrant check. Non-destructive examination of welds shall be carried out after post weld heat treatment, if any	Bidder have not envisaged PT for the edge preparation for shop and site weld in SS and alloy steel.100 % MT/PT for all WEP of SS & AS Pipes. Bidder uses 100% UT tested pipes and at shop WEP is carried out at sophisticated CNC machines & followed by visual inspection. WEP of pipes are done through Machining only. Gas cutting and grinding process is not used. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
783	Volume II / Section-M1	Chapter 11	06 of 103	M1-2.0 (VI) c	Color matching of valve disc/plug and seat shall be carried out to ensure min. 80% contact and no through passage.	Since all valves are checked for leakage test as per next 2 clauses, bidder do not envisaged requirement of color mathing check. Customer is requested to kindly confirm acceptance to our request.	Noted.
784	Volume II / Section-M1	Chapter 11	07 of 103	M1-2.0 (VI) III a	Butt weld between nozzle and lance tube shall be subjected to 100 % radiography tests.	Bidder requests to consider quantum as 20% for RT. Customer is requested to kindly confirm acceptance to our request.	Noted.
785	Volume II / Section-M1	Chapter 11	09 of 103	M1-2.3 b	Butt welds in rotor components shall be 100% RT	Butt welds in rotor components shall be 100% RT / UT. Customer is requested to kindly confirm acceptance to our request.	Noted.
786	Volume II / Section-M1	Chapter 11	09 of 103	M1-2.3 d	Test for natural frequency of all fan components, including fan blades shall be carried out for ID, FD, GR & PA Fans.	Test for natural frequency is applicable only for PA /ID/FD fan blades and shall be performed. This is as per existing industry practice. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
787	Volume II / Section-M1	Chapter 11	09 of 103	M1-2.3 f	Performance Test shall be carried out for each ID/FD/PA/GR Fan instead of one (1) for each type and size.	As per existing industry practice, performance test is carried out on 01 number per type of ID/FD/PA fan. Bidder proposes to above practice for this project also. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
788	Volume II / Section-M1	Chapter 11	09 of 103	M1-2.4 d	Full range performance test shall be carried out as per BS 848, Part-1.	Please note that BS 848, Part 1 is now withdrawn and replaced by BSEN ISO 5801. Bidder proposes to perform testing as per BSEN ISO 5801 or equivalent. Customer is requested to kindly confirm acceptance to our request.	Latest standards to follow.
789	Volume II / Section-M1	Chapter 11	10 of 103	M1-2.5 (i)	Raw material for shaft, coupling, gears and pinions, top and bottom races and other rotating components shall be subjected to UT. MPI/LPI shall be carried out to check surface soundness	Forged shafts used in Roller Journal Assembly / Tensioning Parts Assembly shall be subjected to UT & MPI, as applicable, during stages of production. However, Shaft, Coupling, Gears & Pinions, Top & Bottom races and other rotating components are the part of bought-outs viz., Gear Box with Lubrication units, Hydraulic Tilting Device, Roller Loading Device etc. These are compliant to supplier internal quality norms & no reports for UT/MPI/LPI will be produced. Customer is requested to kindly confirm acceptance to our request.	Bid specificationd to be followed, however the issue may be discussed during detailed engineering as per OEM practice.
790	Volume II / Section-M1	Chapter 11	10 of 103	M1-2.5 (ii)	Wear-resistant parts shall be UT/ RT tested to check soundness after suitable heat treatment. Check for chemical composition, hardness and microstructure shall be carried out. For ceramic materials check for various properties including hardness, density, wear rate and composition shall be carried out	Wear resistant parts viz. Roller Liners (Roller Journal Assembly) & Table Liners are composites comprising of SG Iron & Hi chrome material. For such composite material, UT/RT/MPI is technically not feasible. However, LPI shall be conducted to ensure surface integrity. LPI acceptance norms will be as specified by the OEM specification. Customer is requested to kindly confirm acceptance to our request.	Bid specificationd to be followed, however the issue may be discussed during detailed engineering.
791	Volume II / Section-M1	Chapter 11	10 of 103	M1-2.5 (iii)	Butt welds in the tube/ separator /body casing of the mill shall be tested by RT and MPI. All other welds in main tube/separator shall be tested by MPI/LPI for acceptance. The tube shall be statically balanced.	The separator & body casing of the mill are non pressure part components and hence butt welds shall be subjected to UT and LPI after PWHT, as applicable. The same inspection methodology was followed in NTPC various projects for Central and State Utilities etc. Customer is requested to kindly confirm acceptance to our request.	Bid specificationd to be followed, however the issue may be discussed during detailed engineering.

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792	Volume II / Section-M1	Chapter 11	10 of 103	M1-2.5 (iv)	All gearboxes shall be run tested for adequate duration to check rise in oil temperature, noise level and vibration. Check for leak tightness of gear case also shall be performed.	Trial run duration shall be as per OEM specification. Oil leakage shall be checked during no load trial run test at supplier's works. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
793	Volume II / Section-M1	Chapter 11	10 of 103	M1-2.5 (v)	Fabricated pipe welds should be examined by MPI.	In case of Pulveriser mill, pipe welds are applicable only for Lower housing –seal air piping arrangement. This is a low pressure piping & hence LPI is proposed. Customer is requested to kindly confirm acceptance to our request.	Noted
794	Volume II / Section-M1	Chapter 11	10 of 103	M1-2.5 (viii)	Trial assembly (stacking) of atleast two Mill complete with all major components needs to be carried out at shop	At shop, only one mill will be trial assembled with 01 no. Grinding Table Assembly, 01 no. Roller Journal Assembly, 01 no. Lower Housing Assembly and 01 no. Middle Housing Assembly. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
795	Volume II / Section-M1	Chapter 11	10 of 103	M1-2.3 f	Test for weighing accuracy, calibration and repeatability shall be carried out at various speeds by a coal flow on two feeders.	Bidder will submit type test report for Customer's review for similar type/rating coal feeder. Customer is requested to kindly confirm acceptance to our request.	Test for weighing accuracy, calibration and repeatability shall be carried out at various speeds by coal flow on one feeder and submit reports.
796	Volume II / Section-M1	Chapter 11	11 of 103	M1-2.7 c	All pumps including spare cartridges shall be subjected to performance test at the manufacture's works under as near site conditions as possible and strip down examination after the test.	Strip test shall be performed in case of abnormal sound / vibration observed during run test. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
797	Volume II / Section-M1	Chapter 11	12 of 103	M1-2.11 a	Only material which has been identified against mill sheet or test certificates shall be used for construction. Structural steel and built up plate girders for main boiler shall be fully killed fine grained and normalised. All plates of tension and compression flanges and connection material and plates above 40mm thickness shall be 100% ultrasonically tested.	Only material which has been identified against mill sheet or test certificates shall be used for construction. Structural steel and built up plate girders for main boiler shall be fully killed. Plates beyond 12mm thickness shall be normalized rolled. All plates of tension and compression flanges and connection material and plates above 40mm thickness shall be 100% ultrasonically tested. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
798	Volume II / Section-M1	Chapter 11	13 of 103	M1-2.13 (a)	Metallic Expansion Joint: Hydraulic pressure test shall be carried out on each pipe and expansion bellow.	Roof Penetration exp joint (small OD bellows)bellow Hydro test is not practical , LMB propose to perform air leak test in lieu of Hydro test. Roof Penetration expansion joint bellow Hydro test is not practical due to lesser thickness and size. As per Manufacturer's practice leak test is applied for small expansion bellows. Customer is requested to kindly confirm acceptance to our request.	Noted.
799	Volume II / Section-M1	Chapter 11	16 of 103	M1-5.1, I, c	POWER CYCLE PIPING: The edge preparation for shop and site welds in stainless steel /alloy steel shall be subjected to a dye penetrate check.	Bidder has not envisaged PT for the edge preparation for shop and site weld in SS and alloy steel. 100% MT/PT for all WEP of SS & AS Pipes. Bidder uses 100% UT tested pipes and at shop WEP is carried out at sophisticated CNC machines & followed by visual inspection. WEP of pipes are done through Machining only. Gas cutting and grinding process is not used. Customer is requested to consider our request and confirm acceptance.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
800	Volume II / Section-M1	Chapter 11	16 of 103	M1-5.1, I d	Pipe bend shall be checked for ovality and thinning by ultrasonic or other acceptable methods on first off lot & on random samples for subsequent pieces for high pressure applications. Outer surface of bends shall be subjected to magnetic particle examination/LPI.	Bidder proposes PT/MT on bend area for Hot Bends only as Per Bidder's standard practice. Bidder does not envisage PT/MT for Cold bends of pipes. Cold bending PT/MT will increase lead time. Based on past executed projects for Central and State Utilities in which zero indication were observed. Bidder propose to check ovality and thinning 100 % of production bend pipes. Eliminate the first off lot for bend piping as bidder has established bending parameters data and system to control the required dimensions. Customer is requested to kindly confirm acceptance to our request.	Noted.
801	Volume II / Section-M1	Chapter 11	18 of 103	M1-5.1, V, c	Color matching of valve disc/plug and seat shall be carried out to ensure min. 80% contact and no through passage	Since all valves are checked for leakage test as per next 2 clauses, bidder do not envisaged requirement of color mathing check. Customer is requested to kindly confirm acceptance to our request.	Noted.
802	Volume II / Section-M1	Chapter 11	18 of 103	M1-5.1, VI,a	Hydraulic pressure test shall be carried out on each pipe and expansion bellow.	Customer is requested to note that bidder will perform air leak test in place of hydrotest for metallic expansion joint/below for piping. It is not possible to perform hydraulic pressure test for small metallic expansion joint. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
803	Volume II / Section-M1	Chapter 11	-	-	Wherever UT is mentioned as NDT test	Bidder requests Customer to kindly consider PAUT as an option to UT / RT (PAUT also accepted by IBR & ASME code case). Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed engineering.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
804	Volume II / Section-M1	Chapter 11	-	-	Wherever MT is mentioned as NDT test	Bidder requests Customer to kindly consider PT in place of MT for this test. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
805	Volume III Mechanical Works _____ Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries _____ Ch 1: Steam Generator & Auxiliaries	28 of 186 _____ 122 of 186	1.29 _____ 23	Selective Catalytic Reduction System (SCR) 1.29.1 The scope of supply include design, engineering, manufacture, supply, erection, commissioning and testing of complete mechanical, electrical, C&I and associated civil foundation and structural work for Selective Catalytic Reduction (SCR) System along with ammonia unloading, storage and handling system, Cyclone Separators complete in all respects with all components and accessories etc., for one (1) steam generator as detailed in this specification. _____ SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM AND AUXILIARIES	Bidder request Owner to consider Steam Generator without SCR in present scope of work. Owner may please ask separate optional quote to make the above system SCR ready. Owner may please finalise the decision regarding SCR ready boiler within 2 months from the award of the project.	Bid specifications to be followed.
Control & Instrumentation							
806	Volume-V/ Part-A	S. No. 1	19 of 96 9 of 11 9 of 11 11 of 11	16.01.00 20.09.01 20.09.06 20.10.02	Bidder shall supply high standard State-of-the-art Documentation Management system as per Vol. V, Part B, and Chapter no.20. Minimally DMS shall facilitate Seamless integration with leading SAP,ERP and CRM solutions, Smart search function to make retrieval of information convenient, Consistent Workflows, Reliable data security irrespective of volume and capacity. DMS shall store documents, as to share them online with team members for convenient editing, and track changes in the document. Necessary permissions and restrictions shall be attributed for each document type as per the Owner's prior approved sensitivity rules and documentation policies to be finalized by Owner during implementation stage One no. (1) Server with One no.(1) work-station and bulk storage (min 10TB), One no.(1) Industrial grade Colour laser printer cum scanner (of paper handling capacity upto A3 size) with printer cartridges, papers, accessories along-with four sets of print cartridges and eight ream of papers , One no.(1) A0 size coloured plotter The system shall have facility to store bulk data for 15 years duration with facility for retrieval of the same. All software user licenses shall be valid for entire life of power plant.	a) Bidder proposes to consider Bidder's Document Management System- PowerDocs, which is an Enterprise level Project collaboration and Document Management System that has been implemented in over 25 power projects executed by L&T. The system has the capability to store and retrieve documents having powerful search capabilities, revision control, access control, notification & QR code in drawings/documents for easy revision tracking. PowerDocs manages sharing of documents among various internal and external stakeholders through different review cycles. The work area for all stakeholders are managed through access control. Summary of features: -Web Based – Internet & LAN -Access Control -Search/Advanced Search -Email notification -Revision Control -Audit trail -QR code for drawings/Documents -Document stored in File System With the use of above system, separate hardware & perpetual licenses are not required to be considered at Customer end. Hence server, workstations, printer cum scanner, plotter, UPS, perpetual licenses shall not be required and will not be considered in Bidder's scope. Please confirm. b) Bidder shall submit and maintain all documentation through PowerDocs till Final taking over of the project. PowerDocs shall be operational till final taking over of 1x800 MW Yamunanagar project. At the time of final taking over, the soft copies of all the final As-built documents/drawings in a structured fomat shall be handed over to Customer in a hard disk for future use.	Document Management System stands deleted. Soft copies of all Drawings and documents including all revisions shall be uploaded in the bidder's Document Management System by giving access to the owner. Bidder shall handover the entire documentation including all revisions before FTO in 6 HARD DRIVES; five (5) to HPGCL and one (1) to DESEIN. Hard copies shall be submitted during the engineering stage as per the distribution schedule attached in Chapter 2 of Volume II. Minimum 30 nos users are required to access bidders software.
807	Volume-V/ Part-B	Chapter 20	1 of 11 9 of 11 10 of 11	20.02.03 20.08.03 20.10.00	The Bidder's involvement needs to be spread across a period of 120 months from the date of Letter of Intent (LOI) and implementation at all the locations. All software provided shall necessarily include the cost for perpetual license(s) for use on all the machines and an Annual Maintenance Contract (AMC) which shall include software upgrades as & when released by the software agency for a period of ten (10) years from date of receipt of LOI (Letter Of Intent). Document Management System solution for all the documents collected at Owner's Office in respect of approval process for academic year 2022-23.Expected number of documents is approximately 1 Lac.Phase-I shall be completed within 30 days from the date of LOI.	a) Bidder wish to clarify that Bidder's involvement will be limited up to Final Taking over (i.e 52 months from LOI). Please confirm. b) Bidder request Customer to clarify "at all the locations" where Document Management system to be implemented. c) Bidder's scope for Documentation Management shall be limited to '1x800 MW Yamunanagar' project only. Document Management other than proposed power plant shall not be in Bidder's scope . Please confirm.	
808	Volume-V/ Part B	Ch 2: Field & Measuring Instruments	34 of 64	2.13.00	Capacitance types for oil and dirty medium, water, condensate application. Float type for applications as decided by owner during detailed engineering.	Bidder would like to clarify that Float type level switches are proven for Plant Drain application. Hence Bidder shall follow the same for Plant drain system.	Bid specifications to be followed.
809	Volume-V/ Part B	Ch 2: Field & Measuring Instruments	25 of 64	2.12.01	The accuracy of the each flow element shall be + 0.5% or better.	Bidder would like to clarify that accuracy for Orifice & Flow Nozzle shall be subject to availability of straight length at both upstream and downstream of flow element, which may not be practically feasible. Hence, Bidder proposes to consider accuracy of flow element (Flow orifice/flow nozzle) as +/- 2%. Please confirm.	Bid specifications to be followed.
810	Volume-III	Ch 24 : Fire Detection, Alarm & Protection System	61 of 66	G.1	Features of Main Fire Alarm Panel Redundancy in CPU(Hot)	Bidder would like to clarify Hot redundant CPU for Fire Alarm Panel is not available with Major Fire alarm panel Vendors. Bidder request to relook this requirement and revise the same as Non-redundant CPU.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
811	Volume-III	Ch 24 : Fire Detection, Alarm & Protection System	63 of 66	E	Operating temperature: Programmable type, with combination of fixed temperature and Rate of Rise in temperature	The operating temperature of LHS cable is fixed while designing cable. Therefore , Bidder request to delete the requirement "Programmable Type" for LHS cable. Please confirm.	Noted.
812	Volume-III	Ch 24 : Fire Detection, Alarm & Protection System	43 of 66	24.4.8.2.a 24.4.8.3.f	Contact rating of 10 Amps. at 240V A.C. or 0.5 Amp. at 220V DC is required to operate different circuits Number of contacts for the auxiliary contactor/relay shall be 4NO + 4NC. The contact rating of each such auxiliary contactor/relay shall be of 10 Amps. at 240V A.C. or 0.5 Amp. at 220V D.C.	Bidder would like to clarify 10A contact rating is not required to operate circuits. Therefore Bidder shall ensure contact rating suitable to operate different circuits. If the same is not available then suitable auxiliary contactor/relay shall be considered. The number of contacts shall be as selected as per requirement.	Bid specifications to be followed. However, number of contacts for auxilliary contactor / relay be read as 2 NO+2 NC instead of 4 NO+4 NC.
813	Volume-V/ Part B	Ch 14: Annexure-A Control System for BOP/Offsite Packages	2 of 12	Sl.No. 5	Stand-alone floor mounted Fire Alarm panel shall be provided at different location in plant like each at CCR, ESP control room, CHP control room, AHP control room, WTP (DM plant control room), FO handling Plant control room etc. and at any other location as mentioned in the technical specification Vol-II.	Bidder would like to clarify , location and Quantity of Stand-alone floor mounted Fire Alarm panel shall be finalized as per Plant layout during detail engineering.	Bid specifications to be followed.
814	Volume-III	Ch 11: Effluent Treatment Plant	Sheet | 7 of 23	11.5	Control Philosophy Main ETP CMB sump pumps along with UF/RO module shall be controlled from Plant water system PLC. For all the local sumps located at different locations in the plant, local control panels with PLC based hardwired logic shall be provided.	Bidder request to clarify that ETP control shall be implemented in water system DDCMIS as a separate Functional group. No separate control system shall be considered for ETP inline with NTPC tenders. Also Bidder would like to clarify that Local control panel (if applicable) shall be as per OEM design. Main Plant PLC requirements shall not be applicable for Local Control panel. Request to confirm the same.	For ETP control, follow Annexure-A (Sr. No.23), Sheet-8 of 12, Part-B, Chapter-14, Vol-V
815	Volume-III	Ch 25 : Air Conditioning & Ventilation System	19 of 36	25.7.8.3	Controls: The controls shall be of **microprocessor based programmable** with PID (Proportional, integral and derivative control logic) controller. The controller shall have……	Bidder understands Precision Package AC Unit controls shall be from Machine mounted Microprocessor based Programmable controller. If Strip heater/humidifier integral part of AC Unit then it shall also be controlled from Microprocessor based Programmable controller. If If Strip heater/humidifier is not integral part of AC Unit, then it shall be controlled from respective equipment Local panel as per OEM. Fire Damper shall also be controlled from Local Unit.	DDCMIS based controls shall be provided for HVAC (except split ACs and dry ventilation) in respective DDCMIS inline with the referred clauses of Volume-V, part-A. For service building, HVAC (except split ACs and dry ventilation) controls shall be PLC based inline with Volume-III, Chapter-25. For other non-plant buildings, HVAC (except split ACs and dry ventilation) control system shall be provided as per respective package OEM standard.
816	Volume-III	Ch 25 : Air Conditioning & Ventilation System	34 of 36	25.8 d.v 25.8 d.x 25.8 d.xi	AHU shall be started either from its local panel or from the main control panel of AC system by means of Remote/Manual selector switches Lamps shall be provided for indicating the status of each pump, compressor, fans etc. of AC system in the main and local panel. All the annunciation related to failure of equipments, tripping of equipments, source of failure / reason due to which the equipment is stopped / tripped, low & high limits of parameters such as level, temperature, pressure drop, pressure etc shall be provided for each pump, fan, compressor, AHU, PAC etc. in the respective panel.	Bidder would like to clarify that there is no Local panel for AHU. AHU shall be controlled and monitored from control system of respective AC system. Please confirm.	Bid specifications to be followed. However, the issue may be discussed during detailed Engineering.
817	Volume V, Part B	Ch14	21 of 22	14.24.00	RELAY BASED LOCAL CONTROL PANEL Panel shall be mounted on vibration dampers secured to steel frame on to the floor.	Floor mounted relay based local control panel indicated in tender specification. However Wall mounted relay based panel may also be acceptable. Further technical requirements of Relay based control panel shall be as per respective OEM Standards. Please confirm.	Bid specifications to be followed. However, the issue may be discussed during detailed Engineering.
818	Volume-III	Chapter-33 Layout requirements	4 of 11	Cl. No. 33.3.2 (vii)	SWAS room at 0.0M in TG building	Bidder request Customer to provide flexibility for locating SWAS room in ground floor at 0 meter in annex building, as per layout arrangement & space availability during detailed engineering stage. Please confirm.	Noted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
819	Volume-II	Ch 4 Provenness	32 of 42	6.2	The respective DDCMIS offered for BOP C&I, SG C&I and TG C&I application(s) shall be same or of same series which a) is operating successfully with control system (s) for any of the above application for a period of not less than one (1) year prior to the date of Techno-Commercial Bid opening in at least one (1) unit of a power station having rating of 660 MW or above and b) has been commissioned in at least one (1) unit of a power station having unit rating **660 MW** or above for respective application(s).	Bidder would like to clarify that requirement of 660 MW is restrictive and will reduce Vendor base. We propose to revise 660 MW requirement to 200 MW inline with latest NTPC tenders. In view of above, Bidder request customer to modify the referred clause as indicated below: "The Control system(s) offered for BOP C&I , SG C&I and TG C&I application(s) shall be same or of same series as that of the control system(s) for respective applications which has been commissioned in at least one (1) unit of rating **200MW** or above in a power station(s)." This is inline with NTPC executed projects as well as latest NTPC tenders. Extract of NTPC Talcher and NTPC Lara tenders are attached for ready reference.	In Clause 6.2 (a) & (b) of Ch-4 at Sheet 32 of 42 in Vol-II, the figure "660 MW" be read as "500 MW".
820	Volume-II	Ch 4 Provenness	32 of 42	6.3	Measuring instruments (primary & secondary), SWAS equipment offered for this package shall have at least one year's satisfactory operation prior to the date of Techno-Commercial bid opening in one power station having unit rating of 660 MW or above.	a) Bidder would like to clarify that under Measuring instruments (Primary and secondary) following items are considered inline with latest NTPC tenders : 1) Analyzers for Continuous emission monitoring system 2) Vibration Monitoring system 3) AAQMS b) Bidder would like to clarify that requirement of 660 MW is restrictive and will reduce Vendor base. We propose to revise 660 MW requirement to 200 MW inline with latest NTPC tenders. In view of above, Bidder request customer to modify the referred clause as indicated below: "CEMS, and Vibration Monitoring system offered for this package shall be same or of same series which should have been in successful operation for a period of not less than one(1) year in at least one(1) unit of rating 200MW or above in a power station." "AAQMS offered for this package shall be same or of same series which should have been in successful operation for a period of not less than one (1) year in at least one (1) power station." This is inline with NTPC executed projects as well as latest NTPC tenders. Extract of NTPC Talcher and NTPC Lara tenders are attached for ready reference.	In Clause 6.3 of Ch-4 at Sheet 32 of 42 in Vol-II, the figure "660 MW" be read as "500 MW".
821	Volume-II	Ch 4 Provenness	32 of 42	6.6	All other C&I equipment/ C&I system/Control systems/Sub systems and accessories etc., offered for this project shall have at least one year's satisfactory operation prior to the date of Techno-Commercial bid opening in one power station having unit rating of 660 MW or shall meet the provenness criteria/qualifying requirements indicated elsewhere in the specification	Bidder would like to clarify that there are various instruments in C&I system which are not critical in nature therefore provenness requirement shall be kept limited to following equipment/items: a) DDCIMS b) SWAS c) CEMS d) AAQMS e) VMS f)24 V DC modular charger g) UPS h) CCTV This is inline with NTPC executed projects as well as latest NTPC tenders. Extract of NTPC Talcher and NTPC Lara tenders are attached for ready reference.	Bid specifications to be followed.
Electrical							
822	Vol-IV	Chapter-1 (Electrical Scope of Work)	49 of 58	Cl. No. 1.39.00	63 A welding sockets shall be fed from respective 415 V Welding PCC.	Bidder understands that 63 A welding sockets shall be fed from respective 415V Welding receptacle distribution boards. Owner may please confirm.	Welding sockets shall be fed from Welding Distribution Boards having isolation transformer.
823	Vol-IV	Chapter-25 (Illumination System)	6 of 34	Cl. No. 25.08.03	Additionally, a maintenance factor shall also be considered to account for the fall of illumination due to ageing, pollution like dust deposit etc. Maintenance factors to be considered for various areas shall be as follows: Area Maintenance factor i) Air-conditioned indoor area 0.8 ii) Non-air-conditioned indoor area 0.7 iii) Dust prone indoor and outdoor areas 0.6	Owner is requested to clarify the following: 1. Any specific maintenance factor value requirement for CHP, Ash handling conveyor, Transfer Points, etc. 2. Maintenance factor for Boiler area	The maintenence factor shall be as follows:- Coal Handling area, Ash Handling Conveyor /Transfer Points etc : 0.5 Boiller Area : 0.6

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
824	Vol-IV	Chapter-25 (Illumination System)	6 of 34	Cl. No. 25.08.04	Reflectance Factor i. Dusty area such as conveyor galleries/tunnels, TPs/ Crusher House etc. = 50% ceiling, 30% wall, 10% floor. ii. Clear areas such as switchgear room / control room etc. = 70% ceiling, 50% wall, 10% floor. iii. Working plain = a) At conveyor walkway level. B) At building floor level.	Owner is requested to clarify that, if there is any specific reflection factor requirement for CHP, AHP, Transfer Points, etc.	Reflectance factor shall be as follows: CHP areas such as Bunker floor, TPs etc and AHP outdoor areas :- Ceiling :0.3 Wall :0.3 Floor :0.1
825	Vol-IV	Chapter-25 (Illumination System)	6 of 34	Cl. No. 25.08.04, (iii)	Working plain = a) At conveyor walkway level. B) At building floor level.	Requirement is not clear to Bidder. Owner may please elaborate on this.	Working plane height to be considered in Lighting calculations.
826	Vol-IV Vol-IV	Chapter-25 (Illumination System) Chapter-1 (Electrical Scope of Work)	10 of 34 35 of 58	Cl. No. 25.09.08 (ii) Cl. No. 1.25.09	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). Lighting panels shall have MCB with ELCB incomers and SPN outgoing feeders	There is discrepancy between referred clauses regarding incomer breaker type for lighting panel. Owner is requested to clarify which type of breaker shall be used for lighting panel incomer.	Lighting Distribution Board shall have 4 pole MCCB incomer & bus coupler and 4 pole MCCB outgoing feeder. Lighting panel shall have TPN MCB with ELCB incomer and SPN outgoing feeders. Further, there will be no fuses in Illumination System.
827	Vol-IV	Chapter-25 (Illumination System)	16 of 34	Cl. No. 25.09.20	24V Supply Module	Owner is requested to specify the areas, where 24V AC supply module is required.	Forty (40) Nos. to be considered. Location to be finalised during detailed engineering.
828	Vol-IV Vol-V	Chapter-25 (Illumination System) Chapter-6 (Supervisory Control Panels, Supervisory control Desks, Equipment Panels)	28 of 34 24 of 26	ANNEXURE –II (Illumination Levels) Sr no. 5 Cl. No. 6.20.08.1 & 6.20.08.2	ILLUMINATION FOR CENTRAL CONTROL ROOM 6.20.08.01 CFL based modular round ceiling light 6.20.08.02 CFL based modular Square (2'X2') ceiling light	There is discrepancy between referred clauses. Owner is requested to clarify which type of lighting fixture shall be used for Central Control room.	LED lights shall be used.
829	Vol-IV Vol-IV	Chapter-25 (Illumination System) Chapter-25 (Illumination System)	34 of 34 5 of 34	Note-4 Cl. No. 25.06.03(iii)	Fire Exit Sign 1 No. to be provided at all exits. Lighted Exit signs shall be provided and installed in the control room, switchgear room, relay room, maintenance areas.	Bidder understands that all exits shall be provided with 1 no. of fire exit sign in entire plant. Owner may please confirm.	Bid specifications to be followed.
830	Vol-IV	Chapter-1(Electrical Scope of Work)	18 of 58	Cl. No. 1.13.00 (11)	One (1) Set of Control and relay panel (for 220kV extension bays)	Bidder understands that we can combine control and relay panel as per standard practice followed by NTPC/other SEBs. Owner may please confirm.	Noted. Bidders can combine control & relay panel provided working space inside the panel is not compromised. Panel should be without overcrowding and cramping.
831	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	The existing Main Bus I and Main bus II and bus coupler bay have to be modified. The existing Quad Moose conductor rated for 2000A has to be increased to 4000A using suitable HTLS conductor so that the existing gantry structures can be used.	Quad moose conductor can carry current up to 4000A. So, bidder understands that there is no requirement of extra HTLS conductor. Owner may please confirm. Further, Bidder requests Owner to specify type of HTLS conductor if it is required.	Exisiting 220kV Bus Conductor is having rated capacity of 2000A which is to be increased to 4000A by replacing the bus conductor with suitable HTLS type condutor . Mass(Kg/Km),Size, DC resistance should be less than or equal to exisiting conductor while UTS/weight ratio should be better than exisiting conductor so that the existing gantry structures can be used.
832	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	The existing bus bar protection scheme panel has provision for adding two (2) additional 220 kV bays and implement of unit bus bar protection scheme of additional 220 KV Bays are in the scope of EPC Bidder.	Bidder understands that there is no additional requirement of busbar protection panel with numerical relay for new 220kV bays. Owner may please confirm.	There is no additional requirement of busbar protection panel for new 220kV bays. Bidders is to integrate /add the new 220kV Bays in the exisiting Bus Bar Protection Scheme. In case any auxiliary relays, cables, hardware or software required for this integration or any addition/alteration needed that will be in Bidder Scope.
833	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	All new equipments being supplied shall be suitable for 50 kA for 1 second.	Owner to clarify value of initial tension required for short circuit force calculation.	Available drawings of exisiting switchyard Tower/Gantries etc. are being uploaded as attachment-1, however being an EPC job, bidder to visit the site for further details.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
834	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	The existing Main Bus I and Main bus II and bus coupler bay have to be modified.	Owner to clarify whether any isolation (sectionalizer) will be required between existing 220kV main bus and new 220kV main bus extension.	No isolation (sectionalizer) will be required between existing 220kV main bus and new 220kV main bus extension
835	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	The existing Main Bus I and Main bus II and bus coupler bay have to be modified.	Owner to kindly confirm that existing gantries for bus-section extension is suitable for 50kA for 1sec fault level (i.e. new conductors, gantries can be connected with existing gantries or not).	Towers & gantries of existing Switchyard are designed for 40kA for 1sec fault level, however the Towers & gantries for new 220kV Bays shall be suitable for 50kA for 1 Sec. Fault Level. Further, it is clarified that Gantaries & Towers of existing Bus section which will be used for extension of 220kV switchyard i.e. Tower at 1586.65N/1034.17E, 1586.65N/1016.17E, 1586.65N/998.17E, 1586.65N/977.17E, 1586.65N/959.17E, 1569.65N/1016.17E & 1569.65N/959.17E along with the Gantries between these towers shall upgraded/augmented by the bidder, to make suitable for 50kA for 1 Sec. Fault Level. However the existing Gantry on South side of tower at 1569.65N/959.17E shall not be modified.
836	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	The existing Main Bus I and Main bus II and bus coupler bay have to be modified.	Owner is requested to share as-built layout indicating existing 220kV switchyard interfaces and space available for extension including surrounding facilities.	Available layout of existing 220kV switchyard are being uploaded as attachment-19 however being an EPC job, bidder to visit the site for further details.
837	Vol-IV ____ Vol-IV	Chapter-36 (220 kV Air insulated Switchyard) _____ Chapter-36 (220 kV Air insulated Switchyard)	08 of 30 ___ 28 of 30	Cl. No. 36.03.02 (Disconnector Switch Isolator) _____ Datasheet of Isolator	The disconnecting switch shall carry the rated current at the ambient temperature specified continuously and short time current for 3 secs, without any undue temperature and the temperature rise should be restricted to the IS standards. _____ Point No: 1.7- short time current- 50kA for 1 sec	There is discrepancy between referred clauses regarding short circuit time for isolator. Bidder understands that short circuit time of 1 sec is to be followed as per datasheet of isolator and standard industry practice followed by NTPC and other SEBs. Bidder requests Owner to refer Annexure-1 for the same.	Noted, short time current rating for isolator will be 50kA for 1 sec
838	Vol-IV	Chapter-1(Electrical Scope of Work)	30 of 58	Cl. No. 1.22.04	An appropriate diversity factor with a minimum of 0.9 for continuously running loads and 0.4 for intermittent loads like cranes, plug points, sump pumps, elevator etc., shall be considered.	Bidder proposes to consider diversity factor of 0.1 for intermittent loads. This is in line with standard engineering practice. Owner may accept the same.	Bid specifications to be followed.
839	Vol-IV	Chapter-1(Electrical Scope of Work)	30 of 58	Cl. No. 1.22.05	15% spare margin shall be considered while calculating the total load on the L.T. board.	Bidder proposes to consider 10% margin while calculating the total load on the L.T. board as per standard industry practice followed by NTPC and other SEBs. Bidder requests Owner to refer Annexure-2 for the same. Owner may accept.	Noted.10% spare margin shall be considered while calculating the total load on the L.T. board
840	Vol-IV	Chapter-1(Electrical Scope of Work)	31 of 58	Cl. No. 1.24.01	Incomers / bus-couplers, outgoing tie feeders rated 630A & above and motor feeders rated 90kW & above shall be equipped with air circuit breakers of fault interrupting capacity of 50 KA rms	Bidder proposes to consider motor feeders rated 110kW & above to be equipped with air circuit breakers as per standard industry practice. Bidder requests Owner to refer Annexure-12 for the same. Owner may accept the same.	Bid specifications to be followed.
841	Vol-IV	Chapter-1(Electrical Scope of Work)	32 of 58	Cl. No. 1.24.03	All the boards shall be sectionalized, except for turbine valve DB.	Bidder understands that all ACDBs shall be non-sectionalized. Owner may please confirm	ACDB shall be non-sectionalized having isolation transformer as per tender drg no. 112-10-0100.
842	Vol-IV	Chapter-1(Electrical Scope of Work)	39 of 58	Cl. No. 1.29.05	All the batteries shall be sized for the required load and Two (2) hour load cycle,	Bidder proposes to consider batteries/DC system for 30 minutes as followed by NTPC/ other SEBs. Bidder requests Owner to refer Annexure-3 for the same. Owner may please accept.	Bid specifications to be followed.
843	Vol-IV	Chapter-1(Electrical Scope of Work)	40 of 58	Cl. No. 1.30.02	The fault current & interrupting time shall be as under:- i) For 11kV - 50kA - 0.2 sec for outgoing motor feeders and transformer feeders and 50kA-1sec-for tie and incomer feeders. ii) For 6.6kV - 40kA - 0.2 sec for outgoing motor feeders 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.	Bidder would like to propose the following: i) For 11kV - * kA - 0.16 sec for outgoing motor feeders and transformer feeders (provided with instantaneous protection) and *kA- 1sec-for tie and incomer feeders. ii) For 3.3kV - *kA - 0.16 sec for outgoing motor feeders and transformer feeders (provided with instantaneous protection) and *kA-1 sec-for incomers & tie feeders. iii) For 415V - 50kA - 0.16 sec for motor feeders and 50kA-1sec-for incomer & tie feeders. *- Shall be as per 11kV/3.3kV switchgear fault level. Owner may please accept.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
844	Vol-IV	Chapter-1(Electrical Scope of Work)	8 of 43	Cl. No. 13.06.01 (iv)	The installations of circuit breakers, however, shall be limited to the single tier formation.	Bidder proposes to allow Two tier formation for outgoing Circuit breakers of rating 1600A and below as followed by NTPC and other SEBs. Bidder requests Owner to refer Annexure-4 for the same. Owner may please accept.	Noted.
845	Vol-IV	Chapter-1(Electrical Scope of Work)	37 of 58	Cl. No. 1.27.04	Locked rotor current of the LV motor shall not exceed 600% of full load current subject to 20% IS tolerance.	Bidder would like to clarify that locked rotor current for LV motor shall be as per IS 12615:2011 for IE3 motor with applicable tolerance value. Electrical system shall be designed accordingly. Owner may please accept.	Locked rotor current of the LV motor shall be as per latest IS:12615 standard.
846	Vol-IV	Chapter-1(Electrical Scope of Work)	41 of 58	Cl. No. 1.30.05	For all HV/MV & LV power and 220V DC cable 10% design margin in load current shall be considered.	Bidder proposes to select cables based on the actual required size after considering all other parameters and derating factors. Owner may please accept the same.	Bid specifications to be followed.
847	Vol-IV	Chapter-1(Electrical Scope of Work)	4 of 23	Cl. No. 24.04.11	While estimating battery capacities, aging factor of 25%, temperature correction factor as per standard, contingency (10%), a design margin of 20% shall be kept.	Bidder proposes to consider aging factor for both Lead Acid plante type / Ni-Cd type batteries as per IEEE standard. Owner may please accept the same.	Noted.
848	Vol-IV	Chapter-1(Electrical Scope of Work)	4 of 23	Cl. No. 24.04.11	While estimating battery capacities, aging factor of 25%, temperature correction factor as per standard, contingency (10%), a design margin of 20% shall be kept.	Bidder proposes to consider contingency or a design margin of 10% for battery sizing as per standard industry practice. Owner may please accept the same.	Noted.
849	Vol-IV	Chapter-1(Electrical Scope of Work)	4 of 23	Cl. No. 24.04.13	The float charger shall be sized to carry the total DC continuous load and the trickle charging current of the battery plus full load current of largest DC motor and 25% margin	Bidder proposes that the float cum boost charger shall be sized to carry the total DC continuous load and the trickle charging current of the battery plus full load current of largest DC motor and 10% margin in order to avoid oversize battery charger rating as per standard industry practice. Bidder requests Owner to refer Annexure-5 for the same. Owner may please accept the same.	Noted.
850	Vol-IV	Chapter-1(Electrical Scope of Work)	36 of 58	Cl. No. 1.27.01	Motors rated upto and including 160 kW shall be connected to 415V, 50 Hz AC supply.	Bidder would like to propose LV Motor upto and including 200kW to be fed from LV Switchgear except for CHP as per NTPC and other SEBs. For CHP motor upto and including 160kW shall be fed from 415V system. Bidder requests Owner to refer Annexure-6 for the same. Owner may please accept the same.	Bid specifications to be followed.
851	Vol-IV	Chapter-1(Electrical Scope of Work)	5 of 17	Cl. No. 12.03.08	All anticipated future loads in or around the load centers shall be taken into consideration while finalizing size of L.T. Transformers.	LT Transformer sizing shall be done as per the system/process load requirement. 10% margin shall be considered as per contract over the actual requirement. Bidder understands that this margin is built to take care of future requirement. Owner may please confirm the same.	Confirmed
852	Vol-IV	Chapter-1(Electrical Scope of Work)	18 of 58	Cl. No. 1.12.03 (a)	Continuous current rating with 10 % design margin corresponding to 95% of generator terminal voltage with 105% load as per IS 8084	As per standard engineering practice, bidder would like to propose that, IPBD main run continuous current rating shall be selected considering Turbine VWO output at 95% of generator rated voltage while all UTs are out of service. Bidder requests Owner to refer Annexure-7 for the same. Owner may please accept the same.	Bid specifications to be followed.
853	Vol-IV	Chapter-1(Electrical Scope of Work)	24 of 58	Cl. No. 1.15.01	Each UT shall step down the Generation voltage and feed to respective 11 kV Unit Switchgear through Segregated Phase Bus Duct. The UT shall be 3 phase type connected for a vector group of Dyn1. Each UT shall be rated for 55 MVA as a minimum.	Bidder proposes to size UTs based on actual load requirement as per sizing criteria mentioned in the technical specification. Owner may please accept the same.	Bid specifications to be followed.

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854	Vol-IV	Chapter-1(Electrical Scope of Work)	24 of 58	Cl. No. 1.16.01	Each ST shall be rated for 130 /65/65 MVA as a minimum.	Bidder proposes to size STs based on actual load requirement as per sizing criteria mentioned in the technical specification. Owner may please accept the same.	Bid specifications to be followed.
855	Vol-IV	Chapter-1(Electrical Scope of Work)	04 of 58	Cl. No. 1.02.12	Phase Cross over, if required in 11kV/6.6kV shall be accommodated at the switchgear end in the rear dummy panel. Phase cross overs in bus duct is not acceptable.	Bidder proposes Owner to also allow phase crossover in Busduct run for ease of connection at both the ends as per NTPC practice. Owner may please accept.	Bid specifications to be followed.
856	Vol-IV	Chapter-1(Electrical Scope of Work)	05 of 58	Cl. No. 1.02.20	LV Dry type transformer neutrals shall be connected to earth pit through 1Cx400 sq mm XLPE cable.	Bidder proposes Owner to provide provision for the connection of LV dry type transformer neutral to respective Earth pit via. equivalent size of Earth GS Earthing flat. Owner may please accept the same.	Cl.No. 1.02.20, Sheet 5 of 58, Chapter-1, Vol-IV be followed.
857	Vol-IV	Chapter-1(Electrical Scope of Work)	05 of 58	Cl. No. 1.02.20	All system neutrals (including neutrals of all transformers), grounding terminals of EHV surge arresters and EHV voltage transformers shall be connected to two numbers treated test pit, which in turn shall not be connected to the below grade ground grid.	Bidder proposes Owner to provide provision for the connection of treated earth pit to below ground grid for equalising / distributing of fault current along the below ground grid. Owner may please accept the same.	Bid specifications to be followed.
858	Vol-IV	Chapter-1(Electrical Scope of Work)	06 of 58	Cl. No. 1.02.36	The Bidder shall make its own arrangement of construction power and further distribution arrangement; and the provision of temporary lighting and other facilities needed shall be arranged by the Bidder subject to Owner's approval.	Owner may please provide construction power supply tap-off from the existing power plants. Bidder requests Owner to specify the location of source in the plot plant as well.	Bid specifications to be followed.
859	Vol-IV	Chapter-1(Electrical Scope of Work)	45 of 58	Cl. No. 1.35.03	The steel conduit shall be encased in concrete.	Bidder would like to clarify that steel conduits shall be used for directly buried application only. PVC conduit will be encased in concrete. Owner may please accept the same.	Noted.
860	Vol-IV	Chapter-1(Electrical Scope of Work)	45 of 58	Cl. No. 1.35.02	The minimum nominal diameter/hume pipes of the plastic ducts shall be 125 mm.	Bidder would like to propose minimum 75mm diameter size of plastic ducts shall also be used. Owner may please accept.	Bid specifications to be followed.
861	Vol-IV	Chapter-1(Electrical Scope of Work)	46 of 58	Cl. No. 1.36.02 (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 would like to propose bottom to bottom spacing between cable trays of 300 mm due to space constraints. Owner may please accept.	Noted.
862	Vol-IV	Chapter-1(Electrical Scope of Work)	42 of 58	Cl. No. 1.30.10 (viii)	For multicore & single core LT power cables and 1.1KV Copper Fire Survival Power cables, the drum length shall be 750 metres..	Bidder would like to propose for multicore, single core LT power cables and fire survival cables standard single length of each drum shall be minimum 500 meters based on cable suppliers recommendations. Owner may please accept.	In clause 1.30.10 (viii) of Chapter-1 at Sheet 42 of 58 in Vol-IV, drum length be read as 500 / 750 / 1000 / 2000 meter.

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863	Vol-IV	Chapter-1(Electrical Scope of Work)	53 of 58	Cl. No. 1.44.00 (xxv)	No cable trenches are allowed in buildings. Only in GIS Hall cable chase/slit shall be provided. Cable spreader room shall be provided for following building and areas: - ☐ Main plant turbine building ☐ Main plant control room ☐ 400 kV Switchyard control building ☐ ESP control room ☐ Ash slurry pump house ☐ Ash water pump house ☐ Coal handling plant area ☐ Gypsum dewatering building ☐ DM Plant area ☐ Pretreatment plant area ☐ CW pump house ☐ Chlorination plant area ☐ Fuel oil pump house ☐ Clarified water/ fire water pump house ☐ Compressor house ☐ Wagon tippler MCC room & control room ☐ Ash silo area ☐ Effluent treatment plant area ☐ Service building ☐ Sewage treatment plant area ☐ Hydrogen plant area ☐ Chemical house etc.	Bidder proposes to consider cable trench/slit in buildings & area listed in referred clause of specification as majority of Electrical buildings have less concentration of cables. Owner may please accept the same.	Bid specifications to be followed.
864	Vol-IV	Chapter-1(Electrical Scope of Work)	54 of 58	Cl. No. 1.44.03	Generator Transformers including spare Generator Transformer, Unit Transformers, Station Transformers, Unit Auxiliary Transformers, Station Auxiliary Transformers and two (2) Nos. Emergency DG Sets catering to the plant emergency loads excluding FGD Plant shall be located in the Transformer Yard as shown in the Plot Plan.	Bidder proposes Owner to provide provision for locating station auxiliary transformers near to load distribution as per requirement and not restricting it to Transformer yard area.	Station auxilairy switchgear SAS & DM Plant auxiliary switchgear DMPAS can be clubbed together to form a common switchgear and shall be be located near the bulk load centre. It shall also cater to the 6.6kv auxiliries of ETP (if applicable). Station Auxilairy Transformer shall be loacated near to this switchgear.
865	Vol-IV	Chapter-1(Electrical Scope of Work)	54 of 58	Cl. No. 1.44.07	For generator transformers, unit transformers, station transformers, unit auxiliary transformers and station auxiliary transformer rail track shall be extended from transformer pit and taken into the service bay of turbine building.	Bidder would like to propose that rail track for the station auxiliary transformers will be extended upto the nearest approach road as per standard industry practice. Owner may please accept.	Noted.
866	Vol-Ill	Chapter-33(Layout requirements)	3 of 11	Cl. No. 33.3.2 (vi)	24V charger, UPS & batteries on unit basis in the control room below unit & common control room & control equipment room at mezzanine floor level.	Bidder proposes Owner to provide flexibility to install 24V charger, UPS & batteries as per layout arrangement & space availability.	Noted
867	Vol-Ill	Chapter-33(Layout requirements)	4 of 11	Cl. No. 33.3.3	The unit control room, computer room with programmer station, PADO room, 24V charger & UPS room, SWAS room shall be located in Air conditioned areas. Washroom/Toilet facilities for ladies & gents separately shall be provided. Further, no vertical bracings, pipes, cable shafts etc. shall be routed through control room or control equipment room area.	Bidder proposes Owner that cable shafts shall be routed through control equipment or control room area. Bidder will cover the same to maintain aesthetic view of that room. Owner may please accept.	Bid specifications to be followed.
868	Vol-Ill	Chapter-33(Layout requirements)	8 of 11	Cl. No. 33.4 (28)	The headroom for all pipe/cable in outlying areas shall be 5 M except at rail/road crossing where the headroom shall be 8 M.	Bidder would like to propose that the cable/pipe rack in outlying area shall be 2m as per standard industry practice. Owner may please accept.	Bid specifications to be followed.
869	Vol-Ill	Chapter-33(Layout requirements)	8 of 11	Cl. No. 33.4 (29) (i)	Trestle height in outlying area shall be 5 M (BOS)	Bidder would like to propose that the trestle height in outlying area shall be 2m as per standard industry practice. Owner may please accept.	Bid specifications to be followed.

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870	Vol-Ill	Chapter-33(Layout requirements)	8 of 11	Cl. No. 33.4 (29) (x)	Separate cable tray for optical fiber cable/UTP cable shall be provided.	Bidder would like to propose that optical fiber cable/UTP cables shall be routed through Instrumentation cable trays, wherever same is available. Owner may please accept.	Bid specifications to be followed.
871	Vol-IV	Chapter-22(Cabling system)	13 of 22	Cl. No. 22.11.03	Laying of cables directly buried in ground is not acceptable.	Bidder requests Owner to allow for directly buried cables in ground for outdoor/remote area. Owner may please accept.	Only Cables for street lighting/High Mast can be buried from the nearest overhead structure.
872	Vol-IV	Chapter-22(Cabling system)	17 of 22	Cl. No. 22.14.10 (b)	2 cables in pipe - 51% full	Bidder would like to clarify that 2 cables in pipe/conduit shall be 31% full as per IS 1255. Owner may please clarify.	Cables in Pipes/Conduits shall be laid in accordance to the latest standards.
873	Vol-IV Vol-IV	Chapter-1(Electrical Scope of Work) Chapter-22(Cabling system)	45 of 58 7 of 22	Cl. No. 1.35.02 Cl. No. 22.05.03 (iii)	All underground duct banks shall consist of plastic conduit encased in reinforced concrete. 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.	Bidder would like to clarify that underground duct bank shall consist of PVC/HDPE conduits encased in PCC as per referred clause no. 22.05.03 (iii). Owner may please confirm Bidder's understanding.	Noted.
874	Vol-IV	Chapter-1(Electrical Scope of Work)	17 of 58	Cl. No. 1.12.02	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.	Noted with the stipulation that bidder will provide Neutral CT required for measurement, AVR & protection at the appropriate location.
875	Vol-IV Vol-VII	Chapter-4 (400 kV Gas Insulated Switchgear) 400KV GIS SINGLE LINE DIAGRAM (Dwg No. 112-10-200)	3 of 88 -	Cl. No. 4.02.02 (D) -	Lightning arrestors, Bus Post Insulators (if required), etc. with supporting structures in Switchyard area and transformer yard area. SF6 Type Lightning arrestor in ICT 1 & 2 bay connection	Bidder proposes Owner to consider Air Insulated Lightning Arrestors for ICT 1 & 2, similar to GT and ST bay. Further, bidder suggest to consider connection of GIS and ICT through conductor in line with practice followed by NTPC and other SEBs. Owner may please accept.	Clarified that as per tender drg no. 112-10-200 (400kV GIS single line diagram) LAs /SA are to be provided as below: i) SF6 gas insulated SA to be provided for the 400kV main bus I & II. ii) SF6 gas insulated SA to be provided in GIB for ICTs. iii) Outdoor type LAs to be provided for Line, GT and ST bays.
876	Vol-IV	Chapter-4 (400 kV Gas Insulated Switchgear)	4 of 88	Cl. No. 4.02.02 (R)	Circuit breakers of line bays to be provided with PIR, if the Line Lengths are more than 200 KM (as Applicable). Also, circuit breakers for Line, GT, ST and ICT shall be provided with CSD (Controlled switching device).	Bidder requests Owner to provide the 400kV Transmission line 1 & 2 lengths, for finalizing the requirement of PIR in CBs.	As per preliminary information received from HVPNL line length of outgoing 400KV lines will be less than 200KM. PIR for 400kV Line shall not be required. Exact Length shall be decided during detailed engineering.
877	Vol-IV	Chapter-4 (400 kV Gas Insulated Switchgear)	13 of 88	Cl. No. 4.04.41	Two stage alarms shall be wired and indicated to the LCC and control room in the event of loss of gas pressure. All SF6 gas filling ports in the GIS shall be equipped with standard non-return fitting. Each gas compartment must provide the following:	As per technical specification mentioned clause, we understand that only the gas pressure stage 1 & stage-2 alarms are required. No **tripping** of CB is required with the gas pressure release. Owner may please clarify.	Bidder's understanding is correct.
878	Vol-IV	Chapter-4 (400 kV Gas Insulated Switchgear)	15 of 88	Cl. No. 4.04.48 (c)	Clearance on maintenance bay side shall be at least 10 meter wide (clear space from edge of GIS (400kV) to inner edge of wall).	Bidder requests Owner to clarify whether the mentioned clearance requirement (least 10 meter) is considering future bays or excluding the future bay requirement. Owner may please clarify.	Except the Spare bay for Bus Reactor no future bay requirement is envisaged. 10 Meter clearance is without considering future bay.

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879	Vol-IV --- Vol-VII	Chapter-4 (400 kV Gas Insulated Switchgear) ----- 400KV GIS SINGLE LINE DIAGRAM (Dwg No. 112-10-200)	26 of 88 --- -	Cl. No. 4.13.00 --- -	Fast acting earthing switches shall be located at the busbar and at all external HV connections of feeders like HV cables or overhead lines or transformer connections.	As per mentioned clause in the technical specification, Fast acting earthing switches are located at the busbar and at all external HV connections of feeders like HV cables or overhead lines or transformer connections whereas in the SLD (112-10-200), Fast acting earthing switches are not shown for the ICT-1, ICT-2, GT and ST feeder. Owner may please clarify whether same shall be required as per technical specification for these mentioned feeders also.	Fast-acting earthing switches are to be provided for 400kV lines bay only. Further bidder note that the configuration of 400kV one & half breaker scheme shall be as follows: BAY 1 – GT & ST1 BAY 2 - ICT1 & LINE1 BAY 3 – ICT2 & LINE 2 BAY4 – ST2 & REACTOR (SPARE BAY) The revised SLD is attached as attachment-20.
880	Vol-IV	Chapter-4 (400 kV Gas Insulated Switchgear)	28 of 88	Cl. No. 4.16.00 (e)	Each end of the busbars shall be designed for convenient future extension of the switchgear. Bus conductor end connectors and enclosure flanges shall be designed accordingly.	Bidder understands that future extension of bus bar on both side are required as per mentioned tender specification. Bidder request Owner to clarify how many future bays / space shall be required / considered on both side of the GIS busbars (Right & Left) for future expansion.	Except the Spare bay for Bus Reactor no future bay requirement is envisaged.
881	Vol-IV	Chapter-4 (400 kV Gas Insulated Switchgear)	77 of 88	Cl. No. 4.40.00	SPECIAL TOOLS AND TACKLES	Bidder understands that special tools and tackles for GIS shall be provided as per OEM recommendation. Owner may please confirm,	Noted.
882	Vol-IV	DATASHEET: GENERATOR TRANSFORMERS	28 of 105	Cl. No. 17	Type of tank construction shall be conventional type.	Bidder proposes to consider either Bell or Conventional tank construction based on OEM practice. Owner may please accept the same.	Noted with the stipulation that the tank shall be of proven design of either Bell type with bolted/ welded joint or conventional (preferable) with bolted/welded top cover. Bell type tank, if provided, shall have joint as close as possible to the bottom of the tank.
883	Vol-IV	DATASHEET: STATION TRANSFORMERS	53 of 105	Cl. No. 17	Type of tank construction shall be conventional type.	Bidder proposes to consider either Bell or Conventional tank construction based on OEM practice. Owner may please accept the same.	Noted with the stipulation that the tank shall be of proven design of either Bell type with bolted/ welded joint or conventional (preferable) with bolted/welded top cover. Bell type tank, if provided, shall have joint as close as possible to the bottom of the tank.
884	Vol-IV	DATASHEET: STATION TRANSFORMERS	54 of 105	Cl. No. 20.1	HV connection: Isolated Phase Bus Duct	Bidder understands that that HV connection shall be via overhead 400kV conductor. Owner may please confirm.	Noted, HV connection shall be via overhead 400kV conductor
885	Vol-IV	DATASHEET: UNIT TRANSFORMERS	77 of 105	Cl. No. 17	Type of tank construction shall be conventional type.	Bidder proposes to consider either Bell or Conventional tank construction based on OEM practice. Owner may please accept the same.	Noted with the stipulation that the tank shall be of proven design of either Bell type with bolted/ welded joint or conventional (preferable) with bolted/welded top cover. Bell type tank, if provided, shall have joint as close as possible to the bottom of the tank.
886	Vol-IV	PART D INTERCONNECTING TRANSFORMER	82 of 105	Cl. No. 4.01.00	Transformer tank shall be conventional type.	Bidder proposes to consider either Bell or Conventional tank construction based on OEM practice. Owner may please accept the same.	Noted with the stipulation that the tank shall be of proven design of either Bell type with bolted/ welded joint or conventional (preferable) with bolted/welded top cover. Bell type tank, if provided, shall have joint as close as possible to the bottom of the tank.

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887	Vol-IV	DATASHEET: AUXILIARY TRANSFORMERS	18 of 18	CL. NO. 21	HV-N bushing	Since HV side is not having neutral connection, neutral bushing is not applicable. Hence, neutral bushing class specified is not applicable. Owner may please accept the same.	Noted.
888	Vol-IV	Ch 6: Power Transformers	5 of 105	Cl. No. 1.01.00 / 1.02.00	Minimum rating of Generator Transformer is indicated as 330MVA.	Bidder proposes to consider minimum rating of Generator Transformer as 315MVA. This is the standard rating of Generator Transformer considered by NTPC/other SEBs for 800MW Power Plant as per CEA guidelines on "Standard Specifications and technical Parameters for Transformers and Reactors (66 kV & above voltage class)". Owner may please accept the same.	Bid specifications to be followed.
889	Vol-IV	Chapter-1(Electrical Scope of Work)	18 of 58	Cl. No. 1.12.03	g) The fault withstand time rating of the busduct shall be 3 seconds.	The fault clearing time of protection system is less than 1 second, hence fault withstand rating of 1 second shall be sufficient which is as per prevalent standard industry practice by NTPC and other SEBs. Bidder requests Owner to refer Annexure-8 for the same. Bidder requests Owner to accept the fault withstand time rating of 1 second for IPBD instead of 3 second. Type tested design of IPBD is available from OEMs for 1 sec.	Noted.
890	Vol-IV	Ch 12 : Service Transformers	16 of 17	Cl. No. Xi	Temperature rise above design ambient temperature (in winding by resistance) - 70 deg C	Bidder proposes to consider Temperature rise above design ambient temperature (in winding by resistance) as per NTPC and other SEBs - 90 deg C. Bidder requests Owner to refer Annexure-9 for the same. Owner may please accept the same.	Bid specifications to be followed.
891	Vol-IV	Ch 9 : Isolated Phase Bus Ducts & Neutral Grounding Equipment	19 of 26	1. Generator Busduct, d	d) Material Bus enclosure - Aluminium BS 1470/1050A : Al-AlloyGr. 31000	Bidder proposes the use of Aluminium grade 19500 material for bus enclosure in line with past executed projects and OEM standard design. Owner may please accept the same.	Noted.
892	Vol-IV	Ch 11 : 11 KV & 6.6 KV Switchgears	6 of 41	Cl. No. 11.04.02	The main buses and connections shall be of high conductivity alluminium / aluminium alloy, sized for specified current rating with maximum temperature limited to:- a) 90° C (i.e., 40° C rise over 50° C ambient) - For bolted joints (Plain or tinned) b) 105°C (i.e., 55°C rise over ambient 50° C) - For bolted joints (Silver Plated) **c) 85° C (35° C rise over ambient 50° C)-For bus bars**	Owner may note that temperature rise of bus-bars is governed by the temperature rise of joints hence different temperature rise is not possible for busbar and joints. Also bidder proposes to follow temperature rise as per IEC & IS which only mentions temperature rise for joints. Bidder requests Owner to remove the referred clause for bus bar.	Noted. Temprature rise limits shall be as per IS.
893	General	-	-	-	-	Please furnish the following Electrical drawings: 1. Relay & Metering Diagram for generator, GSU, GIS. 2. SAS architecture block diagram 3. DC system configuration diagram 4. UPS system configuration diagram	For relay & Metering details kindly refer Chapter 1 & 3 of VOL IV. 2. Requsite drawing for SAS (refer Drg No. 112-10-0400) is attached as attachment-15. 3. Please refer Tender DRG No. 112-10-100 (SH 2 OF 2) 4. Please refer VOL V of tender.
894	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	03 of 30	Cl. No. 36.02.00	The existing Main Bus I and Main bus II and bus coupler bay have to be modified.	Owner is requested to share as-built electrical plan- section layout, cable route layout (plan & section) of existing 220kV switchyard.	Available drawings of existing 220kv Switchyard Plan & Section and Cable Routing (Plan & Section) are being uploaded at attachment- 19&21. However, being an EPC job, bidder to visit the site for further details.
895	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	In case Control and Relay Panels for two (2) additional bays could not be accommodated in the existing Switchyard than modification/extension of the existing control room will be carried out.	Owner is requested to share as-built layout of existing 220kV Control Room building.	Available drawings of existing 220kv Switchyard Control Room are being uploaded at attachment-10. However, being an EPC job, bidder to visit the site for further details.

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896	Volume VII Tender Drawings	220KV AIS SINGLE LINE DIAGRAM (Dwg No: 112-10-300)	-		Fault level of existing equipment is 40KA and fault level of new equipment is 50KA.	Bidder understands that no replacement of existing 40KA equipment with new equipment of 50KA short circuit capacity is envisaged in Bidder's scope. Owner may please confirm.	Upgradation of only existing bus coupler bay equipments have to be carried out with new equipment of 4000A (continuous rating) and 50KA short circuit capacity .
897	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	The existing Main Bus I and Main bus II and bus coupler bay have to be modified. The existing Quad Moose conductor rated for 2000A has to be increased to 4000A using suitable HTLS conductor so that the existing gantry structures can be used.	Bidder understands that there is no requirement to change clamp-connectors for connection of new HTLS conductor with existing 220kV AIS equipment. Only new clamp-connectors shall be required for 1 No of Bus coupler bay and 2 Nos of ICT bays. Owner may please confirm.	All the Clamp- connector of Bus-I, Bus-II & Bus Coupler shall be replaced by the bidder with clamp-connectors suitable for new HTLS conductor and 4000A continuous rating.
898	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	03 of 30	Cl. No. 36.02.00	In the Main Bus I and Main Bus II, Bus Coupler Bay and new ICT Bays (2 Nos.) and Bus EMT light weight polymer insulators shall be used.	Owner is requested to specify type of string insulator and post insulator used in existing switchyard.	Porcelien type isulators are used in existing switchyard.
899	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	The equipment rating of the existing bus coupler bay must be enhanced from 2000A to 4000A.	Owner is requested to confirm that existing structure of bus coupler equipment is sufficient to withstand 50KA fault current.	Gantaries & Towers of existing Bus coupler of exisiting 220kV switchyard i.e. Tower at 1586.65N/1034.17E, 1586.65N/1016.17E, 1586.65N/998.17E, 1586.65N/977.17E, 1586.65N/959.17E, 1569.65N/1016.17E & 1569.65N/959.17E along with the Gantries between these towers shall upgraded/augmented by the bidder, to make suitable for 50kA for 1 Sec. Fault Level. However the existing Gantry on South side of tower at 1569.65N/959.17E shall not be modified.
900	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	Augmentation & Modification of existing 220 kV switchyard including ACSR busbars, Bus Coupler Bay, protection & metering system, SCADA system (SAS), extension of shield wires, fencing, earthmat, trenches, roads, drains, shifting of existing Main-Bus I & II EMVT and transfer Bus EVT (from Bay 14 side toward Bay 1) etc. and all other interfacing provisions are in the scope of EPC Bidder.	Bidder requests Owner to specify type of SCADA system whether it is conventional SAS control or with process bus based digital SAS. Please furnish existing As-Built architecture/wiring drawing of the same.	Available drawings of existing 220kv Switchyard SAS are being uploaded at attachment-11. However, being an EPC job, bidder to visit the site for further details.
901	Volume VII Tender Drawings	Plot Plan (Dwg No: 111-29-0200)	-		Shifting of existing Main-Bus I & II EMVT and transfer Bus EMVT having to be shifted from bay 14 side towards Bay 1 and placed after the Bus LA.	As per the plot plan, location of Bus EMVT and Isolator is fouling with road. Hence, Bidder requests Owner to suggest new location for Bus EMVT and isolator.	The road on the south side of the 220kv existing AIS (on which the bus EMVT & isolator shall be coming to be blocked and closed. The road on the east & west side (near the fence) to be extended with gates upto the existing road having centre line at 1326.56 (n). This is in line with clause 36.02.00. However exact location can be finalized during detailed engineering.
902	Vol-IV	Chapter-36 (220 kV Air insulated Switchyard)	02 of 30	Cl. No. 36.02.00	The existing Main Bus I and Main bus II and bus coupler bay have to be modified.	Bidder requests Owner to provide relay and metering SLD of existing 220kV AIS including busbar protection scheme. Also furnish relay make & model of busbar protection relay, busbar protection scheme drawings for required integration. Also, Bidder understands that existing bay's CT, EMVT, isolators, etc. are compatible for new bus rating of 4000A and fault level of 50kA. No updation is required for these existing equipments. Please confirm.	1. Available Drawings of exisiting Bus Bar protection is being uploaded at attachemnt-22.However, being an EPC job, bidder to visit the site for further details.Other details of exisiting Bus Bar protection is as below: i) Siemens Make, DIGSI-4.82 ii) All Relays connected with PAS Station Unit with Eathernet Switches iii) . Decentralised type iv) . Main Bus Bar Protection Relay- Siprotec- 7SS52 and feeder Bus Bar Protection Relay- Siprotec-7SS52 2. Intent is clear that only Exisiting Bus-I, Bus-II & Bus Coupler is required to be upgraded for 4000A & fault level of 50kA. No other equipment is required to be replaced.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
903	Vol-IV — Vol-IV	Chapter-4 GIS ——— Chapter-4 GIS	60 of 88 —— 82 of 86	Cl. No. 4.31.00 —— Annexure-D	Rated voltage of 400kV SA (at AIS end)	In clause No 4.31.00, rated voltage of SA is mentioned as 380kV whereas in Annexure-D, rated voltage is mentioned as 336kV. Owner may please resolve the discrepancy.	Noted, Rated voltage of 400kV SA shall be 360 kV.
904	General	-	-	-	-	In absence of tender requirements, Bidder proposes Bay Marshalling Kiosk (BMK) concept for the new two-(2) nos. ICT bays & one-(1) no. bus-coupler bay. Please confirm.	Noted.
905	General	-	-	-	-	For 220kV AIS breaker of ICT, kindly clarify if CSD is required.	CSD is not required on 220kV side circuit Breaker of ICTs
906	General	-	-	-	-	Bidder understands that 415V Aux supply required for new ICT bays shall be derived from existing ACDB of 220KV AIS switchyard. Owner may please confirm and furnish the existing AC system SLD and distribution board GA drawing.	The following spare feeders are available at site in the existing 220kV switchyard control room: Existing 415V ACDB:- 1. 125A- 02 Nos. 2. 32A- 04 Nos. 3. 20A- 02 Nos. Bidder shall provide floor mounted sub ACDB to cater AC loads of 02 nos. New 220KV ICT bays being supplied by the bidder. ACDB shall have dual incommers which shall be fed from feeder of existing ACDB. Refer revised main SLD attached as attachment-8.
907	General	-	-	-	-	Bidder understands that 220V DC supply required for new ICT bays expansion work shall be derived from existing DCDB of 220KV AIS switchyard. Bidder requests Owner to furnish the existing DC system SLD and distribution board GA drawing for identifying the new DC feeders.	The following spare feeders are available at site in the existing 220kV switchyard control room: Existing 220V DCDB:- 1. 160A- 01 No. 2. 20A- 02 Nos. Bidder shall provide floor mounted sub DCDB to cater DC loads of 02 nos. New 220KV ICT bays being supplied by the bidder. DCDB shall have dual incommers which shall be fed from feeder of existing DCDB. Refer revised main SLD attached as attachment-8.
908	Vol-IV	Chapter-4 GIS	3 of 86	Cl. No. 4.02.02	Metering CT core for Main & Check ABT metering shall be provided inside the GIS for 400 kV and in the AIS yard for 220 kV.	Bidder requests Owner to specify quantity of ABT meter required for 220kV AIS yard extension scope of work.	Already clarified in Clause 1.02.30 that ABT meters shall be provided on LV side of ICTs.
909	Volume VII Tender Drawings/ Vol-IV	220 kV Air insulated Switchyard (Dwg No: 112-10-300) ——— Chapter-36 AIS	- —— 14 of 30	- ——— 36.03.03	Creepage Distance for 220kV AIS equipment: 31 mm/kV ——— Creepage Distance for 220kV AIS equipment: 25 mm/kV	Owner may please resolve the discrepancy regarding creepage distance for 220kV AIS equipment.	Noted, creepage distance of 220kV equipments shall be 31mm/kV.
910	Volume IV Electrical Works	Ch 33 : Roof Top Solar System ——— Ch 33 : Roof Top Solar System	2 of 11 ——— 2 of 11	33.01.01 ——— 33.01.03	The estimated indicative capacity for roof top solar PV installation shall be **exceeding 250 kW peak.** —— List of buildings identified for installation of roof top solar system are as follows: New Buildings a) TG Building. b) ESP Control Room Building. c) Service Building. d) CW Pump House. e) Compressor House f) Switchyard Control Building. g) Filtered Water Pump House Existing Buildings a) Administrative Building b) VIP Guest House in Colony c) Field Hostel in Colony d) Subordinate Rest House in Colony e) Medical Health Centre in Colony	Bidder requests Owner to specify total capacity of Solar roof top in KW for bidding purpose. Owner to specify total capacity in KW to keep all bidders at par.	Upper limit capacity of Solar Plant shall be 350KWp.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
911	Vol-II	Provenness	24 of 42	Cl. No. 5.1.1	ISOLATED PHASE BUSDUCT Bidder/Sub Vendor should have designed, manufactured, type tested, supplied, erected/ supervised erection and commissioned/supervised commissioning of Isolated Phase Bus duct for a turbo-generator of at least 500MW, which should have been in successful operation for a period of not less than two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: Bidder/Sub Vendor should have designed, manufactured, type tested, supplied, erected/ supervised erection and commissioned/supervised commissioning of Isolated Phase Bus duct for a turbo-generator of at least 500MW, which should have been in successful operation for a period of not less than two (2) years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid specifications to be followed.
912	Vol-II	Provenness	24 of 42	Cl. No. 5.1.2(i)	ISOLATED PHASE BUSDUCT Bidder/Sub Vendor should have designed, manufactured, type tested, supplied, erected/supervised erection and commissioned/ supervised commissioning of Isolated Phase Busduct for a turbo-generator of at least 200MW, which should have been in successful operation for a period of not less than two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria. Therefore, Bidder proposes the clause to be read as: Bidder/Sub Vendor should have designed, manufactured, type tested, supplied, erected/supervised erection and commissioned/ supervised commissioning of Isolated Phase Busduct for a turbo-generator of at least 200MW, which should have been in successful operation for a period of not less than two (2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bid specifications to be followed.
913	Vol-II	Provenness	24 of 42	Cl. No. 5.1.2(ii)	ISOLATED PHASE BUSDUCT This Deed of Joint Undertaking should be submitted prior to the placement of order on approved Sub Vendor. In case of award, the Associate or Collaborator of the Bidder /Sub Vendor (as applicable) will be required to furnish an on demand Bank Guarantee for INR 1.5 Million (Indian Rupees One and a half Million only).	Bidder understands that Bank Guarantee has no relevance with the provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: This Deed of Joint Undertaking should be submitted prior to the placement of order on approved Sub Vendor. ~~In case of award, the Associate or Collaborator of the Bidder /Sub Vendor (as applicable) will be required to furnish an on demand Bank Guarantee for INR 1.5 Million (Indian Rupees One and a half Million only).~~ Owner may please accept.	Bid specifications to be followed.
914	Vol-II	Provenness	24 of 42	Cl. No. 5.2.1	POWER TRANSFORMERS Bidder/Sub Vendor should have designed, manufactured, installed/ supervised installation and commissioned/supervised commissioning of at least two (2) nos. (one each at two different installations) of 400 KV or above class Generator transformers of at least 200 MVA capacity (single phase transformer) which should be in successful operation for at least two(2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per NTPC and other SEBs standard. Bidder requests Owner to refer Annexure-11 for the same. Therefore, Bidder proposes the clause to be read as: Bidder/Sub Vendor should have designed, manufactured, installed/ supervised installation and commissioned/supervised commissioning of at least two (2) nos. (one each at two different installations) of 400 KV or above class Generator transformers of at least 200 MVA capacity (single phase transformer) which should be in successful operation for at least two(2) years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid speficiations to be followed.
915	Vol-II	Provenness	24 of 42	Cl. No. 5.2.2	POWER TRANSFORMERS Bidder/Sub Vendor who have designed, manufactured, installed/supervised installation and commissioned/supervised commissioning of at least two (2) no. 220 KV or above class transformer which are in successful operation for two (2) years prior to the date of Techno-Commercial bid opening and have established manufacturing facilities for 400 KV class transformers based on technological support of its Associate or Collaborator, can also be considered Qualified provided its Associate or Collaborator meets the qualifying requirement stipulated at 5.2.1 above and Bidder furnishes an undertaking jointly executed by it and its Associate or Collaborator, as per the format, enclosed in the bidding document for the successful performance of the equipment.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per NTPC and other SEBs standard. Bidder requests Owner to refer Annexure-11 for the same. Therefore, Bidder proposes the clause to be read as: Bidder/Sub Vendor who have designed, manufactured, installed/supervised installation and commissioned/supervised commissioning of at least two (2) no. 220 KV or above class transformer which are in successful operation for two (2) years ~~prior to the date of Techno-Commercial bid opening~~ and have established manufacturing facilities for 400 KV class transformers based on technological support of its Associate or Collaborator, can also be considered Qualified provided its Associate or Collaborator meets the qualifying requirement stipulated at 5.2.1 above and Bidder furnishes an undertaking jointly executed by it and its Associate or Collaborator, as per the format, enclosed in the bidding document for the successful performance of the equipment. Owner may please accept.	Bid speficiations to be followed.
916	Vol-II	Provenness	24 of 42	Cl. No. 5.2.2	POWER TRANSFORMERS This Deed of Joint Undertaking should be submitted prior to the placement of order on approved Sub Vendor. In case of award, the Associate or Collaborator of the Bidder / Sub Vendor (as applicable) will be required to furnish an on-demand Bank Guarantee for INR 22 Million (Indian Rupees Twenty Two Million only).	Bidder understands that Bank Guarantee has no relevance with the provenness criteria as per NTPC and other SEBs standards. Bidder requests Owner to refer Annexure-11 for the same. Therefore, Bidder proposes the clause to be read as: This Deed of Joint Undertaking should be submitted prior to the placement of order on approved Sub Vendor. ~~In case of award, the Associate or Collaborator of the Bidder / Sub Vendor (as applicable) will be required to furnish an on-demand Bank Guarantee for INR 22 Million (Indian Rupees Twenty Two Million only).~~ Owner may please accept.	Bid speficiations to be followed.
917	Vol-II	Provenness	25 of 42	Cl. No. 5.3.1	AUXILIARY OIL FILLED/ DRY TYPE TRANSFORMERS Bidder/Sub Vendor should have manufactured & supplied at least two numbers (one each at two different installations) of at least highest offered rating oil filled/ dry type transformers which should have been in successful operation for a period of at least two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: Bidder/Sub Vendor should have manufactured & supplied at least two numbers (one each at two different installations) of at least highest offered rating oil filled/ dry type transformers which should have been in successful operation for a period of at least two (2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bid speficiations to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
918	Vol-II	Provenness	25 of 42	Cl. No. 5.4.1	LT SWITCHGEAR Bidder/ Sub-vendor should have manufactured and supplied at least a total of four hundred & fifty (450) Nos. draw out type Air Circuit Breaker Panels and / or draw out Motor Control Centre Panels complete in all respects with fault rating of at least 50kA for 1 sec. and 105kA (peak) under a single order and these panels should have been in successful operation for a period of not less than two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: Bidder/ Sub-vendor should have manufactured and supplied at least a total of four hundred & fifty (450) Nos. draw out type Air Circuit Breaker Panels and / or draw out Motor Control Centre Panels complete in all respects with fault rating of at least 50kA for 1 sec. and 105kA (peak) under a single order and these panels should have been in successful operation for a period of not less than two (2) years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid specifications to be followed.
919	Vol-II	Provenness	25 of 42	Cl. No. 5.4.2	LT SWITCHGEAR Bidder/ Sub-vendor should have manufactured and supplied at least one hundred & fifty (150) Nos. draw out Circuit Breaker Panels with Air Circuit Breakers having fault rating of at least 50kA for 1 second, 105kA MAKING and 50kA BREAKING, which should have been in successful operation for a period of not less than two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: Bidder/ Sub-vendor should have manufactured and supplied at least one hundred & fifty (150) Nos. draw out Circuit Breaker Panels with Air Circuit Breakers having fault rating of at least 50kA for 1 second, 105kA MAKING and 50kA BREAKING, which should have been in successful operation for a period of not less than two (2) years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid specifications to be followed.
920	Vol-II	Provenness	26 of 42	Cl. No. 5.5.4	LT SWITCHGEAR Bidder/ Sub Vendor shall furnish a Deed of Joint Undertaking jointly executed by it and its Associate/ Collaborator as per format enclosed in the bidding document in which the Bidder/ Sub Vendor and its Associate/ Collaborator are jointly and severally liable to the Owner for successful performance of the LT Switchgears. This Deed of Joint Undertaking should be submitted prior to the placement of order on approved Sub Vendor. In case of award, the Associate or Collaborator of the Bidder / Sub Vendor (as applicable) will be required to furnish an on-demand Bank Guarantee for INR 6 Million (Indian Rupees Six Million only).	Bidder understands that Bank Guarantee has no relevance with the provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: Bidder/ Sub Vendor shall furnish a Deed of Joint Undertaking jointly executed by it and its Associate/ Collaborator as per format enclosed in the bidding document in which the Bidder/ Sub Vendor and its Associate/ Collaborator are jointly and severally liable to the Owner for successful performance of the LT Switchgears. This Deed of Joint Undertaking should be submitted prior to the placement of order on approved Sub Vendor. In case of award, the Associate or Collaborator of the Bidder / Sub Vendor (as applicable) will be required to furnish an on-demand Bank Guarantee for INR 6 Million (Indian Rupees Six Million only). This Deed of Joint Undertaking should be submitted prior to the placement of order on approved Sub Vendor. ~~In case of award, the Associate or Collaborator of the Bidder / Sub Vendor (as applicable) will be required to furnish an on-demand Bank Guarantee for INR 6 Million (Indian Rupees Six Million only).~~ Owner may please accept.	Bid specifications to be followed.
921	Vol-II	Provenness	26 of 42	Cl. No. 5.5.1	11 KV/6.6 KV SWITCHGEARS The Bidder/ Sub Vendor should have designed, manufactured and supplied at least one hundred (100) 11kV and /or 6.6kV Switchgear panels complete in all respects with fault rating of at least 40 kA for one (1) second and 100kA (peak), which should have been in successful operation for a period of at least two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: The Bidder/ Sub Vendor should have designed, manufactured and supplied at least one hundred (100) 11kV and /or 6.6kV Switchgear panels complete in all respects with fault rating of at least 40 kA for one (1) second and 100kA (peak), which should have been in successful operation for a period of at least two (2) years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid speficiations to be followed.
922	Vol-II	Provenness	26 of 42	Cl. No. 5.5.2	11 KV/6.6 KV SWITCHGEARS The Bidder/ Sub Vendor should have manufactured and supplied at least one hundred (100) Vacuum Circuit Breakers for 11kV and /or 6.6kV panels with a rating of 40 kA rms BREAKING, 100kA peak MAKING and 40kA withstand for one (1) second, which should have been in successful operation in 6.6kV or higher voltage application for a period of at least two years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: The Bidder/ Sub Vendor should have manufactured and supplied at least one hundred (100) Vacuum Circuit Breakers for 11kV and /or 6.6kV panels with a rating of 40 kA rms BREAKING, 100kA peak MAKING and 40kA withstand for one (1) second, which should have been in successful operation in 6.6kV or higher voltage application for a period of at least two years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid speficiations to be followed.
923	Vol-II	Provenness	27 of 42	Cl. No. 5.5.3	11 KV/6.6 KV SWITCHGEARS The Bidder/ Sub Vendor should have manufactured and supplied on an average one hundred (100) 11kV and /or 6.6kV Switchgear panels per annum during the last three years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: The Bidder/ Sub Vendor should have manufactured and supplied on an average one hundred (100) 11kV and /or 6.6kV Switchgear panels per annum during the last three years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid speficiations to be followed.
924	Vol-II	Provenness	27 of 42	Cl. No. 5.5.4	11 KV/6.6 KV SWITCHGEARS The Bidder/ Sub Vendor should have manufactured and supplied at least one hundred (100) 11kV and /or 6.6kV Switchgear panels complete in all respects with fault rating of at least 40kA for one (1) second and 100kA (peak which should have been in successful operation for a period of at least two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: The Bidder/ Sub Vendor should have manufactured and supplied at least one hundred (100) 11kV and /or 6.6kV Switchgear panels complete in all respects with fault rating of at least 40kA for one (1) second and 100kA (peak which should have been in successful operation for a period of at least two (2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bid speficiations to be followed.
925	Vol-II	Provenness	27 of 42	Cl. No. 5.5.5	11 KV/6.6 KV SWITCHGEARS The Bidder/ Sub Vendor should have manufactured and supplied at least one hundred (100) Vacuum Circuit Breakers for 11kV and /or 6.6kV panels with a rating of 40kA rms BREAKING, 100kA peak MAKING and 40kA withstand for one (1) second which should have been in successful operation in 6.6kV or higher voltage application for a period of at least two years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: The Bidder/ Sub Vendor should have manufactured and supplied at least one hundred (100) Vacuum Circuit Breakers for 11kV and /or 6.6kV panels with a rating of 40kA rms BREAKING, 100kA peak MAKING and 40kA withstand for one (1) second which should have been in successful operation in 6.6kV or higher voltage application for a period of at least two years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid speficiations to be followed.

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926	Vol-II	Provenness	27 of 42	Cl. No. 5.5.7	11 KV/6.6 KV SWITCHGEARS Bidder/ Sub Vendor furnishes a Deed of Joint Undertaking jointly executed by it and its Associate/ Collaborator as per format enclosed in the bidding document in which the Bidder/ Sub Vendor and its Associate/ Collaborator are jointly and severally liable to the Owner for successful performance of the MV Switchgears. This Deed of Joint Undertaking should be submitted prior to the placement of order on approved Sub Vendor. In case of award, the Associate or Collaborator of the Bidder / Sub Vendor (as applicable) will be required to furnish an on-demand Bank Guarantee for INR 6 Million (Indian Rupees Six Million only).	Bidder understands that Bank Guarantee has no relevance with the provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: Bidder/ Sub Vendor furnishes a Deed of Joint Undertaking jointly executed by it and its Associate/ Collaborator as per format enclosed in the bidding document in which the Bidder/ Sub Vendor and its Associate/ Collaborator are jointly and severally liable to the Owner for successful performance of the MV Switchgears. This Deed of Joint Undertaking should be submitted prior to the placement of order on approved Sub Vendor. ~~In case of award, the Associate or Collaborator of the Bidder / Sub Vendor (as applicable) will be required to furnish an on-demand Bank Guarantee for INR 6 Million (Indian Rupees Six Million only).~~ Owner may please accept.	Bid speficiations to be followed.
927	Vol-II	Provenness	27 of 42	Cl. No. 5.6.1 Cl. No. 5.6.2	NUMERICAL RELAYS & NETWORKING 5.6.1 Numerical Relays shall be offered from a Manufacturer who has manufactured and supplied and successfully configured at least 100 Nos. of Numerical Relays with IEC 61850 used for application in Feeder Protections /Transformer Protections/ Motor Protections for 500MW unit or above/ atleast for 220kV substation. These relays should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening. 5.6.2 The Numerical Relay Network system shall be offered from an Integrator/ Manufacturer who has designed and successfully done SAT for a network on IEC 61850 with least 100 Communicable Numerical Relays prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as: 5.6.1 Numerical Relays shall be offered from a Manufacturer who has manufactured and supplied and successfully configured at least 100 Nos. of Numerical Relays with IEC 61850 used for application in Feeder Protections /Transformer Protections/ Motor Protections for 500MW unit or above/ atleast for 220kV substation. These relays should have been in successful operation for at least two (2) years ~~prior to the date of Techno-Commercial bid opening~~. 5.6.2 The Numerical Relay Network system shall be offered from an Integrator/ Manufacturer who has designed and successfully done SAT for a network on IEC 61850 with least 100 Communicable Numerical Relays ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bid speficiations to be followed.
928	Vol-II	Provenness	27 of 42	Cl. No. 5.7 (a)	HT MOTORS The CW pump drive motors should be sourced from a Manufacturer who have supplied at least two nos. of 6.6KV or above, vertical, DOL started squirrel cage induction motors of cooling type specified having rating 2000 KW or more and motor speed not exceeding 500 rpm synchronous, which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per NTPC and other SEBs standard. Bidder requests Owner to refer Annexure-11 for the same. Therefore, Bidder proposes the clause to be read as:The CW pump drive motors should be sourced from a Manufacturer who have supplied at least two nos. of 6.6KV or above, vertical, DOL started squirrel cage induction motors of cooling type specified having rating 2000 KW or more and motor speed not exceeding 500 rpm synchronous, which should have been in successful operation for at least two (2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bid speficiations to be followed.
929	Vol-II	Provenness	28 of 42	Cl. No. 5.7 (b)	HT MOTORS The offered Squirrel cage Induction motor shall be from such a Manufacturer who has manufactured and supplied motor of 10 MW or above rating, which should have been in successful operation in at least one (1) plant for a period not less than two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per NTPC and other SEBs standard. Bidder requests Owner to refer Annexure-11 for the same. Therefore, Bidder proposes the clause to be read as:The offered Squirrel cage Induction motor shall be from such a Manufacturer who has manufactured and supplied motor of 10 MW or above rating, which should have been in successful operation in at least one (1) plant for a period not less than two (2) years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid speficiations to be followed.
930	Vol-II	Provenness	28 of 42	Cl. No. 5.7 (c)	HT MOTORS The offered Squirrel cage Induction motor shall be from such a Manufacturer who has manufactured and supplied motor of 8 MW or above rating, which should have been in successful operation in at least one (1) plant for a period not less than two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per NTPC and other SEBs standard. Bidder requests Owner to refer Annexure-11 for the same. Therefore, Bidder proposes the clause to be read as:The offered Squirrel cage Induction motor shall be from such a Manufacturer who has manufactured and supplied motor of 8 MW or above rating, which should have been in successful operation in at least one (1) plant for a period not less than two (2) years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bid speficiations to be followed.
931	Vol-II	Provenness	28 of 42	Cl. No. 5.8	CONTROL CABLES The Bidder/ Sub Vendor should have manufactured and supplied prior to the date of Techno-Commercial bid opening the following: (a) At least 300 km of PVC insulated, PVC sheathed stranded copper conductor 1.1kV grade cables in one single contract (b) At least one (1) km of Flame retardant low smoke cables.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:The Bidder/ Sub Vendor should have manufactured and supplied ~~prior to the date of Techno-Commercial bid opening~~ the following: (a) At least 300 km of PVC insulated, PVC sheathed stranded copper conductor 1.1kV grade cables in one single contract (b) At least one (1) km of Flame retardant low smoke cables. Owner may please accept.	Bid speficiations to be followed.
932	Vol-II	Provenness	28 of 42	Cl. No. 5.9	1.1 KV POWER CABLES The Bidder/ Sub Vendor should have manufactured and supplied prior to the date of Techno-Commercial bid opening the following: (a) At least 100 km of aluminium conductor, XLPE insulated, PVC sheathed power cables of 1.1kV or higher grade in one single contract ... (d) 1.1kV or higher grade power cable of minimum 630sq.mm conductor size.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:The Bidder/ Sub Vendor should have manufactured and supplied ~~prior to the date of Techno-Commercial bid opening~~ the following: (a) At least 100 km of aluminium conductor, XLPE insulated, PVC sheathed power cables of 1.1kV or higher grade in one single contract ... (d) 1.1kV or higher grade power cable of minimum 630sq.mm conductor size. Owner may please accept.	Bid specifications to be followed, however clause 5.9(b) of Ch-4 at Sheet 28 of 42, Vol-II stands deleted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
933	Vol-II	Provenness	28 of 42	Cl. No. 5.10	HT POWER CABLES The Bidder/ Sub Vendor should have manufactured and supplied following cables, prior to the date of Techno-Commercial bid opening: (a) At least 50kms of XLPE insulated power cables of 6.35/11 KV or higher voltage grade, executed in one or more orders. (b) At least one (1) km of flame retardant low smoke cables of any voltage level.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:The Bidder/ Sub Vendor should have manufactured and supplied following cables, ~~prior to the date of Techno-Commercial bid opening:~~ (a) At least 50kms of XLPE insulated power cables of 6.35/11 KV or higher voltage grade, executed in one or more orders. (b) At least one (1) km of flame retardant low smoke cables of any voltage level. Owner may please accept.	Bid speficiations to be followed.
934	Vol-II	Provenness	29 of 42	Cl. No. 5.11	DG SETS The Bidder/ Sub Vendor should have supplied at least two (2) numbers of DG sets of rating not less than 1500 kVA, at least one (1) each at two (2) different installations, which is in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteriaas per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:The Bidder/ Sub Vendor should have supplied at least two (2) numbers of DG sets of rating not less than 1500 kVA, at least one (1) each at two (2) different installations, which is in successful operation for at least two (2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bid speficiations to be followed.
935	Vol-II	Provenness	29 of 42	Cl. No. 5.12	DC BATTERIES The Bidder / Sub Vendor should have manufactured and supplied at least two (2) numbers of highest offered rating or above of High Discharge type Plante type (in case bidder offers Lead Acid Plante type battery) or High Discharge type Nickel Cadmium battery (in case bidder offers Nickel Cadmium battery), at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:The Bidder / Sub Vendor should have manufactured and supplied at least two (2) numbers of highest offered rating or above of High Discharge type Plante type (in case bidder offers Lead Acid Plante type battery) or High Discharge type Nickel Cadmium battery (in case bidder offers Nickel Cadmium battery), at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bid speficiations to be followed.
936	Vol-II	Provenness	30 of 42	Cl. No. 5.13	BATTERY CHARGER The Bidder/Sub Vendor should have manufactured and supplied at least two (2) numbers of Static Automatic Voltage Regulator type Battery Chargers of highest offered rating or above, at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, the clause should be read as:The Bidder/Sub Vendor should have manufactured and supplied at least two (2) numbers of Static Automatic Voltage Regulator type Battery Chargers of highest offered rating or above, at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bid specifications to be followed, however in Clause 5.13 of Ch-4 at Sheet 29 of 42, Vol-II, the word "Static" is replaced with "SCR Based".
937	Vol-II	Provenness	30 of 42	Cl. No. 5.14.1	400 KV SWITCHYARD ...bays of 400 kV or above voltage class with a short circuit rating of not less than 50 kA for 1 second, which should have been in successful operation for a period of not less than two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:...bays of 400 kV or above voltage class with a short circuit rating of not less than 50 kA for 1 second, which should have been in successful operation for a period of not less than two (2) years ~~prior to the date of Techno-Commercial bid opening.~~Owner may please accept.	Bid speficiations to be followed.
938	Vol-II	Provenness	30 of 42	Cl. No. 5.14.2	400 kV AIS INSTRUMENT TRANSFORMERS 400 kV Instrument Transformers being offered should be from Manufacturer who have manufactured and supplied at least fifteen (15) Nos. of single phase Instrument Transformers suitable for Switchyard of 400 kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:400 kV Instrument Transformers being offered should be from Manufacturer who have manufactured and supplied at least fifteen (15) Nos. of single phase Instrument Transformers suitable for Switchyard of 400 kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening.~~Owner may please accept.	Bid speficiations to be followed.
939	Vol-II	Provenness	30 of 42	Cl. No. 5.14.5	400 kV AIS SURGE ARRESTORS 400kV Surge Arrestors being offered should be from Manufacturer who have manufactured and supplied at least fifteen (15) Nos. of single phase Surge Arrestors suitable for Switchyard of 400kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:400kV Surge Arrestors being offered should be from Manufacturer who have manufactured and supplied at least fifteen (15) Nos. of single phase Surge Arrestors suitable for Switchyard of 400kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening.~~Owner may please accept.	Bid speficiations to be followed.
940	Vol-II	Provenness	30 of 42	Cl. No. 5.14.6	220 kV CIRCUIT BREAKERS 220kV Circuit Breakers being offered should be from Manufacturer who have manufactured and supplied at least five (5) three phase circuit breakers suitable for Gas Insulated Substation/ Switchyard of 220 kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:220kV Circuit Breakers being offered should be from Manufacturer who have manufactured and supplied at least five (5) three phase circuit breakers suitable for Gas Insulated Substation/ Switchyard of 220 kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening.~~Owner may please accept.	Bid speficiations to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
941	Vol-II	Provenness	30 of 42	Cl. No. 5.14.7	220 kV INSTRUMENT TRANSFORMERS 220 kV Instrument Transformers being offered should be from Manufacturer who have manufactured and supplied at least fifteen (15) single phase Instrument Transformers suitable for gas Insulated Substation/ Switchyard of 220 kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:220 kV Instrument Transformers being offered should be from Manufacturer who have manufactured and supplied at least fifteen (15) single phase Instrument Transformers suitable for gas Insulated Substation/ Switchyard of 220 kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening.~~Owner may please accept.	Bid speficiations to be followed.
942	Vol-II	Provenness	30 of 42	Cl. No. 5.14.8	220 kV DISCONNECTORS 220kV Disconnectors being offered should be from Manufacturer who have manufactured and supplied at least five (5) three phase Disconnectors suitable for gas Insulated Substation/Switchyard of 220kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno- Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:220kV Disconnectors being offered should be from Manufacturer who have manufactured and supplied at least five (5) three phase Disconnectors suitable for gas Insulated Substation/Switchyard of 220kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening.~~Owner may please accept.	Bid speficiations to be followed.
943	Vol-II	Provenness	30 of 42	Cl. No. 5.14.9	220 kV SURGE ARRESTORS 220kV Surge Arrestors being offered should be from Manufacturer who have manufactured and supplied at least fifteen (15) single phase Surge Arrestors suitable for gas Insulated Substation/ Switchyard of 220kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:220kV Surge Arrestors being offered should be from Manufacturer who have manufactured and supplied at least fifteen (15) single phase Surge Arrestors suitable for gas Insulated Substation/ Switchyard of 220kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening.~~Owner may please accept.	Bid speficiations to be followed.
944	Vol-II	Provenness	31 of 42	Cl. No. 5.15	Substation Automation System & Protective Relays The Substation Automation System offered with distributed architecture should have been in successful operation in at least one (1) Substation/Switchyard of not less than 220 kV class for minimum two (2) years prior to the date of Techno-Commercial bid opening. The Generator Protection Relays, Transformer protection, Line Protection, the Bay Protection Units including the Bus bar protection and the energy metering System offered should be from manufacturer(s) who have manufactured and supplied the offered type of devices for respective equipment, which should have been in successful operation in a 500 MW or above unit/ 220 kV class or above Substation/Switchyard for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as:The Substation Automation System offered with distributed architecture should have been in successful operation in at least one (1) Substation/Switchyard of not less than 220 kV class for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening.~~ The Generator Protection Relays, Transformer protection, Line Protection, the Bay Protection Units including the Bus bar protection and the energy metering System offered should be from manufacturer(s) who have manufactured and supplied the offered type of devices for respective equipment, which should have been in successful operation in a 500 MW or above unit/ 220 kV class or above Substation/Switchyard for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening~~.	Bid speficiations to be followed.
945	Vol-IV	Ch1: Electrical Scope of Work	19 of 58	Cl. No. 1.13.00	The ECP shall accommodate all hardware required for manual synchronizing/ control/ metering of 400kV GT EHV breakers, 11 kV Unit & Station Switchboards incomers & tie feeders, 415V Turbine PMCC, Boiler PMCC, Emergency Services PMCC incomers & B/C breakers and electricals related to DG Set.	Bidder would like to clarify that in modern advanced power plant, electrical system shall be controlled and monitored from Switchgear SCADA system and, hence, the use of Electrical back up Control panel (ECP) is obsolete nowadays as per practice followed by NTPC/other SEBs. Since, the requirement of electrical system control and monitoring is met through SCADA and further interfacing with DDCMIS is already mentioned in tender specification, Owner may please review the requirement of Electrical Back up control panel (ECP).	Bid specifications to be followed. Further synchronizing/ control/ metering of outgoing feeders for Turbine service Transformer,Boiler service Transformer and Emergency service Transformer shall also be included in ECP. In ECP panel, bidder shall provide seprate manual synchronizing facilities for 400kV & 11kV/ 415 volt systems.
946	Vol-IV	Ch 35: Electrical Lab Equipment	3 of 31	Cl. No. 35.03.00	LIST OF ELECTRICAL LABORATORY EQUIPMENT	As per supplier's recommendation, Bidder proposes list of OEMs (refer annexure-14) to be considered for electrical lab equipment in addition to those mentioned in the tender specification based on their satisfactory performance in past supplies to NTPC/ other SEBs. Owner may please accept.	Make mentioned in clause no.- 35.03.00 are deleted and void. Bidder shall get approval of the owner for make of electrical lab equipments during detailed engineering.
947	Vol-IV	Ch1: Electrical Scope of Work	57 of 58	Cl. No. 1.49.01 b)	The Bidder shall only submit the reports of the type tests listed under Category II in CEA guidelines and which are not covered in (a) above for respective equipment which should have been carried out within last five (5) years from the date of bid opening.	Bidder proposes to allow the the validity of type test reports in lieu of conducting type tests as: within last 10 years from the date of bid opening as per latest CEA guidelines. Bidder understands CEA guidelines for type tests will supersede the tender specification. Owner may please confirm.	Noted. Validity of report of Type test shall be as per latest CEA recommendations.
948	General	-	-	-	LDO Booster pump	Bidder understands that power supply for LDO Booster pump will be available from the existing Stage-I switchgear, since the same will be installed near existing LDO tank.	No spare feeder is available in existing LT Switchgear. So new Booster pump loacted near Unit-2 LDO tank shall be fed from Unit-3 LT Switchgear.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
949	General	-	-	-	Raw water pump house	Bidder understands that power supply for raw water pump house of proposed 800 MW plant will be available from the nearby existing Stage-I switchgear, since this facility will be located near Stage-I plant.	The following spare feeders are available at site in the existing Raw Water MCC Room (near Reservior): Existing 415V RW PMCC:- 1. 125A- 02 Nos. 2. 1000A - 1 No. 3. 630A- 1 No. EXISTING 220V DCDB:- 1. 32A- 05 No. In case any other rating is required in PMCC/DCDB then suitable modification to be done by the bidder. Bidder to furnish the required rating of the feeders.
ESP							
950	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	174 of 186	11.00.00 point 2	Type of Fuel - Best Coal	In the reffered clause of ESP sizing criteria, Owner has asked to consider the Best coal also for ESP design. However, as per Coal Analysis given by Owner only Worst & Design coal is available. Request owner to kinldy update the ESP design criteria with Worst coal & Design coal only.	Best coal be considered as Design / Performance coal
	Volume II General & Schedules	Ch 2 : Project Information	05 of 10	APPENDIX – II	COAL QUALITY PARAMETERS - worst coal & Performance/ Design Fuel		
FGD							
951	Volume II General & Schedule	Ch 4: Provenness	41 of 42	Letter of support	LETTER OF SUPPORT FOR SATISFACTORY PERFORMANCE OF FGD SYSTEM FOR EPC PACKAGE	While going through the format of "Letter of Support (LOS)" furnished, we noted that the maximum liability of QFGDM towards Client under such LOS has not been specified therein. Owner is requested to specify the value of liability for Qualified Wet Limestone Based Flue Gas Desulfurization System Manufacturer (QFGDM) in the format of Letter of Support for FGD.	DJU is to be submitted instead of Letter of Support (LOS). Format of DJU is as per Attachment-23.
952	Volume II General & Schedule	Ch 4: Provenness	1 of 42	--	FGD system Proveness not available in tender document	Letter of Support format to be submitted by QFGDM has been provided in the tender documents. However, qualification/proveness criteria pertaining to FGD System is not available. Bidder requests Owner to kindly arrange for the needful.	The provenness criteria for FGD system is as per Attachment-24
	Volume II General & Schedule	Ch 4: Provenness	41 of 42	Letter of support	LETTER OF SUPPORT FOR SATISFACTORY PERFORMANCE OF FGD SYSTEM FOR EPC PACKAGE		
General							
953	Vol-III	Chapter 33, Layout requirements	5 of 11	33.4, (2)	Passage way between TG hall & first row of boiler column "12 M".	Bidder understands distance between TG hall (C-row) column and first row of boiler columns shall be 12 M. Clear passage width will be minimum 10 M.	Clear passage width shall be minimum 10M between C Row column and Bolier columns
954	Vol-VI	Ch 02: Scope of Work	6 of 7	2.6, (83)	RCC sump for collecting boiler blow down and ESP area floor washing for existing Units # - 1 & 2 and ash silo area washing is also covered under the scope of bidder and shall be pumped to proposed Ash Handling clarifier.	Bidder understands only floor wash from existing ESP area and Ash silo area shall be collected in 10 m3 sump and shall be pumped to Ash handling clarifier. Two pumps (1W+1S) of 15 m3/Hr is proposed for pumping collected floor wash in sump to Ash clarifier. Drains from the boiler blow down of the existing units shall be excluded from the bidders scope. Request owner to confirm bidders understanding.	Confirmed.
955	Vol-VI	Ch 02: Scope of Work	4 of 7	2.6, (63)	Rain water harvesting pond. The Pond shall be located at the lowest contour of the plant as far as feasible so that it can effectively collect all the rain water by gravity. HDPE lining and side stream Boulder pitching is also in the scope of bidder.	Bidder understands the drains from the proposed 800 MW shall be routed to Rain water harvesting pond through existing drains. Bidder proposes to provide 4 m deep trapezoidal pond with 1V:1.5H slope of size 25 m x 25 m at top with PCC lining. Two pumps (1W+1S) of 150 m3/Hr is proposed for pumping water from rain water harvesting pond to raw water reservoir. Please Confirm bidders proposal.	Rain water harvesting pond stands deleted from the scope of bidder. However, suitable storm water drainage network of proposed plant shall be connected to existing drain system of the existing plant to dispose off rain water to existing rain water holding pond. Bidder to ensure that ash laden water from fly ash silo area is not led to storm water drain network. It shall be led to ash slurry sump as indicated in vol.-III of specification. Further, water from rain water holding pond shall be pumped to raw water reservoir with 2x100 percent pumps (1W+1S). Suitable shed for pump and pipe network is also in the scope of bidder. Material of construction (MoC) of pumps shall be similar to raw water pumps.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
956	Vol-VI	Ch 22: Scope of Work	2 of 5	22.2.2, 10 (V)	The distance between terminal and dead end gantry shall be taken as 200 meters.	Bidders understands that bidder's scope shall be limited to terminating bay conductor upto outgoing line gantry located inside plant boundary wall. Request owner to confirm bidders understanding.	Outgoing gantry of the switchyard.
957	III VI	21 15	16 &17 of 21 2 of 2	Data Sheet Sr. No. 16.1 & 16.2 15.2	Fludizing Blower Silo - 3 (2W+1SB) -Location Silo Operating Platform ix) Silo utility building including Blower room	There is contradiction in referred tender clauses. In view of this, Bidder understanding that Fluidizing blower for silo will be placed in Silo operating platform in line with the practice followed in existing HPGCL yamunanagar project, Request Owner to confirm Bidder's understanding.	Silo fluidizing blower shall be located on silo operating platform.
958	VI	15	2 of 2	15.2 (IX)	Following facilities shall be provided near the silo as per Vol. III of specification. ix) Silo utility building including Blower room	Bidder understands that Silo utility building is not envisaged for the proposed unit in line with the existing units. Please confirm bidder's understanding.	Confirmed. Further note that, a sump of capacity 30 cu.m with 2 nos. horizontal pump for wash water shall be provided. The pumps shall be installed in an adequatly sized shed.
959	Vol-VI	Ch 2: Scope of Work	19 of 313	2.6 72)	New Security cum Main Gate Complex requirement	Bidder understands that there is an existing Security cum Main Gate Complex which is catering to the existing units. Construction of Material Entry Gate & Security Cabins for the New 1x 800 MW unit is in Bidder's scope. A separate new Security cum Main Gate Complex is not envisaged in the bidder's scope of work. Owner to confirm.	New main gate with new RCC security cabin of size 4m X 4m on both sides and toilet of suitable size shall be provided by the bidder.
960	Vol-VI	Ch 15: AHP	2 of 2	15.3	15.3 ASH PIPE SUPPORTING STRUCTURE Ash pipe from plant area to Ash Dyke will be supported on existing pedestal. Modification and strengthening of existing pedestals (wherever required) is in the scope of Bidder. If required, new pedestal to support ash pipe will also be constructed by the Bidder. Suitable arrangement including constructions of bridges/ culverts to cross the existing roads / drains in entire route of ash pipe is also in the scope of Bidder. Modification / strengthening of existing culverts in ash pipe route will be done by Bidder. Bidder has to perform all the activities complete in all respects including labour, material or any other requirements to the satisfaction of Engineer.	Bidder request to provide Civil drawings, GA drawings, pipe load details of existing pedestals to ascertain the feasibility of laying new slurry pipes on existing pedestals.	Available drawings have been shared with bidders. However, bidder may visit site for further details / information.
961	Vol-VI	Ch 04: Submissions	27 of 313	Point No. 3	Boundary Wall	Bidder understands that Boundary Wall is not envisaged in Bidder's scope of work as the same is already existing. Owner to confirm	Confirmed
962	Volume III Mechanical Works	Ch 5 : Water Treatment Plant	3 of 14	5.2.1 (j)	Rapid Gravity Filter (RGF) Six (6) Rapid Gravity Filters (4W+2S) of adequate capacity with dual media filtering material as per specification along with the necessary valves and instrumentation.	We suggest to have (1w+1sb) Rapid Gravity Filter (RGF) for DM water and potable water stream only. For CW make up water, we suggest clarified water quality (TSS : 10 ppm) is sufficient. Hence Rapid Gravity Filter (RGF) is not envisaged. Kindly check and confirm. Refer - Supporting documents attached as Annexure-M3	Bid specifications to be followed.
963	Volume I, Section III	Readiness of Site Leveling and Basic Infrastructure	40/60	1	Readiness of construction offices of HPGCL, Construction Stores, Steel Yard time schedule is 3-5 months	Bidder request sufficient time of 8-12 for construction offices of HPGCL, Construction Stores, Steel Yard time schedule	Bid specifications to be followed.
964	Volume I, Section III	Milestones Schedule for Steam Generator & Auxiliaries, Turbine Generator & BOP Packages	41/60	3, 4,6	Time schedule of Intermediate milestones	Time schedule of intermediate milestones need to be changed accoding to quantum of work, involved procedure of erection by contractor for Equipments (Boiler & Turbine packages) and piling work involvement. Hovewer time shedule for Trial Operation, PG Test and Final Taking over remains as provided in RFP document The milestones schedule mentioned are suggestive milestones schedule, bidder has flexibility to change dates for Intermediate milestones, keeping Trial Operation, PG Test and Final Taking over as per RFP Document Owner may please confirm.	Bid specifications to be followed.
Quality							

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
965	Volume II General & Schedules	Ch 5: General Technical Requirement	Sheet | 60 of 86	ANNEXURE - III	1. SYSTEM SUPPLIER/SUB-SUPPLIER APPROVAL STATUS CATEGORY (SHALL BE FILLED BY the Owner) A – For these items proposed vendor is acceptable to the Owner. To be indicated with letter "A" in the list alongwith the condition of approval, if any. DR – For these items "Details required" for the Owner review. To be identified with letter "DR" in the list. NOTED – For these items vendors are approved by Main Supplier and accepted by the Owner without specific vendor approval from the Owner. To be identified with "NOTED.' 2. QP/INSPN CATEGORY: CAT-I: For these items the Quality Plans are approved by the Owner and the final acceptance will be on physical inspection witness by the Owner. CAT-II: For these items the Quality Plans approved by the Owner. However no physical inspection shall be done by the Owner. The final acceptance by the Owner shall be on the basis review of documents as per approved QP. CAT-III: For these items Main Supplier approves the Quality Plans. The final acceptance by the Owner shall be on the basis certificate of conformance by the main supplier.	Bidder will be submitting Vendor list along with bid, however bidder may also submit additional vendor during execution stage.	Noted
966	Volume II General & Schedules	Ch 11 : Quality Assurance Requirements	Sheet | 3 of 14	2.4.2	2.4.2 After Award of Subcontract Once Sub-contractors and manufacturers are established, Owner and the Contractor shall review item-by-item all major engineered equipment and systems and any special fabrication/fitting to reach an agreement on the need for prefabrication/pre-inspection meetings.	Pre-inspection meeting will be done for Category I items and will be done once per PO placed by bidder. Bidder would also like to clarify, Pre inspection meeting may be done on virtual mode.	Bid specifications to be followed.
967	Volume II General & Schedules	Ch 11 : Quality Assurance Requirements	Sheet | 4 of 14	2.5.1	2.5.1 Inspection Plan Inspection plans with detailed instructions for the Inspector's guidance shall be provided for each item. The Contractor shall develop the QA plans for all other equipment/systems on a similar basis as indicated in the Tables above.	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 L&T & 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 L&T & 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 specifications to be followed.
968	Volume II General & Schedules	Ch 11 : Quality Assurance Requirements	Sheet | 4 of 14	2.5.2.3	All purchase orders shall have a clause requiring the Sub-Contractor to submit all questions of a technical nature concurrently to the QCPI and requisitioning Owner in writing through fax or letter for resolution.	Bidder request to submit these over email/online system and resolution shall be provided over email/online system	Noted
969	Volume II General & Schedules	Ch 11 : Quality Assurance Requirements	Sheet | 5 of 14	2.5.4	2.5.4 Inspector's Qualifications The Contractor shall submit with their QA/QC Manual resumes of contractor's inspectors detailing their experience, education and qualifications for Owners review/approval. The Inspectors shall have sufficient prior experience and qualifications for the equipment assigned.	The Inspectors shall have sufficient prior experience and qualifications for the equipment assigned. However separate approval for bidder/bidder representative for inspection activities is not envisaged	Bid specifications to be followed.
970	Volume II General & Schedules	Ch 11 : Quality Assurance Requirements	Sheet | 5 of 14	2.5.5	2.5.5 Inspectors responsibilities After receiving the assignment from the QCPI, the source Inspector shall review the order, conduct a pre-inspection meeting (when instructed), perform the inspections outlined, maintain field file in an organized manner and report the results to the key office and Owner.	Bidder request to perform pre-inspection meeting only for category I material and may be performed through virtual platform.	Bid specifications to be followed.
971	Volume II General & Schedules	Ch 11 : Quality Assurance Requirements	Sheet | 9 of 14	2.6.3.1	Prior to finalization of Contract award, the Contractor shall submit a detailed Field Quality Assurance Program for Owner's review. The program must be tailored to show compatibility with engineering design, compliance with applicable codes, specifications, standards, drawings, support documents, governmental regulations and this document.	Bidder clarified that, bidder will be submitting comprehensive quality program including manufacturing and field quality requirements.	Bid specifications to be followed.
972	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 15 of 103	2.6.3.2	4.0 Electrostatic Precipitators (ESP) d) Cupping test for deep drawn sheets.	As per latest IS 513, Cupping test is not mandatory. Bidder request to remove the requirement	Bid specifications to be followed , however issue may be discussed during detailed engineering.
973	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 15 of 103	2.6.3.2 ©	ESP Structure b) Also the butt and fillet welds for built up plates and columns shall be inspected by 100% MPI.	For all structural work mentioned in specification bidding would like to clarify PT may be performed in lieu of MPE Also where structural work mention in the specification with MPI: 100% root PT will be performed on all full penetration butt welds. 25% of weld length of tension member of crane girder and 5 % of weld length with minimum 300 mm length at each location shall be subjected to PT	Bid specifications to be followed , however issue may be discussed during detailed engineering.
974	Volume I (Tendernotice _1)	Section V: ECC	Sheet |28 of 62	35.12 (b)	MDCC shall be issued by RIO based on clearance from Site FQA head, Main contractor, Erection head for dispatch and supply of material. Strict adherence to sequential supply of material as per supply schedule.	Obtaining site FQA clearance for every MDCC will delay the process of clearance and further it will also delay the project. Considering the EPC project completion within the time frame, Owner to consider for main contractor to decide the delivery schedule to ensure the completeness of project within the schedule of Project. With respect to MDCC Issuance: Inspection and test will be carried out as per approved/mutually agreed QA Programme.. MDCC issuance by Employers manager/authorized representative will be applicable for components under category I mentioned in QA programme. For category II, III & IBR MDCC/IRN will be issued by L&T. Please confirm. Note: QA Programme is submitted as part of bid submission	Bid specifications to be followed.

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975	Volume 1 (Tendernotice _1)	Section – VI SCC	Sheet | 3 of 12	Cl 4.0	**Only after having obtained satisfactory results of internal inspection** and ensuring that all reference documents such as purchase specifications, drawings, QAP's and Testing Procedure for the purpose of inspection are approved by the Owner, the Contractor shall call the Owner's representative for inspection in line with requirements of the bidding documents.	Wherever it is possible and necessary, Contractor will ensure the internal results are ready and wherever it is required for joint inspection contractor will raise call for inspection accordingly.	Bid specifications to be followed.
976	Volume 1 (Tendernotice _1)	Section – VI SCC	Sheet | 4 of 12	Cl 4.4	The Contractor shall give the Owner fifteen (15) days written notice of any material being ready for testing.	The inspection notification shall be provided as per QA Program (submitted along with this bid) which will be subject to Owner's approval. Reduction from 15 days notification for Indian manufacturing will help in accurate call raising. Bidder clarifies that following is proposed for inspection notification a) Domestic: For Final Inspection - 7 working days b) Domestic: For stage inspection - 3 working days c) Overseas: Final Inspection - 15 working days	Bid specifications to be followed.
977	Volume 1 (Tendernotice _1)	Section – VI SCC	Sheet | 4 of 12	Cl 4.5	The Project In charge shall within fifteen (15) days from the date of inspection as defined herein give notice in writing to the Contractor, or any objection to any drawings and all or any equipment and workmanship which are in his opinion are not in accordance with the contract.	Bidder request the Project In charge shall within two (2) days from the date of inspection as defined herein give notice in writing to the Contractor, or any objection to any drawings and all or any equipment and workmanship which are in his opinion are not in accordance with the contract. this will delay in dispatch, proceeding with further stage of activities as well as will consume manufacturer factory space	Bid specifications to be followed.
978	Volume 1 (Tendernotice _1)	Section - IV : GCC	Sheet 27 of 80	16.1.4	16.1.4 The following documents shall be couriered to the Owner within seven (7) days from the date of shipment:- Inspection Certificates . Test certificate, wherever applicable (6copies) Invoice for Ocean freight (6 copies)	Bidder propose to submit applicable inspection certificates and test certificate in soft copy considering present facilities of Computer data and to save Green environment	Bid specifications to be followed.
979	Volume 1 (Tendernotice _1)	Section - IV : GCC	Sheet 58 of 80	43.3	43.3 The quality plan and the inspection requirement, finalized for the main equipment shall also be applicable to the corresponding spare parts.	Bidder understand In case items/consumables are not specifically mentioned in QAP, spare parts will be considered as Inspection Cat III (Main Contractor will share the COC) for further clearance by Owner / Owner Representative.	Bid specifications to be followed.
980	Volume 1 (Tendernotice _1)	Section V: ECC	Sheet |2 of 62	3.1	Makes of welding consumables shall be subject to Owner's approval.	Bidder propose to use electrode as per Bidder's Approved list of Welding consumable meeting ASME Sec II Part C. The Consumable batch test certificate submitted to customer for review.	Bid specifications to be followed.
981	Volume 1 (Tendernotice _1)	Section V: ECC	Sheet |2 of 62	3.2.1	Welder's qualification: In addition to such statutory qualification requirements, the welders shall also undergo a satisfactory pre-production qualification test to be conducted by the Contractor at site as per ASME Section IX in presence of Owner/Engineer, prior to performing work under these specifications.	Wherever required, main contractor will qualify welders as per mandatory requirements of ASME Section IX. If the welder is already qualified and required records are provided to Owner for records.	Bid specifications to be followed.
982	Volume 1 (Tendernotice _1)	Section V: ECC	Sheet |3 of 62	4.2, 4.3	4.2 The contractor & Owner's representative, at start and at the end of HT Cycle shall sign the time and temperature charts for heat-treatment. 4.3 After setting up the weld joint for heat treatment operation, the Owner's signature shall be obtained on the strips chart of the recorder prior to starting of heat treatment cycle.	As the HT cycle will start any time in the 24 hours cycle of the day. Main Contractor will certify the HT cycle. The signed HT Cycle chart will be shared with Owner for review.	Bid specifications to be followed.
983	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 4 of 86	5.7	Two (2) English language copies of all national and international codes and/or standards used in the design of the plant and equipment shall be provided by the Contractor to the Owner within two calendar months from the date of the Notification of Award	Main Contractor will show the relevant standards & codes during inspection as per requirement for review / reference.	Bid specifications to be followed.
984	Volume II General & Schedules	ANNEXURE-VI - DISTRIBUTION SCHEDULE Ch 5: General Technical Requirement	Sheet | 11 of 86 Sheet | 63 of 86	8.6.5 (iii)	ii) All documents submitted by the Contractor for Owner's review shall be in electronic form (soft copies) along with the desired number of hard copies as per Annexure-VI. iii) Final copies of the approved drawings along with requisite number of hard copies shall be submitted as per Annexure-VI.	Bidder propose to submit a soft copy of records considering present facilities of Computer data and to save green environment	Bid specifications to be followed.
985	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 21 of 86	22.2	The Quality Plan shall be submitted on electronic media e.g. CD or E-mail in addition to hard copy, for review and approval. After approval, the same shall be submitted in compiled form on CD-ROM	Bidder propose Quality Plans will be submitted through bidder online system in soft copy from instead hard copy and the Owner also can reply through system in soft copy so that the retrieval and the reachability of document will be easy and instant. As well as this will support green environment initiative	Bid specifications to be followed.

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986	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 22 of 86	22.4	Owner shall identify customer hold points (CHP), i.e. test/checks which shall be carried out in presence of the Owner's Project Manager or his authorized representative and beyond which the work will not proceed without consent of Owner in writing.	The inspection notification shall be provided as per QA Program (submitted along with this bid) which will be subject to Owner's approval. Reduction from 15 days notification for Indian manufacturing will help in accurate call raising. Bidder clarifies that following is proposed for inspection notification a) Domestic: For Final Inspection - 7 working days b) Domestic: For stage inspection - 3 working days c) Overseas: Final Inspection - 15 working days If not attended, the inspection will be completed and reports will be submitted for approval.	Bid specifications to be followed.
987	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 25 of 86	24.1	The Bidder shall be required to submit the QA Documentation in two hard copies and two CD ROMs, as identified in respective quality plan with tick (√) mark.	QA documentation will be submitted in soft copy electronic form instead of hard copies for easy handling at customer end and to save green environment.	Bid specifications to be followed.
988	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 25 of 86	24.6	24.6 Similarly, the Bidder shall be required to submit two sets (two hard copies and two CD ROMs), containing QA Documentation pertaining to field activities as per Approved Field Quality Plans and other agreed manuals/ procedures, prior to commissioning of individual system.	These documentation will be submitted in soft copy electronic form instead of hard copies for easy handling at customer end and to save green environment.	Bid specifications to be followed.
989	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 26 of 86	24.8	On release of QA Documentation by Inspector, one set of quality document shall be forwarded to Quality Assurance Department (@ Head Office) and other set to respective Project Site of Owner.	QA documentation will be submitted in soft copy electronic form instead of hard copies for easy handling at customer end and to save green environment.	Bid specifications to be followed.
990	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 30 of 86	29.6	In all the above cases, wherever the training of Owner's personnel is arranged at the works of the manufacturer's (within Owner's Country) it shall be noted that the lodging and boarding of the Owner's personnel shall be at the cost of Bidder. The Bidder shall make all necessary arrangements towards the same.	Bidder request wherever the training of Owner's personnel is arranged at the works of the manufacturer's (within Owner's Country) the lodging and boarding of the Owner's personnel shall be in Owner's scope. However, cost of training will be in Bidder's scope.	Bid specifications to be followed.
991	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 30 of 86	29.7	In case the training of Owner's personnel is arranged at the works of the manufacturer's (outside Owner's Country) it shall be noted that the all the expenses including travel, air fare, application processing fees, lodging and boarding of the Owner's personnel shall be at the cost of Bidder. The Bidder shall make all necessary arrangements towards the same.	Bidder is not envisaging any training outside Owner's country. However, in case of any such training needed as per the specification same will be conducted through virtual mode.	Bid specifications to be followed.
992	Volume II General & Schedules	Ch 11 : Quality Assurance Requirements	Sheet | 4 of 14	**2.4.4.1**	Suggested format for inspection request is enclosed with this chapter. The Contractor shall give advance notice of thirty (30) days for all overseas travel and fifteen (15) days for travel inside India.	The inspection notification shall be provided as per QA Program (submitted along with this bid) which will be subject to Owner's approval. Reduction from 15 days notification for Indian manufacturing will help in accurate call raising. Bidder clarifies that following is proposed for inspection notification a) Domestic: For Final Inspection - 7 working days b) Domestic: For stage inspection - 3 working days c) Overseas: Final Inspection - 15 working days If there is no reply from Owner /Owner representative, it is considered as MDCC issued by Owner / Owner representative. Main contractor will submit the invoice with submitted reports and 5th days reminder notification for Invoice Processing. and further initiating material dispatch.	Bid specifications to be followed.
993	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 5 of 103	V	**V. Fittings** 1. Raw material of all forged fitting shall be ultrasonically tested. All mother pipes used for formed fitting shall be ultrasonically tested as per BS 3602 or equivalent with longitudinal calibration notch of depth 5% of wall thickness (0.3mm min. and 1.5mm max.) shall be adhered to.	All mother pipes used for formed fittings shall be either ultrasonically tested as per ASTM E 213 or Hydrotested as per Pipe material specification.	Bid specifications to be followed.
994	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 5 of 103	V.2. (I)	i. 100% RT/UT shall be carried out both on alloy steel fittings and on carbon steel fittings.	In case, UT is performed as a volumetric examination, the extent of UT shall be as practically possible meeting codal requirement.	Bid specifications to be followed, however issue may be discussed during detailed engineering.
995	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 15 of 103	5.1 -I (b)	b) All pipe lengths shall be 100 % ultrasonic tested. However for critical piping applications (Main Steam, CRH, HRH, Feed water, spray to superheater and Reheater, HP/LP Bypass, Upstream of Aux PRDS and any other system in which alloy steel is used) shall be subjected to 100% ultrasonic examination as per EN 10246:7 1996 or equivalent with longitudinal calibration notch of depth 5% of wall thickness (0.3 mm min. and 1.5mm max.) shall be adhered to.	Bidder proposes to follow, as per ASME - Sec II A standard, 100% pipe lengths shall be subjected to either Ultrasonic test asper ASTM E 213 or Hydrotest.	Bid specifications to be followed, however issue may be discussed during detailed engineering.

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996	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 16 of 103	5.1 -II (a)	Raw material of all forged/formed fitting shall be ultrasonically tested	Raw material of forged fittings will be UT tested. Raw materials of formed fittings will be either Ultrasonically tested or Hydrotested.	Bid specifications to be followed.
997	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 17 of 103	5.1 -II (b) (i)	i. 100% RT/UT shall be carried out both on alloy steel fittings and on carbon steel fittings. - for use above 71 bar design condition. - for use above 400°C design condition. Ii) 100% MPE	It is not technically possible for all the fittings to carryout 100% RT/UT . As per the Clause 5.1 -II (b) (iii), 100% RT/UT shall be followed for the sizes above 200NB	Bid specifications to be followed.
998	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 18 of 103 Sheet | 29 of 103 Sheet | 37 of 103	5.1 -V (a) 2.6 b) 8.1 c)	Hardened/stellitted valve disc and seat are to be subjected to LPI and hardness check. b) Dye penetrant checks shall be carried out on stellited / nitride areas of components and stellite components in the finish ground or honed condition. Hardness check shall be carried out to ensure required hardness. c) Hardened/stellitted valve disc and seat are to be subjected to LPI and hardness check.	Hardness testing on seat/disc may be performed on a sample test coupon (PTC) instead of actual seat. The Sample test coupon will undergo same process as that of actual seat material and the hardness of this test coupon will be measured. As the hardness test on actual seat creates indentation on seat, which may become a leak path in the feature during the valve operation.	Bid specifications to be followed.
999	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 18 of 103 Sheet | 29 of 103 Sheet | 37 of 103	5.1 -V © 2.6 i) 8.1 d)	Color matching of valve disc/plug and seat shall be carried out to ensure min. 80% contact and no through passage. i) Colour matching of the valve disc and seat to ensure the required contact area is to be carried out. d) Colour matching of valve disc/plug and seat shall be carried out to ensure contact.	Colour matching shall not be performed as the valve shall be subjected to seat leak test which will ensure the required contact area	Noted.
1000	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 22 of 86	22.4	22.4 The Bidder shall also furnish copies of the reference documents/plant standards/acceptance norms/tests and inspection procedure etc., as referred in Quality Plans along with Quality Plans.	Copies of the reference documents/plant Standards/acceptance norms/tests and inspection procedure etc. will be limited for submittal due to the confidentiality. Procedure will be submitted for test and inspection to be witnessed can be submitted for information during detail engineering.	Bid specifications to be followed.
1001	Volume II General & Schedules	Ch 5 : General Technical Requirement	Sheet | 22 of 86	22.5	22.5 No material shall be dispatched from the manufacturer's works before the same is accepted, subsequent to pre dispatch final inspection including verification of records of all previous tests/inspections by Owner's Project Manager/ Authorized representative and duly authorized for dispatch by issuance of Material Dispatch Clearance Certificate (MDCC).	Inspection and test will be carried out as per approved/mutually agreed QA Programme.. MDCC issuance by Employers manager/authorized representative will be applicable for components under category I mentioned in QA programme. For category II&III MDCC/IRN will be issued by L&T. Please confirm. Note: QA Programme is submitted as part of bid submission	Bid specifications to be followed.
1002	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 33 of 103	6.1	6.1. All raw materials used shall have co-related mill test certificate meeting mandatory and supplementary checks of material specification.	All the raw materials mandatory requirements with co-related Mill Test Certificate will be supplied	Bid specifications to be followed.
1003	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 34 of 103 Sheet | 15 of 103	7.1 5.1	7.1. Piping and Fittings a) All raw materials used shall have co-related mill test certificate meeting mandatory and supplementary checks of material specification. 5.1 H.P.PIPING FOR STEAM GENERATOR AND AUX. I. Piping: a) All raw materials used shall have co-related mill test certificate meeting material specification. All test, as given in respective material code (other than supplementary requirements), shall be carried out as minimum.	All the raw materials mandatory requirements with co-related Mill Test Certificate will be used. This is inline with 5.1 of Ch11 : QAP (Mechanical) specification	Bid specifications to be followed.
1004	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 34 of 103	6)	6) For welds in P91, X20 & X22 materials, only induction type of heating shall be deployed for heat treatment.	Bidder may use induction heating or furnace heating forP91, X20 & X22 welding heat treatment	Bid specifications to be followed, however issue may be discussed during detailed engineering.
1005	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 39 of 103	8.3 (h)	After assembly, one valve of each size with respective actuator shall be shop operated over the full range of movement in both the directions, with the body subjected to the full hydrostatic pressure conditions, to demonstrate that the unit is in working order without any leakage through the joints and torque switches/clutches, limit switches are operating satisfactorily. During the test, hand wheel operation, opening/closing time and current drawn shall also be checked. The test shall be conducted for three consecutive cycles with valve shaft both in vertical and horizontal planes.	Butterfly valves will be tested for Hydro, Seal and disc strength test. Operational movement of the BFV will be checked without hydrotest pressure as it is already proven in the proof of design	Bid specifications to be followed.
1006	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 40 of 103	11.2	c) All welds between condenser neck and LP turbine shall be subjected to 100% radiographic and magnetic particle examination.	Due to space constraint between LP Turbine neck and expansion joint, Radiographic testing is not possible.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.

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1007	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 36 of 103	7.3 (i)	i) Life cycle test and burst test shall be carried out on bellows of each type, design and size. Test certificate for the same may be furnished for approval of Employer.	Rubber expansion joints will be procured from approved vendors and all the bellows will be checked for Hydro, Pneumatic and deflection tests. However Life cycle test and bursts test report of past executed project shall be submitted for reference	Bid specifications to be followed.
1008	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 40 of 103	11.2 (g)	Condenser water boxes shall be tested hydraulically at a minimum test pressure of 1.5 times the design pressure.	Water fill test shall be performed for condenser water box at site	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1009	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 41 of 103	12.0. CONDENSATE EXTRACTION PUMPS	CEP: Y5 -NPSH (R) test shall be carried out on one Condensate Extraction Pump using cold water at pump flows of 25%, 50%, 80%, 100% and 125% of Design Flow at Design Speed. This shall be preferably done at 1 % and 3% head break by Suction Throttling Procedure / varying suction pressure.	NPSH test with 3% head drop will be conducted & 1% head drop will be determined from the graph plotted by 3% head break. NPSH test will be done at reduced speed as per regular OEM's practice.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1010	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 41 of 103	12.0. CONDENSATE EXTRACTION PUMPS	2) Shop tests shall be conducted with soften Quality Water.	Water quality used for shop tests shall be as per approved manufacturer standard practice	Bid specifications to be followed.
1011	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 46 of 103	14.0. BOILER FEED PUMPS & DRIVE TURBINE	Thermal Shock	Based on reputed manufacturers for BFP's standard practice Thermal Shock test not performed. Please confirm your acceptance.	Noted.
1012	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 46 of 103	14.0. BOILER FEED PUMPS & DRIVE TURBINE	Pressure Pulsation Axial thrust Dry Running Thermal Shock Visual Cavitation Mech. Run test Other Tests	Test certificate for Pressure Pulsation, Axial thrust, Visual Cavitation of similar pump shall be submitted for Owners review. Type test certificates not older than 5 years from the date of bid opening shall be submitted. However Dry Running, Thermal Shock, other test (i.e. string test as per note no.06) is not possible to performed by most of the reputed manufacturers for BFP. Please confirm your acceptance.	Noted.
1013	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 47 of 103	Note Y(4)	**BFP:** 1(a) Performance Tests on each Boiler Feed Pump to determine the characteristic curve (Head, Capacity, Efficiency & Power) at Design Speed and to ensure compliance with design requirements specified in the specification. Measurement shall be carried out at 10%, 25%, 50%, 65%, 80%, 100% & 125% of Design Flow with loop water at design temperature. Performance Test at other specified Conditions shall be carried out on all Boiler Feed Pumps at their respective Speeds at design temperature.	Performance test of BFP will be done at reduced speed as per HIS / ISO guidelines. Bidder request to perform test with reduced speed (inline with Note 5 of the specification) and temperature. Manufacturer have test facility constraint for performing test at design speed and temperature. Also Note 5 of specification and based on HIS. bidder request to perform test at reduced speed and temperature	Bid specifications to be followed.
1014	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 47 of 103	Note Y(4)	**BFP:**String Test:- Operational Test of One Motor Driven Boiler Feed Pump assembly using contract Booster Pump, Drive Motor, Hydraulic Coupling and Main Boiler Feed Pump to include test as specified at 1 & 3 (a) & (b). Dry Run Test shall preferably be carried out during String Test.	Bidder requests to delete the String test requirements as per OEM recommendations. Further, all OEMs have confirmed that they do not have the test bed facility to conduct the string test. Please confirm acceptance..	Noted.
1015	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 47 of 103	4	**BFP:** Dry running withstand capability shall be demonstrated and established on one Boiler Feed Pump and its corresponding booster pump. Feed pump shall be capable of accepting complete loss of water and must be capable of being shut down in a controlled manner and brought down to rest after being tripped from design condition with simultaneous closure of suction valve. To demonstrate the capability during shop testing, suction valve actuation should be fast in order to ensure operation during vapour phase. Pump shall then be restarted and bring it back to design condition.	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. However, type test reports not older than 5 years shall be submitted.
1016	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 47 of 103	2	**BFP:** NPSH (R) test shall be carried out on one Boiler Feed Pump and one booster pump using cold water at pump flows of 25%, 50%, 80%, 100% and 125% of Design Flow at Design Speed. This shall be preferably done at 1 % and 3% head break by Suction Throttling Procedure.	NPSH test with 3% head drop will be conducted & 1% head drop will be determined from the graph plotted by 3% head break. NPSH test will be done at reduced speed as per regular OEM's practice.	Bid specifications to be followed. However the issue may be discussed during detailed engineering.
1017	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 47 of 103	2	**Drive Turbine of BFP:** Drive Turbine Tests as per relevant portion of specification	Drive turbine quality requirements are not specifically mentioned in the Quality Section of Specification. Bidder request to perform testing as per ASME PTC 6/API standard/ equivalent standard. Based on manufacturer design, testing of the pump will be performed	IEC45 (latest edition) be followed for Design parameters.
1018	Volume II General & Schedules	Ch11 : QAP (Mechanical)	Sheet | 56 of 103	Note Y(10)	**ECW System pumps:**Y10: Performance test shall be carried out with contract motor	Wherever Contract Motor specified in contract, bidder Chosen One Motor will be used for testing of CW Pumps at work shop. If the contract motor is not ready, then shop calibrated Motor will be used for Performance test.	Bid specifications to be followed.
1019	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 3 of 80	3.02.00	An indicative structure of contractor's QA & QC manpower required to be deployed at site is enclosed at Annexure-1.	There is no annexure, considering EPC Project, bidder would ensure quality requirement based on his practice of deployment of manpower.	Noted. The same shall be subject to HPGCL approval

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1020	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 7 of 80	7.01.00	7.01.00 All materials/components and equipment covered under the scope of work, shall be procured by the contractor for the purpose of the contract, after obtaining the written approval of the OWNER, which are to be manufactured at shop/ factory of the vendor/sub vendor shah be covered under a comprehensive quality assurance programme	Approval of QAPs shall be as per QA Programme i.e. only category I items QAPs shall be submitted to client for approval , Category II items shall be approved by Contractor & shall be submitted to client for information, For Category III items COC shall be submitted, For Category IBR QAP shall be approved by Contractor & submitted for clients information. IBR items will be accepted based on IBR certification. Witness of material based on approved QAP	Please follow Vol II, Ch-II Distribution Schedule
1021	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 7 of 80	7.01.00	The quality, plans shall be submitted on electronic form e.g. CD or E-.mail in addition to hard copy for review and approval of OWNER.	QAP will be submitted in soft copy electronic form instead of hard copies for easy handling at customer end and to save green environment.	Bid specifications to be followed.
1022	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 7 of 80	7.02.00	7.02.00 The contractor shall furnish copies of the reference documents/ plant standards/ acceptance norms/ tests and inspection procedure etc., as referred in quality plans. These quality plans and reference document/standards etc. will be subject to OWNER approval without which manufacturer shall not proceed. These approved documents shall form a part of the contract.	Approval of QAPs shall be as per QA Programme i.e. only category I items QAPs shall be submitted to client for approval , Category II items shall be approved by Contractor & shall be submitted to client for information, For Category III items COC shall be submitted, For Category IBR QAP shall be approved by Contractor & submitted for clients information. IBR items will be accepted based on IBR certification. Witness of material based on approved QAP	Bid specifications to be followed.
1023	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 7 of 80	7.02.00	7.04.00 Well before the start of the work, the contractor shall prepare and submit the Field Quality Plans (FQP) on the format No. QS-01-QAI-P-09/F2-R1, and obtain approval' of OWNER	Approval of FQAPs shall be as per QA Programme i.e. only category I items FQAPs shall be submitted to client for approval , Category II items shall be approved by Contractor & shall be submitted to client for information, For Category III items COC shall be submitted, For Category IBR FQAP shall be approved by Contractor & submitted for clients information. IBR items will be accepted based on IBR certification. Witness of material based on approved QAP	Bid specifications to be followed.
1024	Volume II General & Schedules		Sheet | 9 of 80	Sheet | 16 of 80	100% RT on Butt welds of tension flange (bottom flange) of crane girders. 10% RT weld length of each welder on butt welds, except for crane girders and coal bunker. 5% sopt RT on butt welds/at inaccessible locations UT on butt welds for coal bunker bins.	100% UT on web to flange joint of crane girder and 10% UT on other load bearing full penetration joint. 100% root PT will be performed on all full penetration butt welds. 25% of weld length of tension member of crane girder and 5 % of weld length with minimum 300 mm length at each location shall be subjected to PT	Bid specifications to be followed.
1025	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 16 of 80	Table . S.no. 4, S.No. ii	**Fillet Weld:** Macro-etch examination on production test coupons for main fillet welds Minimum one joint per built up beams, columns and crane girder etc.	Bidder would like to perform testing on material tube meeting referred material standard (Ex. ASME/ASTM). As per previous bidder experience referred standard has no requirement of Microscopic testing intern will not be able to accept the material based on any acceptance norm.	Noted.
1026	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 16 & 72 of 80	Table . S.no. 9, S.No. iv	Butt Weld: 100% RT on Butt welds of tension flange (bottom flange) of crane girders.	100% UT on web to flange joint of crane girder and 10% UT on other load bearing full penetration joint. 100% root PT will be performed on all full penetration butt welds. 25% of weld length of tension member of crane girder and 5 % of weld length with minimum 300 mm length at each location shall be subjected to PT	Bid specifications to be followed.
1027	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 16 & 72 of 80	Table . S.no. 8, S.No. iii	Mechanical testing of production test coupons	Qualified WPS and PQR with Welder Qualification (WPQ) performed as per reference standard. Qualified WPS/PQR/WPQ will be used in lieu of performing PTC As Qualified WPS/PQR/WPQ along with NDT will provide integrity and strength of the material	Noted.
1028	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 17 of 80	Table . S.no. 17, 18, 24, 25	S.No. 17, 24, : UT : Not Recommended S.No. 18, 25: RT - 5%	Bidder proposes to carryout UT/ PAUT/TOFD in lieu of RT	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1029	Volume II General & Schedules	Ch11 : QAP (Civil)	Sheet | 17 of 80	Table . S.no. 27	Hydraulic tests 1.5 times the design pressure or 2 times the working pressure whichever is higher.	Alternatively bidder proposes to carryout 100% RT /UT/ PAUT / TOFD in lieu of Hydrotest	Alternatively, 100% RT in lieu of Hydrotest is acceptable.
1030	Volume VI (Tendernotice _9)	Ch 07: Material	Sheet | 1 of 2	S.NO. 7.1	7.1 STRUCTURAL STEEL For plates above 20 mm thickness and welded construction steel conforming to Grade-B (killed and normalized)	For Plates above 20 mm and up to 40 mm steel will be supplied in hot rolled condition in line with BIS IS 2062. For plates above 40 mm steel shall be supplied in Normalized or Normalized rolled condition.	Shall be provided as per latest IS 2062.
1031	Volume VI (Tendernotice _9)	Ch 07: Material	Sheet | 1 of 2	S.NO. 7.1	7.1 STRUCTURAL STEEL Steel shall be procured from SAIL, RINL, TATA STEEL, JINDAL or any other approved main producers.	Main contractor proposes ArcelorMittal and Nippon Steel (Erstwhile Essar) or any other steel producer also to be included for Structural Steel raw materials supply.	Bid specifications to be followed.
1032	Volume VI (Tendernotice _9)	Ch 09: Steel Structure	Sheet | 18 of 28	S.No. 9.6	**9.16:** Plates above 25 mm thickness shall be subject to ultrasonic test as per ASTM-A435 or equivalent to check the presence of lamination	Main contractor proposes to use the plates above 40 mm will be subjected to Ultrasonic test as per ASTM - A 435 in line with all other Power Projects. As per SECTION - M1 STEAM GENERATOR & AUXILIRIES Boiler Structure, Ducts, Hoppers etc. "All plates of tension and compression flanges and connection material and plates above 40mm thickness shall be 100% ultrasonically tested." Bidder propose to use same.	Noted.
1033	Volume VI (Tendernotice _9)	Ch11 : QAP (Civil)	Sheet | 27 of 80	3	**3. Computers – 2 Nos shall be deployed with Windows operating system and connected to the Owner server.**	Bidder will supply 2 Nos. of computer with windows operating system, however connection to Owner's server shall be in Owner's scope considering IT policy of Owner.	Noted.
1034	Volume 2 (Tendernotice _9)	Ch11 : QAP (Civil)	16/28	9.15 G 1	Welding shall be done by experienced and good welders qualified by tests in accordance with IS:817.	Bidder propose to use ASME Sec IX addition to the clause provided	Noted.
1035	Volume 2 (Tendernotice _9)	Ch11 : QAP (Civil)	17/28	9.16	All butt weld shall be tested for 100% length by ultrasonic test	100% UT on web to flange joint of crane girder and 10% UT on other load bearing full penetration joint. 100% root PT will be performed on all full penetration butt welds. 25% of weld length of tension member of crane girder and 5 % of weld length with minimum 300 mm length at each location shall be subjected to PT	Noted.
1036	Volume 2 (Tendernotice _9)	Ch11 : QAP (Civil)	17/28	9.16	5% of the total length, dye-penetration test shall be carried out to the root and final run for fillet welds.	Root run DPT may not be required for fillet welds. Back gouge area DPT and final DPT will be carried out	Noted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1037	Volume 2 (Tendernotice _9)	Ch12	17/38	12.8.2	The installation procedure of the lining system shall be verified by installing the system on a transparent panel. Visual inspection shall be made of back, end and side joints.	Borosilicate: Approved procedure established by OEM will be followed. Verification of the system will be inline with OEM recommendations and practices	Noted.
1038	Volume 2 (Tendernotice _9)	Ch12	18/38	12.8.2	The lining system (borosilicate glass block and adhesive) supplier shall provide on-site technical support and QA/QC supervision, and shall employ QA/QC supervisors with a demonstrated experience of at least 5 years in technical support and QA/QC supervision of the subject lining system.	QA/QC supervision shall be deployed based on OEM authorisation letter only.	Noted.
1039	Volume 2 (Tendernotice _9)	Ch12	26/38	12.23	Each flue can shall have only two circumferential joints, thus forming a maximum of three rings. These rings shall be provided with full strength butt welding. Root runs of all the butt welds shall be tested by DPT. Seam welds in adjacent rings shall be staggered at least by 2000mm. seam welds shall also be provided with full strength butt welding. Root runs of all seam welds shall be inspected with DPT.	Root run DPT may not be required for butt welds as final DPT will be carried out for seam welds	Noted.
1040	VOLUME - II / GENERAL & SCHEDULES / PART A	Chapter 4 / Provenness	24 of 42	5.3.2	PROVENNESS : AUXILIARY OIL FILLED/ DRY TYPE TRANSFORMERS :Bidder/Sub Vendor should have his own facilities for conducting all routine and type tests as per IS: 2026 (except short circuit test).	Bidder would like to clarify that for Auxiliary Oil Filled Transformer / Dry Type of transformer conditions for own testing facilities except Short Circuit test) may be revised as Sub vendor should have his own Facilities for conducting routine and type tests as per IS 2026 **(except Short circuit and Impulse test)** Justification : Many of the renowned manufacturer who has good capability to manufacture quality transformer does not have impulse test facility in house. Impulse test for small transformer (below 132 KV) is a type test and generally not done as regular practice therefore manufacturer does not have inhouse facility, however as and when required they tie up with renowned third party labs like CPRI, ERDA etc. and conduct the impulse test Bidder request to consider same.	Bid specifications to be followed, however in clause 5.3 of Ch-4 at Sheet 25 of 42, Vol-II, the words "Auxiliary Oil Filled / Dry Type Transformers" be reread as "Auxiliary Oil Filled Tansformers".
1041	VOLUME - IV / ELECTRICAL	Chapter 4 / GIS	75 of 88	4.39.05 / GIS	Type Tests conducted at an internationally recognized laboratory (KEMA or equivalent) acceptable to Owner.	Bidder would like to clarify that GIS type test report of principals of Indian manufacturer shall be acceptable. Some of the test report of test conducted at inhouse lab of Principal manufacturer shall also be acceptable as they have recognized and established test lab	Noted. In Clause 4.39.05 (d) at page 75 of 44 of Chapter 4 of Vol.IV, both bullet points i.e ☐ *Type Tests conducted at an internationally recognized laboratory (KEMA or equivalent) acceptable to Owner.* ☐ *Repeated Type Tests conducted at the manufacturer's laboratory, witnessed by representatives from an internationally recognized laboratory (KEMA or equivalent) and accepted by owner.* above points are being replaced with following para: "on the equipment similar 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 or his representative."
1042	VOLUME - IV / ELECTRICAL	Chapter 4 / GIS	76 of 88	4.39.06	Routine test : c) Following tests shall be performed as routine tests in addition to the standard tests: At least one local control cubicle (LCC) shall be tested together with the GIS during factory acceptance tests	Bidder would like to clarify that routine test of GIS will be carried out with testing panel at Manufacturer works. However LCC panel will be tested at panel manufacturer works as per approved drawing	Noted.
1043	VOLUME - IV / ELECTRICAL	Chapter 4 / GIS	76 of 88	4.39.06	Routine test : c) Following tests shall be performed as routine tests in addition to the standard tests: Chattering time of the arc contact shall be measured and recorded at no-load operations	Bidder would like to clarify that the test is not performed as per manufacturer standard practice.	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1044	VOLUME - IV / ELECTRICAL	Chapter 6 / Part A / Power Transformer (Generator Transformer)	7 of 105	3.13.00	Power Transformer REJECTION The Owner may reject any transformer if during tests any of the following conditions arise: i) More than 10% of mentioned total guaranteed losses of each transformer. ii) The difference in impedance values of any two phases during single-phase short circuit impedance test exceeds 2 percent of the average value guaranteed by the Bidder. iii) The Owner reserves the right to retain the rejected transformer and take it into service until the Bidder replaces the defective transformer by a new transformer, within a reasonable period, complying the specification requirement, at Bidder's risk and cost	Bidder would like to propose Owner to consider IEC / IS tolerance also while reviewing the test result.	Bid specifications to be followed.
1045	VOLUME - IV / ELECTRICAL	Chapter 6 / Part A / Power Transformer (Generator Transformer)	7 of 105	4.01.00	Tanks i. Tank shall be of fabricated from good commercial grade low carbon steel of adequate thickness. Transformer tank shall be conventional type	Bidder would like to clarify that Bell Type transformer tank construction may also be allowed as per approved manufacturer's practice	Noted with the stipulation that the tank shall be of proven design of either Bell type with bolted/ welded joint or conventional (preferable) with bolted/welded top cover. Bell type tank, if provided, shall have joint as close as possible to the bottom of the tank.
1046	VOLUME - IV / ELECTRICAL	Chapter 6 / Part A / Power Transformer (Generator Transformer)	7 of 105	4.01.00	Tanks : iii. The requirement of post weld heat treatment for tank/stress relieving parts shall be based on recommendation of BS 5500 table 4.4.3.1.	Bidder would like to clarify that post weld heat treatment is not required in transformer tank as these are non pressure part items in line with manufacturer standard proven practice	Bid specifications to be followed, however applicable standard shall be IS 10801 in place of BS5500 table 4.4.3.1.
1047	VOLUME - IV / ELECTRICAL	Chapter 6 / Part A / Power Transformer (Generator Transformer)	7 of 105	4.01.00	xiii.. The hotspot temperature in any location of the tank shall not exceed 110 deg C at rated MVA. This shall be measured during temperature rise test at manufacturer's works.	Bidder would like to clarify that as per IEC, temperature of tank body shall be 130 deg C, bidder propose to consider the same	Bid specifications to be followed.
1048	VOLUME - IV / ELECTRICAL	Chapter 6 / Part A / Power Transformer (Generator Transformer)	11 of 105	4.05.02	First filling of oil along with 10% excess shall be furnished for each transformer. Excess Oil shall be supplied in non-returnable containers suitable for outdoor storage	Bidder would like to clarify this excess oil will be part of spare oil supplied.	Excess oil to be supplied with transformers in addition to spare oil mentioned in mandatory spares.
1049	VOLUME - IV / ELECTRICAL	Chapter 6 / Part A / Power Transformer (Generator Transformer)		4.15.01	4.15.00 TRANSPORTATION Transformer tank shall be dispatched filled with oil or pure dry inert Nitrogen gas depending upon the transport weight limitations. A positive pressure of 0.175 kg/sqcm during transportation and storage	Bidder would like to clarify that many of MNC Transformer manufacturer doesn't use nitrogen for transportation due to safety reasons therefore dry air may also be allowed	Transformer can be transported filled with dry air conforming to EN 12021 at positive pressure. The necessary arrangement shall be ensured by the supplier to take care of pressure drop of dry air during transit and storage till completion of oil filling during erection. The duration of the storage of transformer/reactor at site with dry air, shall be decided during detailed engineering.
1050	VOLUME - IV / ELECTRICAL	Chapter 6 / Part A / Power Transformer (Generator Transformer)	26 of 105	6.02.07	6.02.07 Short circuit test – Test procedure shall be as per IEC 60076-5.	Bidder would like to clarify that Short Circuit calculation shall be submitted	For Power Transformers (GT, ICT, ST and UT), Dynamic Short Circuit Withstand Test shall be conducted on one unit of each type and rating of transformers to validate the design and quality unless such tests has been successfully conducted as per Indian Standard 2026 Part-5 within last 10 years (as on last date of bid submission) on transformer of similar design. Further, Type Test report of transformer shall only be acceptable provided the offered transformer has been manufactured from the same plant. Criterion for similar design shall be as per Annexure-J of Central Elecricity Authority "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" and inline with the latest Central Electricity Authority "Technical Standard for Construction of Electrical Plants and Electrical Lines Regulations 2022".
1051	VOLUME - IV / ELECTRICAL	Chapter 6 / Part A / Power Transformer (Generator Transformer)	25 of 105	6.01.15	Degree of protection test for CMB/CCC	Bidder would like to clarify that DOP test is Type test and reports shall be submitted for the same	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1052	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART B - Power Transformer (Station Transformer)	33 of 105	3.13.00	Power Transformer REJECTION The Owner may reject any transformer if during tests any of the following conditions arise: i) More than 10% of mentioned total guaranteed losses of each transformer. ii) The difference in impedance values of any two phases during single-phase short circuit impedance test exceeds 2 percent of the average value guaranteed by the Bidder. iii) The Owner reserves the right to retain the rejected transformer and take it into service until the Bidder replaces the defective transformer by a new transformer, within a reasonable period, complying the specification requirement, at Bidder's risk and cost	Bidder would like to propose Owner to consider IEC / IS tolerance also while reviewing the test result.	Bid specifications to be followed.
1053	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART B - Power Transformer (Station Transformer)	33 of 105	4.01.00	Tanks i. Tank shall be of fabricated from good commercial grade low carbon steel of adequate thickness. Transformer tank shall be conventional type	Bidder would like to clarify that Bell Type transformer tank construction may also be allowed as per approved manufacturer's practice	Noted with the stipulation that the tank shall be of proven design of either Bell type with bolted/ welded joint or conventional (preferable) with bolted/welded top cover. Bell type tank, if provided, shall have joint as close as possible to the bottom of the tank.
1054	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART B - Power Transformer (Station Transformer)	33 of 105	4.01.00	Tanks : iii. The requirement of post weld heat treatment for tank/stress relieving parts shall be based on recommendation of BS 5500 table 4.4.3.1.	Bidder would like to clarify that post weld heat treatment is not required in transformer tank as these are non pressure part items	Bid specifications to be followed, however applicable standard shall be IS 10801 in place of BS5500 table 4.4.3.1.
1055	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART B - Power Transformer (Station Transformer)	35 of 105	4.01.00	xiii.. The hotspot temperature in any location of the tank shall not exceed 110 deg C at rated MVA. This shall be measured during temperature rise test at manufacturer's works.	Bidder would like to clarify that As per IEC temperature of tank body shall be 130 deg C, therefore same may be revised	Bid specifications to be followed.
1056	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART B - Power Transformer (Station Transformer)	39 of 105	4.05.02	First filling of oil along with 10% excess shall be furnished for each transformer. Excess Oil shall be supplied in non-returnable containers suitable for outdoor storage	Bidder would like to clarify this excess oil will be part of spare oil supplied	Excess oil to be supplied with transformers in addition to spare oil mentioned in mandatory spares.
1057	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART B - Power Transformer (Station Transformer)	45 of 105	4.15.01	4.15.00 TRANSPORTATION Transformer tank shall be dispatched filled with oil or pure dry inert Nitrogen gas depending upon the transport weight limitations. A positive pressure of 0.175 kg/sqcm during transportation and storage	Bidder would like to clarify that many of MNC Transformer companies due to safety reasons doesn't use nitrogen for transportation therefore dry air may also be allowed	Transformer can be transported filled with dry air conforming to EN 12021 at positive pressure. The necessary arrangement shall be ensured by the supplier to take care of pressure drop of dry air during transit and storage till completion of oil filling during erection. The duration of the storage of transformer/reactor at site with dry air, shall be decided during detailed engineering.
1058	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART B - Power Transformer (Station Transformer)	51 of 105	6.02.07	6.02.07 Short circuit test – Test procedure shall be as per IEC 60076-5.	Bidder would like to clarify that Short Circuit calculation shall be submitted	For Power Transformers (GT, ICT, ST and UT), Dynamic Short Circuit Withstand Test shall be conducted on one unit of each type and rating of transformers to validate the design and quality unless such tests has been successfully conducted as per Indian Standard 2026 Part-5 within last 10 years (as on last date of bid submission) on transformer of similar design. Further, Type Test report of transformer shall only be acceptable provided the offered transformer has been manufactured from the same plant. Criterion for similar design shall be as per Annexure-J of Central Elecricity Authority "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" and inline with the latest Central Electricity Authority "Technical Standard for Construction of Electrical Plants and Electrical Lines Regulations 2022".
1059	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART B - Power Transformer (Station Transformer)	50 of 105	6.01.15	Degree of protection test for CMB/CCC	Bidder would like to clarify that DOP test is Type test and reports shall be submitted for the same	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1060	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART C - Power Transformer (Unit Transformer)			Power TRansformer REJECTION The Owner may reject any transformer if during tests any of the following conditions arise: i) More than 10% of mentioned total guaranteed losses of each transformer. ii) The difference in impedance values of any two phases during single-phase short circuit impedance test exceeds 2 percent of the average value guaranteed by the Bidder. iii) The Owner reserves the right to retain the rejected transformer and take it into service until the Bidder replaces the defective transformer by a new transformer, within a reasonable period, complying the specification requirement, at Bidder's risk and cost	Bidder would like to propose Owner to consider IEC / IS tolerance also while reviewing the test result.	Bid specifications to be followed.
1061	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART C - Power Transformer (Unit Transformer)	59 of 105	4.01.00	Tanks : ivThe requirement of post weld heat treatment for tank/stress relieving parts shall be based on recommendation of BS 5500 table 4.4.3.1.	Bidder would like to clarify that post weld heat treatment is not required in transformer tank as these are non pressure part items	Bid specifications to be followed, however applicable standard shall be IS 10801 in place of BS5500 table 4.4.3.1.
1062	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART C - Power Transformer (Unit Transformer)	60 of 105	4.01.00	xiv. The hotspot temperature in any location of the tank shall not exceed 110 deg C at rated MVA. This shall be measured during temperature rise test at manufacturer's works.	Bidder would like to clarify that As per IEC temperature of tank body shall be 130 deg C, therefore same may be revised	Bid specifications to be followed.
1063	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART C - Power Transformer (Unit Transformer)	60 of 105	4.01.00	Tanks : xvii.)The manufacturer shall ensure that windings of all transformers are made in dust proof (Cleanroom class ISO 9 or better as per ISO 14644-1) and air-conditioned atmosphere.	We understand this clause is meant for Winding portion not for tank. We would like to clarify that above condition is mandated for transformers above 132 KV, below 132 KV same is not required	Clause is applicable for winding of transformers of rating 66KV and above.
1064	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART C - Power Transformer (Unit Transformer)	70 of 105	4.15.01	Transportation :Transformer tank shall be dispatched filled with oil or pure dry inert Nitrogen gas depending upon the transport weight limitations.	Bidder would like to clarify that many of MNC Transformer companies due to safety reasons doesn't use nitrogen for transportation therefore dry air may also be allowed	Transformer can be transported filled with dry air conforming to EN 12021 at positive pressure. The necessary arrangement shall be ensured by the supplier to take care of pressure drop of dry air during transit and storage till completion of oil filling during erection. The duration of the storage of transformer/reactor at site with dry air, shall be decided during detailed engineering.
1065	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART C - Power Transformer (Unit Transformer)	74 of 105	6.02.01	Dielectric type test (IEC60076-3) iii) Induced AC over voltage withstand test.	Bidder would like to clarify that as per IEC 60076 -3 for Transformers having Um </= 72.5 kV IVPD test a special test and not a type test	Noted. Induced AC over voltage withstand test shall not be applicale for Unit Transformers.
1066	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART C - Power Transformer (Unit Transformer)	74 of 105	6.02.04	LTAC test as per IEC 60076-3.	Bidder would like to clarify that LTAC test is not applicable for the transformer with Um </= 72.5 kV as per IEC 60076 -3, therefore this test will not be applicable for Unit Transformer	Noted. LTAC test shall not be applicale for Unit Transformers.
1067	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART C - Power Transformer (Unit Transformer)	74 of 105	6.02.07	6.02.07 Short circuit test – Test procedure shall be as per IEC 60076-5.	Bidder would like to clarify that Short Circuit calculation shall be submitted	For Power Transformers (GT, ICT, ST and UT), Dynamic Short Circuit Withstand Test shall be conducted on one unit of each type and rating of transformers to validate the design and quality unless such tests has been successfully conducted as per Indian Standard 2026 Part-5 within last 10 years (as on last date of bid submission) on transformer of similar design. Further, Type Test report of transformer shall only be acceptable provided the offered transformer has been manufactured from the same plant. Criterion for similar design shall be as per Annexure-J of Central Elecricity Authority "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV and above)" and inline with the latest Central Electricity Authority "Technical Standard for Construction of Electrical Plants and Electrical Lines Regulations 2022".
1068	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART D - Power Transformer (Interconnecting Transformer)	82 of 105	3.14.00	REJECTION The Owner may reject any transformer if during tests any of the following conditions arise: i) More than 10% of mentioned total guaranteed losses of each transformer. ii) The difference in impedance values of any two phases during single-phase short circuit impedance test exceeds 2 percent of the average value guaranteed by the Bidder. iii) The Owner reserves the right to retain the rejected transformer and take it into service until the Bidder replaces the defective transformer by a new transformer, within a reasonable period, complying the specification requirement, at Bidder's risk and cost.	Bidder would like to propose Owner to consider IEC / IS tolerance also while reviewing the test result.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1069	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART D - Power Transformer (Interconnecting Transformer)		4.01.00	Tank shall be of fabricated from good commercial grade low carbon steel of adequate thickness. Transformer tank shall be conventional type.	Bidder would like to clarify that Bell Type transformer tank construction may also be allowed as per approved manufacturer's practice	Noted with the stipulation that the tank shall be of proven design of either Bell type with bolted/ welded joint or conventional (preferable) with bolted/welded top cover. Bell type tank, if provided, shall have joint as close as possible to the bottom of the tank.
1070	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART D - Power Transformer (Interconnecting Transformer)	84 of 105	4.01.00	xiii. The hotspot temperature in any location of the tank shall not exceed 110 deg C at rated MVA. This shall be measured during temperature rise test at manufacturer's works.	Bidder would like to clarify that As per IEC temperature of tank body shall be 130 deg C, therefore same may be revised	Bid specifications to be followed.
1071	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART D - Power Transformer (Interconnecting Transformer)	82 / 83 of 105	4.01.00	iii. After construction of tank and before painting, Dye penetration test shall be carried out on welded part of Jacking boxes, lifting lugs and all load bearing members. The requirement of post weld heat treatment for tank/stress relieving parts shall be based on recommendation of BS 5500 table 4.4.3.1.	Bidder would like to clarify that post weld heat treatment is not required in transformer tank as these are non pressure part items	Bid specifications to be followed, however applicable standard shall be IS 10801 in place of BS5500 table 4.4.3.1.
1072	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART D - Power Transformer (Interconnecting Transformer)	93 of 105	4.15.01	Transportation : Transformer tank shall be dispatched filled with oil or pure dry inert Nitrogen gas depending upon the transport weight limitations.	Bidder would like to clarify that many of MNC Transformer companies due to safety reasons doesn't use nitrogen for transportation therefore dry air may also be allowed	Transformer can be transported filled with dry air conforming to EN 12021 at positive pressure. The necessary arrangement shall be ensured by the supplier to take care of pressure drop of dry air during transit and storage till completion of oil filling during erection. The duration of the storage of transformer/reactor at site with dry air, shall be decided during detailed engineering.
1073	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART D - Power Transformer (Interconnecting Transformer)	101 of 105	6.01.15	Degree of protection test for CMB/CCC.	Bidder would like to clarify this excess oil will be part of spare oil supplied	Query is not related to refered clause
1074	VOLUME - IV / ELECTRICAL	Chapter 6/ / PART D - Power Transformer (Interconnecting Transformer)	102 of 205	6.02.07	Short circuit test – Test procedure shall be as per IEC 60076-5.	Bidder would like to clarify that DOP test is Type test and reports shall be submitted for the same	Query is not related to refered clause
1075	Volume II General & Schedule	Ch11 : QAP (Civil	4 of 80	4.03.00	Before execution of any civil work the contractor shall conduct full-scale suitability tests on various construction and building material such as fine and coarse aggregates, cement, reinforcement, construction chemicals, supplementary cementitious materials and construction water to ascertain their suitability for use and the concrete mix designs conducted from reputed institutes such as IIT's, etc. as agreed by the engineer. The test samples for such full scale testing shall be jointly sampled and sealed by the engineer and contractor, thereafter these shall be sent to the concerned laboratory through the covering letter signed by field quality assurance (FQA) representative of the engineer.	Before execution of any civil work the contractor shall conduct full-scale suitability tests on various construction and building material such as fine and coarse aggregates, cement, reinforcement, construction chemicals, supplementary cementitious materials and construction water to ascertain their suitability for use and the concrete mix designs conducted from reputed institutes such as **IIT's, NITs, CSMRS-Delhi, NABL accredited Laboratories and in-house lab at site etc.** as agreed by the engineer. The test samples for such full scale testing shall be jointly sampled and sealed by the engineer and contractor, thereafter these shall be sent to the concerned laboratory through the covering letter signed by field quality assurance (FQA) representative of the engineer.	Bid specifications to be followed.
1076	Volume II General & Schedule	Ch11 : QAP (Civil	11 of 80	11.01.04	CONCRETE WORKS For concreting works provisions of technical specifications and IS: 466 shall apply.	CONCRETE WORKS: Bidder understand IS 466 is not relevant for concreting. For concreting works provisions of technical specifications and **IS: 456** shall apply.	Noted
1077	Volume II General & Schedule	Ch11 : QAP (Civil	22 of 80	11.01.11	PILING WORK PILE LOAD TEST Pile load testing shall conform to the requirements of IS-2991 (Part IV) and the technical specification. Initial load tests as specified in the contract documents shall be conducted to assess the safe load carrying capacity of pile before start of work to verify the load carrying capacity of the working piles, routine load test shall be conducted.	PILING WORK Bidder understand IS 2991 is not relevant for piling work. PILE LOAD TEST Pile load testing shall conform to the requirements of **IS-2911 (Part IV)** and the technical specification. Initial load tests as specified in the contract documents shall be conducted to assess the safe load carrying capacity of pile before start of work to verify the load carrying capacity of the working piles, routine load test shall be conducted.	Noted
1078	Volume VI Civil, Structural & Architectural Works	Ch 12: RCC Chimney	9 of 38	12.4	GRADES OF CONCRETE AND STEEL Concrete grade to be used for foundation and shell shall be M30 (minimum). Cement content in concrete shall not be less than 400kg/m^3. Cement to be used for pile cap and above grade level shall be 43 grade ordinary port land cement. Only one grade of cement shall be used throughout the structure.	GRADES OF CONCRETE AND STEEL Concrete grade to be used for foundation and shell shall be M30 (minimum). Minimum Cement content in concrete shall be **maintained as specified in Table-1 Chapter- RCC structure & foundations of Volume VI - Civil, Structural & Architectural Works or Table-5 of IS:456.** Cement to be used for pile cap and above grade level shall be 43 grade ordinary port land cement. Only one grade of cement shall be used throughout the structure.	Bid specifications to be followed.
Civil Structural & Architectural							

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1079	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 14: CHP Ch 08:Loading	Sheet 14 of 22 Sheet 3 of 5	14.17 8.2	LOADING Walkways (including walkways in conveyor/cable galleries) **300 Kgs. / m2** IMPOSED LOADS b)iii) Cable gallery **0.5 T/Sq.m**) K)vii) Walkways (General) : **0.50 T/sq.m** K)viii) Walkways of conveyor galleries : **0.50 T/sq.m**	Said clauses are contradictory. Bidder proposes to consider walkways live loads as 300 Kgs. /m^2 for CHP conveyor/cable galleries as per clause 14.17.	Noted.
1080	Volume III Mechanical Works Volume VI CIVIL, STRUCTURAL & ARCHITECTUR	Ch: 19 Coal Handling System Ch 14: CHP	Sheet 9 of 120 Sheet 5 of 22	1.1.11 14.3 & 14.4	Steel frame construction Junction towers, Sampling Tower & Crusher House Buildings etc with **RCC roof** and RCC floors complete with side cladding of permanently color coated zincalume sheet minimum 0.55mm TCT (total coated thickness), 550 MPa tensile strength IS: 277 & IS: 513 / equivalent approved, complete with 1000 mm wide stair case with hand railing & toe plate, rain water pipes etc. / FRP panels (translucent sheets) provided (for natural lighting). Roof shall be provided with troughed profile permanently colour coated sheet on outside and plain permanently colour coated sheet on inside with 50mm thick mineral wool insulation in between the two sheets. A slope of 1 in 5 shall be provided for quick drainage of rain water.	Said clauses for roof type in transfer house and crusher house are contradictory. Bidder proposes to consider clause 14.3 & 14.4 for transfer houses and crusher house. Please confirm	Flat RCC roof over deck sheet shall be provided for all Transfer houses and Crusher houses. Deck sheet shall be considered as shuttering material only. Thickness of RCC excluding corrugations shall be 150 mm. Roof shall be designed for solar panel load also.
1081	Volume III Mechanical Works Volume VI CIVIL, STRUCTURAL & ARCHITECTUR	Ch: 19 Coal Handling System Ch 14: CHP	Sheet 9 of 120 Sheet 3 of 22	1.1.11 14.2	Conveyors galleries complete with walkway & hand railing with toe plate and supporting trestles for all conveyors. Roof and side cladding of permanently color coated zincalume sheet minimum 0.55mm TCT (Total coated thickness), 550 MPa tensile strength IS: 277 & IS: 513 / equal approved. FRP panels (Translucent sheets) provided (for natural lighting) on both side of gallery and roof (every sixth panel). Minimum crossover per enclosed drawings shall be provided. Conveyor gallery shall have permanently colour coated steel sheet covers on roof and both sides. However in roof, a panel of minimum 1.5 m x 1.5 m area at about 6.0 m center shall be provided with translucent sheets of polycarbonate material for natural lighting.	The requirements of translucent sheet as mentioned under clause 1.1.11 and 14.2 are contradictory. Bidder understands that Translucent sheets of polycarbonate material shall be provided only at conveyor galleries roof as per clause 14.2. Please confirm.	Polycarbonate sheets shall be provided on both sides and roof of Conveyor Gallery
1082	Volume III Mechanical Works Volume VI CIVIL, STRUCTURAL & ARCHITECTUR	Ch: 19 Coal Handling System Ch 14: CHP	Sheet 9 of 120 Sheet 29 of 120 Sheet 3 of 22	1.1.11 1.10 14.2	Minimum **5mm** thk. Seal plate (throughout gallery) for each conveyor. **5mm** thk. MS (IS:2062) seal plate shall be provided throughout conveyor gallery for all conveyor which are installed in overhead conveyor gallery The floor of conveyor gallery all along the gallery length, shall be provided with minimum **12 gauge** thick seal plates and other drainage arrangements as specified elsewhere.	Mentioned clauses are contradictory. Bidder proposes to use 12 gauge thick seal plate at floor of conveyor gallery as per clause 14.2. Kindly confirm.	Noted.
1083	Volume III Mechanical Works Volume VI CIVIL, STRUCTURAL & ARCHITECTUR	Ch: 19 Coal Handling System Ch 14: CHP	Sheet 16 of 120 Sheet 6 of 22	1.5.13 14.4	**Two (2) external Independent steel staircase** up to roof level [minimum 1200 mm (clear) width] shall be provided for Crusher house building with landing facility at all floors. **Two staircases** shall be provided one inside and one outside, both of structural steel. Elevator shall also be provided serving all the floors.	Mentioned clauses about number of external staircase in crusher house are contradictory. Bidder proposes to consider clause 14.4 having one inside and one outside staircase in crusher house. Please confirm	Follow Clause 14.4
1084	Volume III Mechanical Works Volume VI CIVIL, STRUCTURAL & ARCHITECTUR	Ch: 19 Coal Handling System Ch 14: CHP	Sheet 16 of 120 Sheet 9 of 22	1.5.13 14.11	Two (2) external Independent steel staircase up to roof level [minimum **1200 mm** (clear) width] shall be provided for Crusher house building with landing facility at all floors. All stairs of overground portion of transfer houses & crusher house shall be of steel (minimum **1000 mm** wide)and maximum rise should not be more than 180 mm and minimum tread width 250 mm.	Mentioned clauses about width of staircase in crusher house are contradictory. Bidder proposes to consider 1000mm wide staircase in crusher house. Kindly confirm.	Provide 1200 mm wide staircase

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1085	Volume III Mechanical Works Volume VI CIVIL, STRUCTURAL & ARCHITECTUR	Ch: 19 Coal Handling System Ch 14: CHP	Sheet 16 of 120 Sheet 9 of 22	1.5.13 14.11	For underground / semi ground Junction Towers minimum **1200mm** wide RCC stair shall be provided. RCC staircase[**1200mm** wide] shall be provided for approach to Tail/ portion of Conveyor/ other equipment etc which are located in pit/ underground portion of Wagon tippler Complex/ Junction Towers with landings facility on all floors. The minimum width of stairs for MCC/Control room shall be **1200mm** wide and for reclaim hopper/underground TP's shall be **1000mm**.	Width of RCC staircase in case of reclaim hopper/underground TP's are contradictory in mentioned clauses. Bidder proposes to consider 1000mm wide staircase for reclaim hopper/underground TP's. Please confirm.	Consider 1200 mm wide staircase
1086	Volume VI CIVIL, STRUCTURAL & ARCHITECTUR AL WORKS	Ch 09:Steel Structures	Sheet 5 of 28	9.4	MINIMUM THICKNESS OF STRUCTURAL STEEL ELEMENTS a)Trusses, purlins, girts and bracing: 6mm b)Column & beams: 8mm	Bidder understands that specified limit of minimum thickness is applicable only for flange thickness in case of purlin, girts, columns & beam having I-section or Channel sections irrespective of web thickness. Please confirm.	Noted. (For rolled sections only)
1087	Volume II General & Schedules Volume VI CIVIL, STRUCTURAL & ARCHITECTUR	Ch 7: Painting Ch 9: Steel Structures	Sheet 12 of 15 Sheet 9 of 18	Table 9.9	PAINTING SCHEME FOR C2 AMD C3 ENVIRONMENT sl. No. 5: Coal Handling Plant - Total DFT 260µ Painting : **Coal handling** and ash handling structures : Total Dft (Micron) 225	Mentioned clauses are contradictory regarding **Coal handling Plant/Structure** painting DFT. Bidder request owner to confirm painting DFT as 260 or 225 micron for **Coal handling Plant/Structure**.	275 microns shall be considered (refer attached revised painting schedule attached as Attachment 18).
1088	Volume VI CIVIL, STRUCTURAL & ARCHITECTUR AL WORKS	Ch 14: CHP	Sheet 3 of 22	14.2	OVERHEAD / GROUND CONVEYOR GALLERIES AND TRESTLES Overhead conveyors shall be located in a suitably enclosed gallery of structural steel. The overhead gallery shall consist of two vertical latticed girders having rigid jointed portal frame at both ends. Cross beams at floor level supporting conveyor stringer beams shall be made of single rolled steel beam or single channel section (ISMB or ISMC) or plate girder.	Bidder proposes owner to allow use of hollow section in conveyor gallery roof truss & bracings.	Bid specifications to be followed.
1089	Volume VI CIVIL, STRUCTURAL & ARCHITECTUR AL WORKS	Ch 21: Water Supply, Drainage & Sanitation Ch 14: CHP	Sheet 4 of 13 Sheet 8 of 22	5.07.00 14.1	The sewerage system of foul water from toilet shall include layout and laying of sewers up to a sewage treatment plant together with all fittings and fixture and inclusive of ancillary works such as connections, installation of man-hole and inspection chambers. Toilet with potable water line facilities shall be provided in each of the following locations: Crusher House (Ground Floor) In all M. C. C./ Control Room building	Stage II CHP facilities are remotely located and scattered in overall plant layout. It is difficult to provide and connect sewerage network for all CHP facilities with common STP. Bidder proposes to provide separate package type STP for mentioned CHP facilities. Please confirm.	Shall be discussed during detailed engineering
1090	Volume VI CIVIL, STRUCTURAL & ARCHITECTUR AL WORKS	Ch 14: CHP	Sheet 10 of 22	14.13.1	For Conveyors in Main plant area each down comer shall lead the water / coal slurry to RCC pit (of 2 Cu.M capacity) to allow settling of coal. The water from the pit shall overflow into R.C.C drain, which will lead the discharge finally into trunk drain routed alongside the nearby road. For TP's in Main plant area, each down comer shall lead the water / coal slurry into the peripheral drains (Brick drains with steel gratings provided around the building) which will lead the water / coal slurry to RCC drain and finally into trunk drain routed alongside the nearby road.	Bidder understands that 3JT-4, 3JT-5, 3JT-6, 3JT-7, 3JT-8, 3JT-9, 3JT-10 and connecting conveyors (from 3JT to 4 to 3JT-10) coal slurry water shall be connected to nearby road side storm water drain/trunk drain. Same is not required to be routed to coal settling pond. Kindly confirm.	Shall be discussed during detailed engineering
1091	Volume VI CIVIL, STRUCTURAL & ARCHITECTUR AL WORKS	Ch 14: CHP Ch 10:RCC structures &	Sheet 13 of 22 Sheet 10 of	14.15 10.9	The grade slab shall consists of 230 mm thick rubble soling (63 mm downgraded hard stone aggregate as per IRC specification, watering and compaction to minimum of 95% Standard Proctor density, including filling the interstices of stone aggregates with sand), over well compacted earth, overlaid by 75 mm thick P. C. C. M-7.5 and **100 mm thick** R. C. C. of grade M-20 with minimum 8 mm dia bars placed at 200 mm C / C in either direction respectively. The paving construction shall be as per specifications for the grade slab at ground level. MINIMUM THICKNESS OF STRUCTURAL ELEMENTS Ground floor slab (non-suspended) : **150 mm** Paving : **150 mm**	Mentioned clauses are contradictory regarding thickness of grade slab and paving. Bidder proposes to follow clause 14.15 for thickness of grade slab and paving.	Follow Clause 14.15 with RCC thickness of 150 mm.

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1092	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 14:CHP Ch 07:Material Ch 09:Steel Structure	Sheet 13 of 22 Sheet 3 of 22 Sheet 1 of 2 Sheet 5 of 28	14.15 14.2 7.1 9.4	Chequered plates (used for platforms, walkways etc.) shall be minimum **6 mm** thick o/p or as indicated on drawings. The walkways shall be chequered plate construction of minimum 8mm thick with anti - skid arrangement. Chequered plate shall conform to IS: 3502 (latest) and minimum thickness of chequered plate for floorings, covers etc shall be **8 mm** O/P. MINIMUM THICKNESS OF STRUCTURAL STEEL ELEMENTS e) Chequered plates **8 mm** o/p & above	Mentioned clauses are contradictory regarding minimum thickness of chequered plate for CHP facilities. Bidder proposes to use minimum 6mm thk. o/p chequered plate as per cl. 14.15 for CHP facilities. Please confirm.	Follow Clause 14.15
1093	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 14: CHP	Sh 11 of 22	14.13.2	All open drains shall have removable steel grating designed for loads as specified under loading clause. Minimum size of main bar of grating (Galvanised to 610 gm/m2) shall be 12 mm x 3mm and cross bars 6mm.	Bidder understands that removable grating on drains shall be provided only for coal slurry drains. Road side storm water drains is not required to be covered with grating. Please confirm.	Confirmed
1094	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 14: CHP	Sheet 10 of 22	14.13.1	The drainage arrangements shall be so planned so as to ensure quick disposal of drainage water without stagnation and / or overflow.	Bidder requests Owner to provide Stage I road and storm water drain drawings.	Bidder to visit the site and collect the information.
1095	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 10: RCC Structures & Foundations	Sheet 1 of 36	14.18 DESIGN CRITERIA	For all other under ground structurers not in contact with liquid on inside face may be designed as cracked sections with crack width limited to 0.1mm for both faces.	Bidder proposes to consider 0.1mm crack width of CHP underground structures (Wagon Tippler, Tunnel, TP, ERH) for exposed earth face only. Inside face shall be designed for 0.2mm crack width as per clause 35.3.2 IS 456:2000. Kindly confirm.	Bid specifications to be followed.
1096	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 14: CHP	Sheet 5 of 22	14.2	Ground conveyor portals shall be provided at a maximum spacing of 3 m	Bidder propose Owner that spacing of ground conveyor portal shall be finalised based on design requirement which may greater than specified spacing limit of 3m. Please confirm.	Shall be discussed during detailed engineering
1097	Volume VII TENDER DRAWINGS	Drawing No.111-29-0200		Plot plan		Reclaim hopper 3RHC (underground structure) is located in close vicinity of existing Stage-I tunnel. Bidder request Owner to provide existing tunnel GA drawing.	Bidder to visit the site and collect the information.
1098	Volume VII TENDER DRAWINGS	Drawing No.111-29-0200		Plot plan		Conveyors between Stage-II transfer points 3JT-2, 3JT-3, 3JT-4 are crossing existing Stage I facilities. Bidder requests Owner to provide superstructure and substructure drawings of Stage-I crusher house, Coal conveyor BC3A, Coal conveyor BC4A/4B, Coal conveyor BC5A/5B, Transfer point JT3, JT4.	Bidder to visit the site and collect the information.
1099	Volume VII TENDER DRAWINGS	Drawing No.111-29-0200		Plot plan		Stage II CHP transfer point 3JT-6 & 3JT-7 are located adjacent to existing Silo pipe rack. Bidder requests Owner to provide superstructure and substructure drawing of existing Silo pipe rack.	Bidder to visit the site and collect the information.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1100	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 14: CHP	Sheet 1 of 22 Sheet 7 of 22 Sheet 14 of 22	14.1 WAGON TIPPLER, RECLAIM HOPPER AND UNDERGROUND TUNNEL 14.5 STACKER RECLAIMER FOUNDATION 14.17 LOADING	The vertical and inclined portion of coal hopper, the beams in the wagon tippler hopper structure as shown in the **tender drawing** shall be provided with 50 mm thick guniting (shotcreting). Drains shall be routed on both sides of the foundation along the rail as shown in **Tender Drawing**. Roof-truss members are to be checked for supporting fire fighting pipes/ Service water pipes. Tentative locations and diameter for pipes are shown in **Tender Drawing**.	Mentioned Tender drawings in specified clauses are not available in Tender documents. Bidder request Owner to furnish mentioned Tender drawings e.g. Wagon tippler (including expansion joint details), stacker reclaimer and conveyor tender drawings	Shall be discussed during detailed engineering
1101	Vol-VI	Chapter-10(RCC Structures & Foundations)	3 of 36	Cl. No. 10.7	TG foundation shall be supported on vibration isolation system. The vibration isolation system shall consist of steel helical spring units and viscous dampers supporting the RCC deck which would support the machine. The spring units shall conform to DIN 2089 and DIN 2096. GERB or equivalent manufacturer's vibration isolation system shall be supplied for supporting TG foundation. Isolation efficiency of at least 90% shall be provided for the Turbo generator.	As per our OEM practice, Bidder proposes to support the Steam Turbine Equipment Top Deck on RC rigid frame foundation without any Vibration Isolation System and in compliance with the manufacturer's performance criterion. Bidder have supplied many machines in India & outside India without any VIS and the plants are in operation. Bidder have extensive experience of designing the Turbo-generator Foundations (Dynamic Analysis) for NTPC projects also without any VIS. Please confirm acceptance.	Confirmed.
1102	Vol-VI	Chapter-6 (General Requirement of Buildings & Structures)	12 of 12	Cl. No. 6.19	These shall include provision of continuous walkway (minimum 750 mm wide) along crane-girder at crane girder level on both sides of the building, comfortable approach to EOT crane.	Bidder requests Owner that the Minimum width of Walkway may be reduced suitably at Column Locations	Bid specifications to be followed.
1103	Vol-VI	Chapter-9 (Steel Structures)	2 of 28	Cl. No. 9.2	**The design of steel structures shall be done by Limit state method. Design shall be as per provision of IS:800 (latest) and other relevant IS standards.** Permissible stresses for different members shall be allowed to exceed up to 33.33% only under normal loads along with wind and seismic conditions. The members which are designed primarily to resist wind load such as bracing members ,no increase in permissible stress will be permitted. However, permissible stresses in bolts and welds shall be allowed to exceed up to 25 % only under wind and seismic conditions.	Bidder understands that the Design of Steel Structures shall be as per IS 800 : 2007 using Limit State Method of Design. All other clauses of Working Stress Method including increase in permissible stresses shall be superseded by this. **Owner to confirm the same.**	Bid specifications to be followed.
1104	Vol-VI	Chapter-19 (Surveying Works)	2 of 2	Cl. No. 19.3	**HYDROGRAPHIC SURVEY** Hydrographic survey need to be carried out when intake well / pump house or any other structure is located inside or close to a water body like river, lake etc. This is essentially to find out the topography of the river bed / lake bed through soundings taken from surface of water body usually by employing boats. The hydrographic survey should be carried with proper datum so that topographic details on land outside the water body and the area submerged are linked appropriately. For locating and finalising the details of drawal scheme, in addition to the topography of river bed / lake bed, data on maximum water level / minimum water level will be required. For drawal from river or streams, cross section of the river / stream at a few locations will be needed. For establishing the availability of required quantum of water throughout the year gauge discharge data / flow data for the river / stream has to collect. In case the stream / river is not gauged, the discharge availability has to be established by correlating the data available elsewhere or by correlating with rainfall data. A report on the studies conducted shall be submitted to the OWNER for his reference.	Hydrographic survey is not required since intake well/pump house is not included in Bidder's scope. Please confirm.	Confirmed.
1105	Vol-VI	Chapter-23 (CONCRETE ROAD AND RIGID PAVEMENT) Chapter-21 (Water Supply, Drainage & Sanitation)	2 of 2 1 of 13	Cl. No. 23.1 Cl. No. 21.2 e)	On either side of type I and type II roads and on one side of type III roads, open drains shall be provided. **Minimum clear width of drains shall be 600mm**. The drains shall be designed and built using RCC. However, for road crossings etc., pipe of class NP3 SHALL BE PROVIDED. For rail crossings, pipes conforming to railway loading standards shall be provided. If sufficient clearance cannot be provided between the top of the pipe and road top, the pipes shall be encased in RCC. **Minimum clear width of drain shall be 300 mm.**	There are discrepancies among the clauses. Bidder shall consider 300mm as minimum clear width of storm water drain as per Cl No. 21.2.e. Please confirm.	Minimum clear width shall be kept 450 mm.
1106	Vol-VI	Chapter-21(Water Supply, Drainage & Sanitation)	4 of 13	Cl. No. 21.4	RCC sump for collecting boiler blow down and ESP area floor washing for unit-I & II and ash silo washing is also covered under the scope of bidder.	Bidder understands the effluent waste to be handled is from existing unit. Bidder requests Owner to provide all the relevant information like type of waste, quality, Volume of water to be considered, Location of Pit & Discharge Point, etc.	To be decided during detailed engineering.

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1107	Volume VI : Civil, Structural & Architectural Works Volume I Conditions of Contract: Commercial & General	Chapter-02(Scope of Work) Section V: ECC	7 of 7 24 of 62	Cl. No. 2.6, Point 85 (xiv.) 32.0	Successful bidder to erect a temporary curtain wall of approximately **10 M high** using structural steel members and sheet to isolate proposed construction site from existing plant. Length of curtain wall is approximately 400m. Although exact length to be verified by bidder during site visit before bidding. CONTRACTOR'S AREA LIMITS Necessary barricading of the existing facilities from the construction area, to avoid any interference. Necessary barricading of the existing facilities from the construction area, to avoid any interference. The height of barricading shall not be less than **30 feet.** For the construction, material handling and labour movement for the packages which are interlinked with the existing plant facilities, necessary permission be taken by the Contractor in order to avoid infringement with the operation/ Generation of the existing Units.	a. Bidder requests owner to specify location of temporary curtain wall. b. Bidder understands that owner would allow temporary low height (approx. 2.5m) curtain wall instead of 10 M high curtain wall (or 30 feet height barricading) using structural steel/other materials. Please confirm. c. Bidder understands that this temporary curtain walls/alternative partition can be taken away/dismantled by Bidder after completion of construction work. Please confirm.	Follow Specification Volume VI.
1108	Volume VI : Civil, Structural & Architectural Works	Chapter-2 (Scope of Work)	2 of 7	Cl. No. 2.6	19. Complete desilting of both compartments of existing Raw water reservoir inside plant boundary is in the scope of bidder.	Reservoir - De-siltation activity is part of regular O&M scope and should not be clubbed with EPC scope of work. Owner is requested to de-scope desilting activity from EPC Scope of work. Owner to kindly amend the existing clause accordingly.	Desilting of existing raw water reservoir stands deleted from the scope of bidder.
1109	Volume VI : Civil, Structural & Architectural Works	Chapter-2 (Scope of Work)	2 of 7	Cl. No. 2.6	19. Complete desilting of both compartments of existing Raw water reservoir inside plant boundary is in the scope of bidder.	a) Bidder understands that repairing of reservoir lining (Precast tiles, concrete slab, HDPE liner, etc.) or embankment after completion of de-siltation work, is not included in Bidder's scope. Please confirm. b) In case after de-siltation work, Owner insist EPC contractor to repair the reservoir lining (Precast tiles, concrete slab, HDPE liner, etc.) or embankment then the same will be considered as Change Order and its financial implication shall be mutually discussed and finalized. Please confirm.	Desilting including repairing of existing raw water reservoir stands deleted from the scope of bidder.
1110	Volume III Volume III	CHAPTER – 33 CHAPTER – 3	2 of 11 6 of 19	33.1.2 e) 3.4.21	e) Fuel storage tanks, hydrogen storage complex, etc., shall be designed in accordance with statutory agency guidelines. i) 200 Hydrogen gas cylinders iii)100 Carbon Dioxide Cylinders	Owner to note that requirement of storage shed for H2 and CO2 cylinder is not mentioned in Tender Specification and Plot Plan. Owner to confirm whether storage shed for the envisaged H2 and CO2 cylinders has to be provided by Bidder. If storage shed for H2 and CO2 cylinders has to be provided by bidder, Owner to please furnish the following to keep all bidders at par : 1. Minimum dimensions of such storage shed 2. Type of storage shed (Open/Semi covered/Covered) 3. Location of storage shed 4. Type of shed (RCC/Structure)	Storage shed is required. The shed shall be suitable to store all the cylinders specified in the tender. Type of storage shed shall be semi covered in steel construction. Location of the shed shall be decided during detailed engineering
1111	Volume VI Civil, Structural & Architectural Works	CHAPTER – 2 SCOPE OF WORK	7 of 7	2.6	85. (xiv.) All existing roads of the plants to be used by successful bidder for transportation of material during construction period shall be rebuild after finish of construction activities at site.	a. Bidder requests Owner to specify separate approach road which can be used exclusively for new plant construction activities. b. Bidder understands that existing roads of the plants shall not to be used extensively during proposed plant construction activities. Hence, rebuilding of existing road shall be excluded from EPC Bidder's scope of work. Please confirm.	Bid specifications to be followed.
1112	Volume I Conditions of Contract: Commercial & General	Section V: ECC	16 of 62	27.5	SPACE The clearance required from Forest Department/any other department shall be to Contractor's account. The Owner shall provide the necessary assistance, if required.	There are discrepancies among the clauses. As per ANNEXURE- G (GCC) , taking Statutory approvals for Forest Clearance is Owner's Responsibility. Hence, Bidder understands that taking clearance Forest Department/any other department shall **not** be to Contractor's account. Please confirm.	Taking statutory approvals from Forest department shall be in Bidder's scope. HPGCL shall facilitate to obtain the clearance for tree cutting
1113	Volume VI Civil, Structural & Architectural Works	Ch 07: Material	1 of 2	7.2	**CEMENT** Ordinary Portland cement 43/53 grade conforming to IS: 8112 and, IS: 12269 shall be used for all structural work and special structure and for foundation. Portland pozzolana cement conforming to (IS: 1489, part-1) shall be used for plastering work, fill concrete and PCC. Sulphate resistant cement, conforming to IS-12330, shall be used in concrete mixes when concrete is exposed to aggressive soil/water conditions. Cement manufacturer shall be approved by the Owner.	Bidder requests Owner to allow use of Fly Ash Cement except for machine foundation, chimney and NDCT. This is inline with specifications followed in NTPC projects. Please confirm	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1114	Volume VI Civil, Structural & Architectural Works	Ch: 11 - Building Description	17 of 18	11.2	**RAILWAY SIDING SYSTEM** The work shall be carried out as per the latest Indian Standard / recognized international standards and should be capable of handling 4 wheeler wagons / box wagon / N-type wagon runs on broad gauge line. **The lines shall be laid as per the layout approved by Indian Railway**	a) Owner to share the Indian Railway approved Feasibility report (FR) and Detailed Project Report (DPR) for Railway siding work for proposed 1x800 MW unit. b) In case Owner has not prepared the FR and DPR then Bidder understand that the same shall be shared with Bidders atleast two months before submission of Price Bid. Approval of FR from Indian Railway authorities is a long lead item and cannot be clubbed in EPC schedule. Owner to confirm the Bidder's understanding with respect to aforesaid points.	Bid specifications to be followed. Feasibility report (FR) and Detailed Project Report (DPR) to be prepared by successful bidder with the consultancy of approved agency like RITES etc. and submitted to HPGCL for necessary approval. All railway siding work as per specifications is in the scope of bidder..
1115	Volume VI Civil, Structural & Architectural Works	Ch: 02 - Scope of work	5 of 7	64.0	Tentative list of various civil works covered under the scope is given below:..... 64. Railway siding system and locomotive shed.	Railway siding is a specialized work undertaken by government agencies like RITES, IRCON etc. Bidder requests Owner to exclude Railway siding work from EPC scope of work.	Bid specifications to be followed. In the scope of bidder.
FGD - CIVIL & STRUCTURAL							
1116	Volume -II /Part-A	Chapter 4	34 of 42	7.4	....at least one reinforced concrete chimney of minimum 220 M height.	The bidder understands that stack shall be designed as wet stack and its height shall be calculated as per MoEF formula considering FGD in operation only. The higher of MoEF formula and 150m shall be considered for stack height. Kindly confirm.	Confirmed.
1117	Volume -VI	Chapter 3	01 of 05	3.1.5	Size, concrete grade and other design parameters and construction details etc. for 275m high RCC chimney with steel single flue.		
1118	Volume -VI	Chapter 2	02 of 07	2.6	...Minimum 150 M height.		
1119	Volume -III	Chapter 29	03 of 15	29.2.1.4.1	Total vertical travel (M) : 275		
1120	Volume -VI	Chapter 12	05 of 38	12.3.1.0	The concrete shell shall be designed as per working stress method as per following load combinations. The modular ratio shall be calculated as per Annexure B of IS 456. a) Dead load. b) Dead load + Wind Load c) Dead load + Earthquake forces. d) Dead load + Temperature effect. e) Dead load + Wind load + Temperature effect. f) Dead load + Earthquake force + Temperature effect. g) Circumferential stresses due to temperature effect.	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.	Confirmed.
1121	Volume -VI	Chapter 12	01 of 38	12.2	b) IS:4998 : Criteria for design of reinforced concrete chimneys – Part 1 Design Criteria -1975 c) IS:4998 : Criteria for design of reinforced concrete Part 1 Assessment of loads - 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.	Latest codes shall be followed along with the specifications.
1122	Volume -VI	Chapter 12	04 of 38	12.3.4	**Thermal Effect**		
1123	Volume -VI	Chapter 12	04 of 38	12.3.6	**Wind Load** Wind load calculation will be done as per IS:4998 (Part-1) and....		
1124	Volume -VI	Chapter 12	05 of 38	12.3.9	**Ring Moments Due to Wind** The circumferential ring moment due to wind will be calculated in accordance with clause 5.4 of IS:4998 (Part-I) – 1992. The wind induced stresses in concrete and steel shall be calculated in accordance with Cl. No. D-2.2.7, D-2.2.8 and D-2.2.9 of IS:4998 (Part-I) – 1975.		
1125	Volume -VI	Chapter 12	10 of 38	12.4	For transfer of vertical reaction to wind shield from the supporting beams at platform level, increase in permissible bearing pressure in concrete shall not be considered as permitted at the base of columns as per clause 34.4 of IS 456.		
1126	Volume -VI	Chapter 12	04 of 38	12.3.5	Importance factor to be considered for seismic analysis of chimney is 1.75	As per latest AMENDMENT NO. 1 came on July 2022 for IS 4998-2015, chimney Earthquake loads shall be computed in accordance with IS 1893 (Part 4) ,in which importance factor for RCC chimney(Table-9) is given 1.5. Therefore bidder would like to consider 1.5 importance factor for chimney earthquake design. Please confirm.	Confirmed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1127	Volume -VI	Chapter 12	07 of 38	12.3.10	The maximum width of opening shall be limited to an angle of not more than 30 degree subtended at centre of concrete shell.	As per latest AMENDMENT NO. 1 came on July 2022 for IS 4998-2015,Bidder request client to consider opening requirements as per clause 7 of IS 4998 : 2015 as following: 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 30 degrees. Please confirm.	Bid specifications to be followed.
1128	Volume -VI	Chapter 12	07 of 38	12.3.10	The total plan area of openings at a particular section shall not be more than 15% of plan area of concrete shell at that location.	As per latest AMENDMENT NO. 1 came on July 2022 for IS 4998-2015,Bidder request client to consider opening requirements as per clause 7 of IS 4998 : 2015 as following: The cumulative of all opening angles at any cross-section shall not exceed 72° (72/360*100 = 20 %). Therefore bidder would like to consider 20% plan area in place of 15%. Please confirm.	Bid specifications to be followed.
1129	Volume -VI	Chapter 12	06 of 38	12.3.10	Minimum thickness of the shell at the top shall be 500mm & at junction of shell & pile cap shall be 950mm.	The bidder proposes the minimum 500mm thickness on the top of raft/pile cap in line with ongoing FGD projects by NTPC/DVC.	Minimum thickness of shell shall be 500 mm.
1130	Volume -VI	Chapter 12	10 of 38	12.5.1	The Transition ducting shall be suitably profiled form a Rectangular shape at chimney inlet to Circular shape where it shall be connected to the suspended circular steel liners…	The bidder understands that flue duct shall be designed as per EPRI guide. Therefore, no transition from rectangular to circular is envisaged as per revised EPRI guide. Request OWNER to remove this clause.	Confirmed.
1131	Volume -VI	Chapter 12	10 of 38	12.5.1	The Liner shall be pf corrosion resistant steel type " CORTEN-B of minimum 10 mm thick.	The bidder request Owner to allow Mild steel 8mm thickness (minimum) as MOC for flue liner in-line with ongoing FGD projects by NTPC/DVC etc.	Bid specifications to be followed.
1132	Volume -VI	Chapter 12	22 of 38	12.14	The suitcase shall be supported by a structural steel framework supported from platform to platform independently of the wind shield.	There is a ambiguity in the clauses The bidder proposes to support the staircase on the RCC shell in-line with ongoing FGD jobs by NTPC/DVC. Request OWNER to consider the same.	Follow Clause 12.14.
1133	Volume -VI	Chapter 12	9 of 38	12.3.10	Embedments to support the staircase shall be provided in the shell.		
1134	Volume -VI	Chapter 12	12 of 38	12.6	The Flue shall be insulated externally.	Owing to excellent insulation properties, no insulation is required in case of borosilicate lining on the inner face of the flue liner/chimney inlet duct. Bidder request owner to remove the insulation requirements.	External Insulation stands deleted
1135	Volume -VI	Chapter 12	31 of 38	12.29	Working stress method shall be adopted for the design of foundation.	The working stress method is obsolete now a days. The bidder request owner to allow design of all chimney components as per limit state method as per applicable IS codes in-line with ongoing FGD projects by NTPC/DVCL etc.	Bid specifications to be followed.
1136	Volume -VI	Chapter 12	19 of 38	12.9	The beams shall be painted with 2 coats of zinc silicate primer & 2 coats of heat & acid resistant epoxy paint of approved brand & shade surface preparation as per IS : 1477.	Internal platform Beams are not exposed to gas. Hence normal anti corrosion paint is serve the purpose. Kindly confirm.	Bid specifications to be followed.
1137	Volume -VI	Chapter 12	20 of 38	12.10	**EXTERNAL PLATFORM** External platform shall be provided as per directorate of air routes and aerodynamics(DARA) ….	External platforms are obsolete these days. Moreover, DARA circulars are superseded by DGCA/ICAO guidelines. Also, external platforms have schedule and safety concerns. The bidder request Owner to remove the provision of external platforms as aviation warning lights can be installed on door mounted on RCC shell as per requirements of ICAO/DARA.	Shall be discussed during detailed engineering.
1138	Volume -VI	Chapter 12	10 of 38	12.5.1	Stainless steel liner shall commence immediately above the flue supporting platform but below the roof supporting structure.	Bidder would like to propose 8mm MS flue lined with Borosilicate lining for the liner portion above roof inline with current experience in similar FGD cum bypass chimneys. Kindly confirm.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1139	Volume -VI	Chapter 12	10 of 38	12.5.1	Clean-out door shall be provided below the each flue for the removal of ash.	The bidder request OWNER to remove this clause as stack is designed as wet stack, and there will not be any ash accumulation for cleaning. Kindly confirm.	Clean-out door stands deleted.
1140	Volume -VI	Chapter 12	13 of 38	12.80	External surface of chimney flue liner projecting over the chimney roof shall be wrapped with 3 mm thick Titanium sheet.	Bidder would like to propose 2 mm Titanium wrapping inline with current experience in similar FGD cum bypass chimneys. Kindly confirm.	Bid specifications to be followed.
1141	Volume -VI	Chapter 12	13 of 38	12.60	The liner hood provided at top of flue shall be fabricated from 6mm thick(minimum) stainless steel sheets of grade 316L.	Bidder would like to propose 2 mm Titanium wrapping inline with current experience in similar FGD cum bypass chimneys. Kindly confirm.	Confirmed.
1142	Volume -VI	Chapter 12	13 of 38	12.8.1	Chimney Liner Materials All materials shall conform to IS codes. However, the following shall apply: The flue duct shall be lined internally with Borosilicate glass blocks of 51mm thick.	Bidder understands that chimney shall be having 8mm thk MS flue, which shall be lined with 38 mm thick Borosilicate glass block. The same is being followed in all NTPC projects.	Bid specifications to be followed.
1143	Volume -VI	Chapter 12	11 of 38	12.5.1	Load Bearing and Side Restraints of Flues Load bearing insulation assembly to have (i) a properly machined…..	The bidder request owner to proceed with additional option of hanger type assembly along with support bracket arrangement.	Shall be discussed during detailed engineering.
1144	Volume -VI	Chapter 03	03 of 05	3.2.3	Proof checking of structural design of following structures shall be got from SERC Chennai or IIT Roorkee by the Contractor at his own cost. (b) Chimney profile laser testing and Non Destructive testing of Concrete Wind Shell.	Bidder understands that Proof check for the chimney shell profile & NDT for wind shell are the only scope to be considered in the Bid. Kindly confirm. We also understand that additional structural design proof checks for chimney shell & foundations are not envisaged as the same may result in a delay of overall approvals & progress at site by approximately 3 to 6 months.	Bid specifications to be followed.
1145	Volume -VI	Chapter 12	14 of 38	12.8.2	Borosilicate Blocks: ii) Compressive strength of at least 1.38 Mpa / 1.1 N/Sq.mm as per ASTM C.165	There is the ambiguity in the compressive strength. The bidder request OWNER to confirm the compressive strength for the borosilicate blocks.	Shall be discussed during detailed engineering.
1146	Volume -VI	Chapter 12	15 of 38	12.8.2	Specification for surface preparation for steel substrate. ☐ The steel surface shall be grit blasted to a cleanliness of SA 2 1/2 and approved by the supplier of the lining system	The bidder request OWNER to allow shot blasting in place of grit blasting because of statutory/HSE concerns regarding the grit blasting.	Shall be discussed during detailed engineering.
1147	Volume -VI	Chapter 12	16 of 38	12.8.2	☐ The temperature for mixing the main material and hardener shall be about 24 deg C.	The bidder understands that mixing temp. shall be as per the ambient site temp. However, pot life of the mix shall be as per expertise of the supplier. Kindly confirm.	Shall be discussed during detailed engineering.
1148	Volume -VI	Chapter 12	16 of 38	12.8.2	A nominal adhesive thickness of 3.2 mm is recommended behind and between each block.	There is an ambiguity in the clauses regarding the thickness of the adhesive membrane. Bidder request Owner to confirm the same.	3.2 mm shall be thickness of Adhesive membrane
1149	Volume -VI	Chapter 12	16 of 38	12.8.2	If the maximum projection or offset between bricks on the interior surface of the liner shall not exceed (3.1 mm).		

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1150	Volume -III / Section - 1	Chapter 30	12 of 93	1.9	Gypsum shed of 15 days storage shall be considered. Shed shall be provided with side protection. Adequate space inside shed for truck movement shall be provided.	Bidder understands that the functional requirement of side protection is to provide shelter to Gypsum heap inside the gypsum storage shed from wind & dust from outside of the storage shed. Kindly confirm.	Follow specification.
1151	Volume -III / Section - 9	Chapter 30	75 of 93	1.2	Vehicle crush barrier shall be provided for all the structural columns inside the storage shed.	With regards to crash barrier for structural columns inside the storage shed kindly confirm the following; (1) Bidder understands the crash barriers are column protectors meant to safe-guard the structural column in case of any accidental oversight by vehicle operator. (2) Height upto which the crash barriers / column protectors are required. (3) Type (including material of construction) of column protector / crash barriers required for gypsum storage shed considering the columns along with its crash barriers / column protector will be covered inside the gypsum heap.	1) Crash Barriers are for protection of columns in the shed to protect them during movement of dozers/ pay loaders. 2) 2 M high crash barriers shall be provided. 3) Crash barriers of standard desiegn shall be provided.
1152	Volume -III / Section - 9	Chapter 30	75 of 93	1.2	4.0 M high RCC wall for stacking gypsum considering 15 days gypsum storage shall be provided.	There is a contradiction with regards to the number of days of storage capacity for gypsum. Clause 2.6 (sr no. 57) in Volume VI/ Chapter 02 on sheet 4 of 7 states that "**7 days storage capacity fully covered gypsum storage shed and RCC approach road to gypsum storage shed.**" Kindly confirm the storage capacity (in days) for Gypsum.	15 days gypsum storage shall be considered
1153	Volume -VI	Chapter 11	14 of 18	11.19.6	**Limestone unloading shed** Limestone storage shed shall be framed structure of structural steel work with permanently colour coated profiled steel sheet side cladding. The foundation & grade slab shall be RCC. Plinth protection shall be given with necessary garland drain. Adequate open paved area shall be provided for parking of 20 (Twenty) number of limestone trucks.	Bidder understands limestone unloading shed is not applicable to the scope of the work. As mentioned in the FLOW DIAGRAM - LIMESTONE HANDLING SYSTEM (Drawing 111-13-5213), only Limestone storage shed shall be considered by bidder. The structural configuration of limestone storage shed shall be as per clause 11.9.1 of Volume-VI/Chapter-11 on page 14 of 18. Clause 11.9.6 shall be omitted however, Adequate open paved area for parking of 20 (Twenty) number of limestone trucks shall be provided. Kindly confirm.	Confirmed. However Limestone storage shed shall be considered by bidder. The structural configuration of limestone storage shed shall be as per clause 11.9.6 of Volume-VI/Chapter-11 on page 14 of 18.
1154	Volume -VI	Chapter 11	15 of 18	11.21.1	**Gypsum Processing Building** The Gypsum Processing building shall be twin storied RCC building. The ground floor shall comprise of gypsum dumping space and shall be open on sides. The upper floor shall house the gypsum belt conveyor. The building shall be covered with brick cladding on the sides to match the existing buildings in the plant.	In order to explore the optimization of layout for limestone and gypsum handling area for FGD, Bidder request to consider combining limestone mill building with Gypsum dewatering building. The combined building shall meet all the functional requirements as described for individual buildings in the technical specification. Kindly Confirm.	Noted.
1155	Volume -VI	Chapter 11	15 of 18	11.21.2	**Gypsum storage shed** The storage shed shall be of composite construction with structural steel roof truss supported on RC columns. The shed shall be provided with permanently	As represented in the Plot Plan (drawing 111-29-0200) the gypsum storage shed and limestone storage shed are combined with common column between the two sheds. Bidder shall consider the same combined shed philosophy for limestone and gypsum storage shed. There will be internal wall between the limestone storage shed and gypsum storage shed.	Confirmed
1156	Volume VI	Chapter 05	2 of 7	5.3 (b)	Field investigation shall be done in detail. **At least 4 boreholes at each structure/building location like TG bay, Boiler house, ESP, A-row, B-row, C&D - row columns**, **minimum 5 nos each in Switchyard Area**, **Transformer yard area and fuel oil handling area**, **minimum 3 nos each in Chimney area and Ash silos area** and **minimum 2 nos each at all other building/area other than those mentioned above**, at least 1 borehole at every 400 m c/c along pipe corridors, ash water re-circulation pipe corridor..... and one borehole at each pair of ID, FD and PA fan locations and one bore hole at each TP, ...Main plant etc shall be carried out. One borehole shall be carried out at every crossing and bends. Minimum one no cyclic plate load test or seismic refraction test .....test under geo-technical investigation scheme. Adequate number .....sub-strata conditions as approved by the Owner before the execution of work. The depth of boreholes in main plant area shall generally be atleast 20-25 m or 5m in rock with RQD> 50%. Depth of borehole shall be atleast 5 m along pipe corridor and 20m at crossing location.	There is a discrepancy in the number of boreholes and depth of boreholes in the two specified clauses. As can be seen from the description of strata encountered at this location in the geotechnical report provided with tender, there is no rock encountered, so drilling in rock is out of question. Bidder shall follow the table provided in clause 5.5 to follow number of boreholes and depth of boreholes, please confirm.	Confirmed
1157	Volume VI	Chapter 05	5 of 7	5.5			
1158	Volume VI	Chapter 05	2 of 7	5.3 (c)	Incase, rock is met at the proposed founding level, bore hole shall be extended up to 10m depth in the rock.	As can be seen from the description of strata encountered at this location in the geotechnical report provided with tender, there is no rock encountered, so drilling in rock is out of question. Hence, this clause is not applicable, please confirm.	Bid specifications to be followed.
1159	Volume VI	Chapter 18	1 of 10	18.3 (d)	The uplift and lateral load capacities shall be restricted to 20% and 5% respectively of the allowable load capacity in vertical compression.	Bidder requests the following : The uplift and lateral load capacities shall be restricted to 35% and 5% respectively of the allowable load capacity in vertical compression.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1160	Volume VI	Chapter 18	1 of 10	18.3 (f)	Piles shall be designed for a limiting settlement of a single pile under vertical design load of 8 mm at the head and lateral deflection as 5mm.	Bidder requests the following with reference to IS 2911 - Part 4 : Piles shall be designed for a limiting settlement of a single pile under vertical design load of 12 mm (For piles up to 600 mm dia) and 18 mm or 2% of pile diameter whichever is less (For Piles of more than 600 mm dia) as per IS:2911 (Part IV) and lateral deflection as 5mm. Kindly Confirm.	Confirmed
1161	Volume VI	Chapter 18	5 of 10	18.7 (b)	i. The liquid limit of bentonite when tested in accordance with IS:2720 (Part V) shall be more than 300 percent and less than 450 percent.	As per latest code IS : 2911 Part 1 - Section 2, The liquid limit of bentonite when tested in accordance with IS 2720 (Part 5) shall be 400% or more, Please confirm.	Confirmed
1162	Volume VI	Chapter 18	5 of 10	18.7 (b)	ii. The sand content of the bentonite powder shall not be greater than 7 percent.	As per latest code IS : 2911 Part 1 - Section 2, This requirement is not there, Please confirm.	Confirmed
1163	Volume VI	Chapter 18	5 of 10	18.7 (b)	iv. The marsh velocity when tested by a Marsh cone should be about 37 seconds.	As per latest code IS : 2911 Part 1 - Section 2, The marsh viscosity of bentonite suspension when tested by a marsh cone shall be between 30 to 60 stoke; in special cases it may be allowed up to 90 s, please confirm.	Confirmed
1164	Volume VI	Chapter 18	5 of 10	18.7 (b)	v. The differential free swell shall be more than 540 percent.	As per latest code IS : 2911 Part 1 - Section 2, This requirement is not there, Please confirm.	Confirmed
1165	Volume VI	Chapter 18	5 of 10	18.7 (c)	The minimum diameter of links and helical reinforcement shall be 6 mm spaced at 150 mm and not more than 300 mm.	As per latest code IS : 2911 Part 1 - Section 2, The minimum diameter of the links or spirals shall be 8 mm and the spacing of the links or spirals shall be not less than 150 mm, please confirm.	Confirmed
1166	Volume VI	Chapter 18	5 of 10	18.7 (c)	Minimum cover to main reinforcement in the pile shall be 75mm.	As per latest code IS : 2911 Part 1 - Section 2, Clear cover to all main reinforcement in pile shaft shall be not less than 50 mm, please confirm.	Confirmed
1167	Volume VI	Chapter 18	6 of 10	18.7 (d)	Concrete in piles shall be of design- mix with minimum grade M25 with minimum cement of 400 kg/cum water cement ratio within 0.45 to 0.55 using super plasticized Sikament 170 or equivalent. Generally the slump of the concrete shall be within the range 100 to 150 mm.	Latest IS code 2911 : Part 1 - section 2 shall be followed, please confirm.	Bid specifications to be followed.
1168	Volume VI	Chapter 18	7 of 10	18.8 (a)	**a) SOIL** Standard penetration test(SPT) in Pile Bore The contractor shall carry out SPT in pile bore. The depth of SPT shall be at 1 meter interval, starting from 3.0mt prior to termination levels, in the piles selected by the engineer. SPT rods shall be lowered through 100mm dia casing pipes. Casing pipes shall extend upto 150mm above SPT Depth.For conducting the test, the bottom of bore hole shall be cleaned properly, and the the spoon shall be properly and centrally seated in position in bore hole.it is necessary to ensure that drive hammer is of specified weight and has a specified free fall as/IS-2131. It shall be ensured that energy of falling weight is not reduced by friction between drive weight and guides or between rope and winch drum. Only BIS recommended standard connecting rods shall be used for the test. The pile shall be terminated if three consecutive SPT values are equivalent or higher than designed SPT values.	a) SOIL The termination of pile shall be decided based on the SPT values and theoretical design capacity with reference to the soil properties in the nearest borehole. In addition to the above, the design pile capacity for working piles shall be ensured by conducting routine vertical load tests on selected piles as per technical specification. Kindly confirm.	Bid specifications to be followed.
1169	Volume VI	Chapter 18	7 of 10	18.9 (a)	9 number of trial piles shall be tested for each dia and rated capacity of the pile. Out of the nine (9) nos. of piles to be tested for three (3) nos. of each dia and rated capacity shall be tested for vertical load, three (3) nos. for lateral load and three (3) nos. for uplift load.	**6** number of trial piles shall be tested for each dia and rated capacity of the pile. Out of the **six (6)** nos. of piles to be tested, **two (2)** nos. of each dia and rated capacity shall be tested for vertical load, **two (2)** nos. for lateral load and **two (2)** nos. for uplift load. Please confirm.	Bid specifications to be followed.
1170	Volume VI	Chapter 18	8 of 10	18.9 (c)	The safe load on pile shall be the least of the following : i Two third of the final load at which the total settlement attains the value of 12 mm. ii Two third of the final load at which the net settlement attains a value of 6 mm. iii 50 per cent of the final load at which the total settlement equals onetenth of the pile diameter.	The latest revision of IS 2911 - Part 4 shall be followed to estimate the safe load from load test, please confirm.	Confirmed

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1171	Volume VI	Chapter 18	8 of 10	18.9 (f)	These tests shall be carried out on working piles upto one and half times the design load and the maximum settlement of test loading in position being not exceeding 12 mm as per IS:2911 (Part IV).	These tests shall be carried out on working piles upto one and half times the design load and the maximum settlement of test loading in position being not exceeding 12 mm (For piles up to 600 mm dia) and 18 mm or 2% of pile diameter whichever is less (For Piles of more than 600 mm dia) as per IS:2911 (Part IV). Please confirm.	Confirmed
1172	Volume VI	Chapter 18	7 of 10	18.9 (a)	Number of routine tests to be conducted on work piles for each diameter and rated capacity shall be equal to one and half (1.5) percent of the total number of piles used in the work for vertical load tests as well as lateral load tests subject to the minimum of one.	Number of routine tests to be conducted on work piles for each diameter and rated capacity shall be equal to **zero point five (0.5)** percent of the total number of piles used in the work for vertical load tests as well as lateral load tests subject to the minimum of one. Kindly confirm.	Confirmed
1173	Volume VI	Chapter 18	9 of 10	18.9 (f)	The routine test on piles shall be conducted by direct loading method. The test load on initial test piles shall be applied by means of reaction from anchor piles / rock anchors alone or combination of anchor piles / rock anchors and kentledge.	High strain dynamic load test shall be carried out for routine load testing of working piles. However, at least two numbers of static routine vertical load tests shall be carried out on pile on which high strain dynamic load test has already been carried out for establishing the correlation between the two method of tests. Kindly confirm.	Bid specifications to be followed.
1174	---	---	---	---	General Query	Bidder requests to provide the foundation drawings of existing structures of 2x300 MW plant and already constructed CHP area for reference.	Not available.
NDCT							
1175	Volume III - Mechanical Works	CH 18: NDCT	3 of 23	18.2.8	For arriving at the air properties such as enthalpy, density etc., no correction for altitude shall be considered. All properties shall be taken from the data provided on CTI or BS code corresponding to sea level	If the tower is designed with 0 MSL, design of tower shall be different & may have effect on performance of tower. Therefore, Bidder recommends that actual MSL as specified in tender shall be used to arrive the properties of air.	Bid specifications to be followed.
1176	Volume III - Mechanical Works	CH 18: NDCT	3 of 23	18.2.8	Justification for the outlet air temperature. This could be in the form of operating experience on existing tower or laboratory test on actual fill shape, material and configuration as offered. In the case of laboratory test, Bidder shall indicate correction / scaling factor applied to predict performance of full size tower under field conditions.	Outlet temperature of air shall be determined by General Heat Balance equation used for cooling tower design. L x Cp x R + Ev x CWT = G x (H2 – H1)	Bid specifications to be followed.
1177	Volume III - Mechanical Works	CH 18: NDCT	5 of 23 11 of 23	18.3.1 18.4.5.3	- Staircases with handrails and posts, platforms, FRP access doors with all accessories, internal walkways and walkways at CT top with stainless steel pipe handrails and posts, all necessary stainless steel inserts in the concrete etc., for satisfactory maintenance of the Cooling Tower as detailed in civil tender specification. - Whether specifically mentioned in the Data Sheet or not, steel components and fittings used in walkways, handrails shall be hot dip galvanized after fabrication followed by one coat of etching primer and two coats of bituminous paint.	Request to kindly clarify the handrail material (Stainless steel or CS with galvanizing)	Handrails in cooling tower shall be stainless steel in line with Clause 18.3.1 of Chapter-18 at Sheet 5 of 23, Volume III.
1178	Volume III - Mechanical Works	CH 18: NDCT	5 of 23	18.3.1	The drift eliminators shall limit the drift loss to 0.05% of total water in circulation. The air pressure drop across the drift eliminators shall be kept to a minimum by suitable design. The water collected in the drift eliminators shall be returned to the Tower basin and it shall not mix with the discharge air system. The bidder shall demonstrate the efficiency of the drift eliminators by means of tests as per BS 4485 Part 2.	Kindly confirm whether certification of drift eliminator for drift loss by CTI approved laboratory / supplier is acceptable.	Bid specifications to be followed.
1179	Volume III - Mechanical Works	CH 18: NDCT	8 of 23	18.4.2.2	The hot water distribution shall be suitable for handling an additional 20% flow over the design circulating water flow. The hot water distribution shall be done by two headers, each covering half of cooling tower area so that it can be operated at 50% capacity	Please note that hydraulic design of cooling tower shall be designed with 20% margin & thermal design of cooling tower will be as per design flow for the tower.	Noted.
1180	Volume III - Mechanical Works	CH 18: NDCT	10 of 23	18.4.3.5	Type Test of PVC/PP Material In addition to the routine tests specified in this Technical specifications, ultra-violet exposure for 500 hours on the PVC/PP material shall be carried out for this contract once as per ASTM-G155, Test Method 3 and Impact resistance test before and after UV exposure shall be conducted as per ASTM D-256. The above type test shall be carried out by the Contractor at reputed third-party laboratory. Offered fills shall be tested by an independent reputed laboratory approved by Owner to validate thermal characteristic and pressure drop correlation of the offered fill. In case the bidder has their own established test facility where such tests have been conducted for other reputed clients in the past, the same is also acceptable subject to owner's approval. Test bed shall have fill height same as the offered fill height. During testing water and air loading as well as the air velocities shall be maintained same as the duty conditions and in the range of performance guarantee conditions for which tower is designed.	Bidder understands that travel, lodging and boarding expenses for Employer/Employer's representative for witnessing fill test in India or abroad shall not be borne by bidder. Please confirm.	Shall be dealt as relevant applicable Clauses of the contract.
1181	Volume III - Mechanical Works	CH 18: NDCT	11 of 23	18.4.6.1	The hot water distribution system, basin and cold water outlet channel of the cooling tower shall be designed by considering a minimum of 20% margin over the design cooling tower flow.	Please note that hydraulic design of cooling tower shall be designed with 20% margin & thermal design of cooling tower will be as per design flow for the tower.	Noted

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1182	Volume III - Mechanical Works	CH 18: NDCT	12 of 23	18.4.8	Screens Quantity - 6 Nos. (2 Nos. per Tower + 2 Nos. common standby).	Screens shall be as per below: 2 No. per tower + 1 Stand by = Total 3 Nos.	Clause 18.4.8 (i) of Ch-18 at Sheet 12 of 23 in Vol-III be read as "Quantity - 2 Nos. (1 No. per partition)"
1183	Volume III - Mechanical Works	CH 18: NDCT	15 of 23	18.5.3.4(d) - iv	Calibration of instruments to be used in the test shall be carried out by an approved independent agency. Calibration of instruments shall be carried out previous to, but not more than six months before the test. The calibration certificate of the instruments shall be valid for the period of test.	As per CTI ATC-105, calibration of instruments shall be as follow:- Temperature sensors - 3 months prior to use Water flow measurement device - 3 years Electric power and wind measuring devices - Yearly. Kindly consider calibration as per CTI ATC-105.	Bid specifications to be followed.
1184	Volume III - Mechanical Works	CH 18: NDCT	20 of 23	18.7	If the cold water temperature is less than or equal to predicted cold water temperature as described above, the Tower is deemed to have met the guarantee	Since the test will be conducted as per CTI ATC-105, the acceptance criteria shall be the tower capability calculated as given in CTI. If the tower capability is found to be equal to or more than 100% then the tower is acceptable. Please Confirm.	Noted.
Railway Siding							
1185					Plot Plan	Bidder requests Owner to furnish revised location of wagon tippler as the present location is not feasible considering shorter length available at outhaul.	Bidder to propose the location in their proposal as per latest railway authorities/RDSO guidelines
1186	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 11: Buildings Description	17 of 18	11.23.4	Rail size - As approved by Indian Railway	a) New railway marshalling yard needs to be fitted with R-260 rails as per latest RDSO guidelines. Bidder understands that new marshalling yard to be constructed with R-260 rails even though 52 kg rails have been installed for existing railway marshalling yard. Please confirm. b) The existing yard is fitted with 52 kg rails which are obsolete as per Railway board policy. Bidder understands that replacement of 52 kg rails with R-260 rails for existing railway marshalling yard shall be Owner's scope. Please confirm.	a) New railway marshalling yard must be fitted with rails as per latest railway authorities/RDSO guidelines b) Confirmed **Complete electrification of marshalling yard as per latest RDSO is also in bidder's scope**
1187	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 11: Buildings Description	18 of 18	11.24	Comprehensive study for the marshalling yard shall be done by the EPC contractor through approved agencies like RITES….....	Existing railway yard is manual operated system. Bidder understands that no work is envisaged in existing Railway yard with respect to modification from manual operated system to Signal interlocking and electrified operated system. Please confirm.	Confirmed
1188	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 11: Buildings Description	18 of 18	11.24	Comprehensive study for the marshalling yard shall be done by the EPC contractor through approved agencies like RITES….....	It is not specified in Tender document, that whether the new yard is to be interlocked or kept manual operation system. Railway authorities may not approve manual operating system and therefore signal interlocking should be included in Railway siding scope of work. In order to keep all Bidders at par, Owner to furnish suitable amendment for the same.	Marshalling yard including interlocking system as per latest railway authorities/RDSO guidelines shall be in the scope of bidder.
1189	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 11: Buildings Description	18 of 18	11.24	Comprehensive study for the marshalling yard shall be done by the EPC contractor through approved agencies like RITES….....	As on date, Indian railway routes are totally electrified as per Railway Board guidelines and therefore all the new Railway yards should be electrified. Hence Bidder proposes that **existing railway marshalling yard shall also be electrified.** Owner to furnish suitable amendment for the same.	New marshalling yard system shall be completely electrified. Further, bidder to note that bye-pass railway line shall be provided for each wagon tippler. Electrification of existing railway marshalling yard is not in the scope of bidder.
1190	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS Volume III Mechanical Works	Ch 11: Buildings Description Ch:19 Coal Handling System	18 of 18 8 of 120	11.24 1.1.8	Comprehensive study for the marshalling yard shall be done by the EPC contractor through approved agencies like RITES…..... 56. Diesel Locomotives Lot-4 For movement of coal railway wagons	a) As per latest Railway board policy, the new proposal or modification, approvals are being granted as EOL (Engine on load) policy, where engine enters in the complex and keep the rack attached with engine for 6 hours for un-loading/ loading. Therefore no private engine is required. b) Also as the plant will be electrified, only electric locomotives will be required. Other type of locomotives will not be applicable. Please confirm	To be decided during detailed engineering.
1191					Railway siding work	If plant area is to be signal interlocked, then Owner is requested to provide location of S&T room, Goomties etc. as per Railways requirements.	Bidder to provide as per latest railway authorities/RDSO guidelines

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1192	Volume VI CIVIL, STRUCTURAL & ARCHITECTURAL WORKS	Ch 11: Buildings Description	18 of 18	11.24	…….Saturatory approval for the marshalling yard from railways other agencies is included in scope of bidder…….	Bidder understands that EPC contractor to consider codal charges or any other Government fee to be deposited to Northern Railways or other Govt. department. Please confirm	Bidder's understanding is correct.
1193	Volume III Mechanical Works	Ch:19 Coal Handling System	10 of 120	1.2.1	ROM Coal will be brought to Power Plant site using coal rake of Indian Railways.	Bidder understands that Railway will provides its own engine for rake movement, loading, unloading and all other function. So, separate engine is not required. Please confirm	Bidder to povide locomotives as per bid specifications.
1194					General	Merry go round (MGR) system is not mentioned for railway siding work in tender specification and therefore the same shall be excluded from Bidder's scope of work. Please confirm.	Merry go round (MGR) system not being considered, please refer technical specifications.
1195					General	Bidder understands that no work with respect to Railway siding scope is included outside the Plant boundary. Please confirm.	Confirmed.
STG Island							
1196	Volume I	Section - III BDS	50 of 60	12.2	Adjustment Factors For Bid Evaluation a) Turbine cycle Heat rate @ **55% of rated load** b) Turbine cycle Heat rate @ 100% of rated load c) Efficiency of the steam generator at **105% TMCR (840 MW unit load)** d) Efficiency of the steam generator at 100% TMCR (800 MW unit load)	a) Since HPGCL Yamunanagar Tender Specifications are issued on EPC turnkey package basis, instead of separate Boiler efficiency & TG cycle Heat rate guarantee, Bidder proposes to offer single Plant / Unit heat rate (TG cycle HR / Boiler efficiency) guarantee. This is inline with the practice followed by most of the centre & state electricity boards including NTPC. Accordingly bidder request owner to provide the single fixed value of Unit Heat rate for this project. b) Also there is an discrepancy in the tender specifications related to guarantee points. Please clarify the guarantee point. Refer Annexure-M5 for the same	Bid specifications to be followed. However the figure "105% TMCR (840 MW unit load)" be read as "55% TMCR (440 MW unit load)" in following clauses of bid specifications:- i) In clause 12.2 of Section -III BDS at Sheet 50 of 60 in Vol-I ii) In Attachment-6(P) Table of Vol-I (section-VII) Book 2 of 3.
1197	Volume I	Section - III BDS	50 of 60	12.2	12.2 Adjustment Factors For Bid Evaluation Turbine Cycle Heat Rate in kcal/kwhr under rated steam conditions at guaranteed optimized condenser pressure with zero make-up at 440 MW Unit Load (i.e. 55% of rated load) Turbine Cycle Heat Rate in kcal/kwhr under rated steam conditions at guaranteed optimized condenser pressure with zero make-up at 800 MW Unit Load (i.e. 100 % of rated load)	Bidder understands that for Turbine cycle heat rate and heat balance calculation following rated steam conditions shall be considered. <u>For 100% rated load case</u>: Turbine throttle steam pressure : 270 Kg/cm2 (abs) Turbine throttle main steam temp. : 600 °C Reheat steam temp. at turbine inlet : 600 °C <u>For 55% rated load case</u>: Turbine throttle steam pressure : 150 Kg/cm2 (abs) Turbine throttle main steam temp. : 600 °C Reheat steam temp. at turbine inlet : 600 °C Please confirm acceptance.	Confirmed . However, the Note given at top of the Sheet 12 & 75 of 87 of Chapter-2 / Vol-III be read as:- "Maximum Operating Main Steam & Hot reheat temperature at Turbine inlet and operating margin shall be as per latest IEC-45 design code."
	Volume II	Ch 8: FG & LD	4 of 57	3.1	3.1 The Performance Guarantees which attract Liquidated Damages (LD) are as follows: i. Turbine Cycle Heat Rate a) Turbine Cycle heat rate in kcal/kWhr under rated steam conditions at guaranteed condenser pressure with zero make up at 440 MW unit load (i.e. 55% of rated load). b) Turbine Cycle heat rate in kcal/kWhr under rated steam conditions at guaranteed condenser pressure with zero make up at 800 MW unit load (i.e. 100% of rated load).		
	Volume III	Ch 2: Turbine Generator & Auxiliaries	11 of 87	1.1.2	(iv) Turbine throttle main steam temp. 600 °C * (v) Reheat steam temp. at turbine inlet 600 °C * Note: - * Maximum Operating Main Steam & Hot reheat temperature at Turbine inlet shall be 605°C. ±5 deg.C is operating margin. Turbine shall be designed for 605°C temperature.		
1198	Volume II	Ch 8: FG & LD	53 of 57	6.3	Corrections to the test results for steam turbine shall be applied as per the correction curves listed in detailed technical specification. When the system is properly isolated for a performance test, the unaccounted for leakages should not be more than 0.1% of the design throttle flow at that load. To achieve the above value of unaccounted for leakages, the Bidder shall prepare the unit during pretest available shutdown. However, during the test, if it is found that the unaccounted for leakage is more than 0.1% of design throttle flow at that load, then heat rate will be increased by an amount equal to half the difference between actual unaccounted for leakage expressed as percentage of design throttle flow at that load and 0.1% (allowed by the code).	During Performance Test, Make up water will be isolated and the correction for change in system water storage will be applied as unaccounted for loss for actual leakage. Please confirm acceptance.	Bid specifications to be followed.
1199	Volume II	Ch 3: Operating Capability of Plant	2 of 4	3.3	(p) Plant shall be designed to give life of not less than 25 years. Further, expected numbers of Steam Turbine Generator startups during design life are as follows: Type of starts Number of starts Hot Start 4000 Warm start 1000 Cold start 250	No. of Startups shall be as per CEA guidelines Hot Start - 4000 Warm Start - 1000 Cold Start - 150 Owner to please confirm acceptance.	Confirmed

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1199	Volume III	Ch 2: Turbine Generator & Auxiliaries	14 of 87	1.1.7	Expected number of turbine generator start-ups during design life of minimum 25 years shall be as under. Cold Start (after shut down period exceeding 72 hours) 455 Warm Start (after shut down period between 10 hours and 72 hours) 1000 Hot Start (after shut down period less 10 than hours) 4500		
1200	Volume II	Ch 8: FG & LD	16 of 57	3.6	The performance guarantee test will be carried out within three months after the successful completion of Initial Operation of facilities or as per the time frame specified for a particular equipment/ plant/ system in the Technical specifications. 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 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 will be considered from the date of first steam admission as per the formula given in clause 3.07, sub-section-3 of ASME-PTC-6 Report 1985 (Reaffirmed 1991). Please confirm acceptance.	Bid specifications to be followed.
1201	Volume II	Ch11 : QAP (Mechanical)	30 of 103	2.10	These check lists shall be designed so that a comparison can be made between the design clearances, the clearances measured during works assembly, and those measured during the site turbine build. The vendor shall state, in his proposal, whether or not it is his practice to carry out no load works running tests on the steam turbine. (To this end the vendor shall give details of their normal works practice. In order to prove the compliance with design of the steam turbine control and emergency control equipment, functional tests shall be carried out in the manufacturer's works).	No load works running tests on the steam turbine will not be carried out as per Bidder's design. However HP, IP & LP turbine assembly will be carried out separately to ensure required flow path, clearances etc. Please confirm acceptance.	Bid specifications to be followed.
1202	Volume III	Ch 1: Steam Generator & Auxiliaries	37 of 186	1.3	3. Steam temperature at superheater outlet 603 degC 4. Steam temperature at reheater outlet 603 degC	There is contradiction in these clauses related to Main steam & reheat steam temperature at the Turbine & Steam generator inlet. Bidder understands that following steam temperatures to be considered for Steam turbine & steam generator design & performance guarantee. Steam Generator(s) : Steam temperature at superheater outlet : 603°C Steam temperature at reheater outlet : 603°C STEAM TURBINE : Turbine throttle main steam temp. : 600 °C Reheat steam temp. at turbine inlet : 600 °C ~~Note: * Maximum Operating Main Steam & Hot reheat temperature at Turbine inlet shall be 605°C. ±5 DegC is operating margin. Turbine shall be designed for 605 DegC temperature.~~ Please confirm acceptance.	Note given at top of the Sheet 12 & 75 of 87 of Chapter-2 / Vol-III be read as:- "Maximum Operating Main Steam & Hot reheat temperature at Turbine inlet and operating margin shall be as per latest IEC-45 design code."
	Volume III	Ch 2: Turbine Generator & Auxiliaries	11 of 87	1.1.2	(iv) Turbine throttle main steam temp. 600 °C * (v) Reheat steam temp. at turbine inlet 600 °C * Note: - * Maximum Operating Main Steam & Hot reheat temperature at Turbine inlet shall be 605°C. ±5 DegC is operating margin. Turbine shall be designed for 605 DegC temperature.		
	Volume III	Ch 2: Turbine Generator & Auxiliaries	73 of 87	15.0	Throttle steam temperature °C 600 * Reheat steam temperature °C 600 * Note: - * Maximum Operating Main Steam & Hot reheat temperature at Turbine inlet shall be 605°C. ±5 DegC is operating margin. Turbine shall be designed for 605°C temperature.		
1203	Volume III	Ch 2: Turbine Generator & Auxiliaries	35 of 87	1.23.1	o) All HP heaters out of service under rated steam conditions at design & worst condenser pressure with 0% and 1% make-up with rated output.	During all HP Heater out of service condition, rated output shall be available at generator terminals under design condenser pressure and 0% make-up. Owner to confirm acceptance. During all HP Heater out of service condition with worst condenser pressure, power output at generator terminals shall be limited by boiler heat duty limitation provided that it does not exceed the rated output at generator terminals. Please confirm acceptance.	Confirmed
1204	Volume III	Ch 2: Turbine Generator & Auxiliaries	35 of 87	1.23	u) Steam Generator output corresponding to BMCR flow under rated steam condition, turbine under VWO operation, **worst condenser pressure** with 0% and 1% make up. Difference of BMCR flow and VWO steam flow through turbine shall be assumed to be drawn off from Main steam line. Same quantity of flow is to be added to condenser as additional make up.(GUARANTEED STEAM GENERATOR CAPACITY)	Bidder proposes to consider the BMCR parameter for steam generator as follows inline with the practice followed by most of the centre & state electricity boards including NTPC. Steam flow at superheater outlet : 102% of the turbine VWO steam flow requirement, **design condenser pressure**, 0% make up, optimized feedwater temperature, rounded to next integer divisible by 5. Please confirm acceptance. Refer Annexure-M6 for the same	Bid specifications to be followed.
	Volume III	Ch 1: Steam Generator & Auxiliaries	37 of 186	1.3	BMCR Parameters 1. Steam flow at superheater outlet at BMCR is atleast 102% of the turbine VWO steam flow requirement at **worst condenser pressure** and 1% make up, rounded to next integer divisible by 5		Clause 1.3 of Section-II at Sheet 37 of 186 of Vol-III be read as under:- "Steam flow at superheater outlet at BMCR shall be 1.02 times the steam flow at turbine VWO condition plus continuous auxilary steam requirement of unit at TMCR, rounded to next integer divisible by 5".
1205	Volume III	Ch 2: Turbine Generator & Auxiliaries	35 of 87	1.23	j) VWO output under rated steam conditions at worst condenser pressure with 1% make-up k) 800 MW output under rated steam conditions at worst condenser pressure with 1% make-up. o) All HP heaters out of service under rated steam conditions at design & worst condenser pressure with 0% and 1% make-up with rated output.	We understand worst condenser pressure shall corresponds to Condenser pressure with maximum CW temperature. Please confirm acceptance.	Confirmed. However, against S.No. m) in Table at Sheet 41 of 87 of Ch-2 , Vol-III, Maximum CW temp be read as 36 Deg C. instead of 38 Deg C.

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1206	Volume III	Ch 2: Turbine Generator & Auxiliaries	75 of 87	15.0	(6) In the sliding pressure mode of operation the throttle pressure will slide down from rated pressure to a value corresponding to 40% of rated pressure. For computing heat balance for sliding pressure mode of operation at 80%, 70%,60%, 50% & 30% of Unit rated load, rated temperature of atleast 565 deg.C and 593 deg.C* shall be used for main steam and hot reheat steam respectively.	There is contradiction in these clauses related to definition of sliding pressure mode of operation. Bidder proposes following to be considered as modified Sliding Pressure definition: • 0% to 40% TMCR : Constant Pressure Operation • 40% to 100% TMCR: Sliding Pressure Operation • 100% TMCR to VWO : Constant Pressure Operation Please confirm acceptance.	Noted
	Volume III	Ch 1: Steam Generator & Auxiliaries	40 of 186	1.9.1	ii. Sliding Pressure Operation from rated pressure down to 30-40% of rated pressure with as well as without any throttle reserve. 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 all turbine control valves wide open. The throttle reserve shall be adjustable to minimum 0% for pure sliding pressure mode of operation.		
1207	Volume III	Ch 2: Turbine Generator & Auxiliaries	12 of 87	1.1.2	Note: - * Maximum Operating Main Steam & Hot reheat temperature at Turbine inlet shall be 605°C. ±50C is operating margin. Turbine shall be designed for 605°C temperature.	Bidder proposes Rated temperature for MS and RH will be 600 degC at Turbine inlet. Turbine is capable of accepting variation in main steam and hot reheat steam parameters as per IEC45 requirement. Please confirm acceptance.	Note given at top of the Sheet 12 & 75 of 87 of Chapter-2 / Vol-III be read as:- "Maximum Operating Main Steam & Hot reheat temperature at Turbine inlet and operating margin shall be as per latest IEC-45 design code."
1208	Volume III	Ch 2: Turbine Generator & Auxiliaries	14 of 87	1.1.6.1	Step load change: Minimum ±10% per minute to facilitate fast loading/unloading of the unit Ramp Rate: Minimum ± **3% per minute above 30 % load** (under sliding pressure operation) Minimum **± 5%** per minute (**50% to 100% load**) (under Constant pressure operation)	The specified ramp rates are not possible to achieve and no where in Indian plants such high loading or unloading rates were successfully demonstrated by any contractor. Bidder requests Owner to modify the ramp rates as per latest CEA Gazette notification (CG-DL-E-31012023-243299 Dtd 25-01-2023) as per below: **70% to 100% Load : Min. 3% per min** **55% to 70 % Load : Min. 2% per min** **45% to 55% Load : Min. 1% per min** Please confirm acceptance. Also Step load shall be ±10%. Per minute is not applicable. Please confirm acceptance. Refer Annexure-M9 for the same	In clause 1.1.6.1 of Ch-2 at Sheet 14 of 87, Vol-III, Ramp Rate mentioned in second and third row of table shall be reread as per CEA Gazette notification dated 25.01.2023 as under: (i) Above 70% Load : @ 3% per min. (ii) 55% to 70% Load : @ 2% per min. (iii) 40% to 55% Load : @ 1% per min
	Volume II	Ch 8: FG & LD	31 of 57	5.10	5.10 Rate of change of load and sudden load change withstand capability The Bidder shall demonstrate capability of boiler-turbine-generator in regards to ramp rate and step load change as specified and sudden load change withstand capability.		
1209	Volume III	Ch 2: Turbine Generator & Auxiliaries	74 of 87	15.0	4. Worst pressure in the condenser mm Hg (abs) 89	Bidder proposes that Worst condenser pressure shall be corresponding to max cooling water temperature . Please confirm acceptance.	Confirmed. However, against S.No. m) in Table at Sheet 41 of 87 of Ch-2 , Vol-III, Maximum CW temp be read as 36 Deg C. instead of 38 Deg C.
	Volume III	Ch 2: Turbine Generator & Auxiliaries	41 of 87	2.2	1. m) Maximum circulating water temperature deg.C (min.) 38°C (max.)		
1210	Volume III	Ch 2: Turbine Generator & Auxiliaries	41 of 87	2.2	1. m) Maximum circulating water temperature deg.C (min.) 38°C (max.)	38 Deg.c maximum cooling water temperature seems to be on very much higher side. Since design cooling water temperature is 32.5 Deg.c the maximum cooling water temperature to be not more than 35.5 Deg.c. Kindly review.	Against S.No. m) in Table at Sheet 41 of 87 of Ch-2 , Vol-III, Maximum CW temp be read as 36 Deg C. instead of 38 Deg C.
1211	Volume III	Ch 2: Turbine Generator & Auxiliaries	21 of 87	1.10.2	(f) The gland sealing arrangement for steam turbine shall permit easy examination and replacement of glands without lifting the upper half of turbine casing. Effective drain system for maintaining the required temperature shall be provided	For inspecting the outer glands there is no need to lift the outer casing upper half, however to inspect inner glands outer casing upper half needs to be lifted.	Noted.
1212	Volume III	Ch 2: Turbine Generator & Auxiliaries	3 of 87	2.1	2. .....removable type steam strainers for start up and normal operation upstream of emergency stop and reheat stop valves, cross-over/cross around piping and electric motors for all its integral subsystems. Steam strainers integral with main steam emergency stop and reheat stop valves are also acceptable as per standard practice of Turbine manufacturer.	Steam strainer will be provided only for main stop valves and reheat interceptor valves. Steam strainer for reheat stop valve is not possible as per OEM design. Accordingly please modify the requirement as follows: Provide Temporary & Permanent steam strainers for Emergency stop and Reheat Stop or control 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. The strainers shall be arranged to permit easy inspection and cleaning.	Noted.
	Volume III	Ch 2: Turbine Generator & Auxiliaries	21 of 87	1.11.1	(f) 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 shall be provided in addition to the permanent strainer. The strainers shall be arranged to permit easy inspection and cleaning.		
1213	Volume III	Ch 2: Turbine Generator & Auxiliaries	24 of 87	1.13	(g) (1) The difference in temperature between upper and lower metallic parts of HP and IP casings in the zone of governing stage/ steam admission shall not be more the 400C during cooling of the casing. (2) The difference in metallic temperatures of upper and lower halves of both H.P. and I.P. casings, during normal operating conditions shall not be more than 150 deg.C.	As per Bidder proven practice, temperature measurements are provided on the upper and lower half of the casing for keeping the thermal stress within the limits. The allowable temperature difference is limited upto 42 degC as per OEM design irrespective of the mode of operation (startup or normal operation).	Noted

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1214	Volume V	Part B/Ch 4: Main Equipment Related C&I system	11 of 19	4.15.01	2. (b) Absolute as well as relative shaft vibration measurement, of each bearing in both X & Y direction (both for Turbine and Generator bearing).	ISO-7919 will be followed only. The bidder's proposed measurement method will monitor directly the gap between rotor and pedestal, which is mandatory requirement for the rotating machines to protect the contact between rotating parts and stationary parts. Therefore, the measurement of relative movement as gap between rotor shaft and bearing pedestal is suitable method for vibration measurement. Apart from the above pedestal vibration is also measured in a relative to ground in line to ISO 10816. Hence, absolute shaft vibration measurement is not necessary as per OEM design.	Latest applicable standards shall be followed for measurement of relative shaft vibration & pedestal vibration of bearings & casing.
1215	Volume V / Part B	Ch 11: Control Valves With Actuators	8 of 10	11.09.01	ii) Control valves shall be furnished with IBR certification, wherever required. 1. Noise: The maximum allowable noise level shall be **85 dba** or less at 1 m.	For HP-LP bypass system Noise level shall be **90 dba** at 1 m as per OEM standard proven practice. This is inline with the practice followed by most of the centre & state electricity boards including NTPC. Please confirm acceptance. Refer Annexure-M7 for the same	For HP-LP bypass, maximum allowable noise level shall be 90 dbA but for other control valves, it will be 85 dba or less at 1 metre.
1216	Volume V / Part B	Ch 11: Control Valves With Actuators	2 of 10	11.02.04	All SH/RH block valves, shut off valve of LDO & HFO and HP/LP bypass control valve shall have leakage class **MSS-SP-61**.	The LP spray water control valve leakage class shall be Class V as per **ANSI FCI 70.2** instead of MSS SP61. This is inline with the practice followed by most of the centre & state electricity boards including NTPC. Please confirm acceptance. Refer Annexure-M8 for the same	Noted.
1217	Volume II	Ch 9 : Mandatory Spares	18 of 103	S	a) BFP assembly : 1 set	Please clarify the following related to this spares requirement. 1) Whether BFP assembly means TDBFP assembly or MDBFP assembly or both TDBFP & MDBFP assembly. 2) BFP assembly means only Main pump assembly or it is inclusive of Booster pump, Gear box, Coupling, Motor etc. Requirement of complete BFP assembly is not at all recommended & will unnecessarily increase the overall project cost. Request Owner to relook into this spares requirement.	1 Set of BFP assembly includes Booster Pump Assembly, if applicable.
1218	Volume II	Ch 9 : Mandatory Spares	18 of 103	S	d) Hydraulic coupling assembly : 1 set	Requirement of complete Hydraulic coupling assembly is not at all recommended & will unnecessarily increase the overall project cost. Request Owner to relook into this spares requirement.	Bid specifications to be followed.
1219	Volume II	Ch 9 : Mandatory Spares	18 of 103	T	a) CEP assembly	Please whether CEP assembly includes Motor also ? Requirement of complete CEP assembly is not at all recommended & will unnecessarily increase the overall project cost. Request Owner to relook into this spares requirement.	CEP assembly without Motor is to be supplied.
1220	Volume II	Ch 9 : Mandatory Spares	93 of 103	1.00.16 (A)	Following spares shall be furnished for control valves, Power Cylinder, Control Dampers as applicable.	No Mandatory spares related to HP-LP Bypass system will be offered against this clause. Please confirm acceptance.	Mandatory spares for HP-LP bypass shall be provided by the bidder as per Cl.No. 1.00.16 (c) & (d), Sheet 94 of 103, Chapter-9, Vol-II.
1221	Volume II	Ch 9 : Mandatory Spares	93 of 103	1.00.16 (B)	Mandatory spares for each type of critical applications special control valves.	No Mandatory spares related to HP-LP Bypass system will be offered against this clause. Please confirm acceptance.	Mandatory spares for HP-LP bypass shall be provided by the bidder as per Cl.No. 1.00.16 (c) & (d), Sheet 94 of 103, Chapter-9, Vol-II.
1222	Volume II	Ch 9 : Mandatory Spares	94 of 103	1.00.16 (C)	Following spares shall be supplied for each of the HP/LP By Pass & Spray control valves	Since only HP/LP Bypass & spray control valve related spares are mentioned in this clause, HP spray water isolation valve & HLP stop valve related spares are not offered against this clause. Please confirm our understanding. Also we understand that referred spares to be supplied for **each type** of the HP/LP By Pass & Spray control valves i.e all valves applicable under 1unit of 800MW. Please confirm our understanding.	First line of Clause 1.00.16 (c) of Ch-9 at Sheet 94 of 103 in Vol-II, be read as under:- "Following spares shall be supplied for each of the HP/LP By Pass & Spray control valves and Stop valves"

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1223	Volume II	Ch 9 : Mandatory Spares	94 of 103	1.00.16 (D)	Common spares for HP By Pass & Spray control valves system and LP By Pass & Spray control valves system separately: i) Feedback transmitter 2 NOS. ii) Electronic positioner 2 NOS. iii) Proportional Valve 2 NOS. iv) Quick opening device 2 NOS. v) Seal sets 4 Sets vi) Solenoid Valves 2 NOS. vii) Filters for Oil Units 1 set viii) Supply manifold for oil units 1 No ix) Hose for each service 1 each x) Seal set for oil unit 1 Set xi) Complete actuator for each 1 set	It is understood that referred spares are to be quoted for HP system and LP system separately. However Owner to clarify how quantity to be offered against each requirement? Is it based on same make/ model/ type for each of spare requirement given?	Bidder to provide common spares for HPBP and LPBP separately as per the quantity mentioned against each.
1224	Volume II	Ch 9 : Mandatory Spares	94 of 103	1.00.16 (F)	Solenoid Valves : 20 percent or min 10 no. of each type & model for total qty. (whichever is more)	Since SOV is already covered under 1.00.16 (D), No Mandatory spares related to HP-LP Bypass system will be offered against this clause. Please confirm acceptance.	Noted.
1225	Volume II	Ch 9 : Mandatory Spares	97 of 103	2	Turbine Supervisory System /EHTC /TSC/ATT /ATRS /GSPC /TDBFP etc. (x) Electro-hydraulic converter/Servo unit and position feedback transmitter for LPBP and HPBP : 1 set each	Only spares related to clause (X) will be quoted for HP LP Bypass valve? And for rest of the clauses no spares related to HP-LP bypass will be offered. Please confirm acceptance.	Bid specifications to be followed.
1226	Volume II	Ch 9 : Mandatory Spares	1 to 103	-	Mandatory spares	Customer is requested to clarify following understanding : If a particular mandatory spare of one System/ Sub-System /Equipment is found to be covered under any other chapters/ sub clause of Volume II - General & Schedules, Ch 9 : Mandatory Spares of technical specification, these spares are not required to be repeated. In case of repeated / duplicate spares, the highest quantity arrived from the calculation of mandatory spares from any of the repeated / duplicate clause shall be supplied.	Noted.
1227	Volume V / Part B	Ch 9 : Mandatory Spares	17 of 103	2.1 (L)	LPBP/CV All type of internals like stem, disc, seal, bushings, pilot valves, seat of LP valves, safety valves and control valves with one set of fasteners, one set of actuator cylinder, spring set, pins, couplings and its fasteners	Please clarify whether referred spares are applicable for only LP steam control valve or even applicable to LP steam stop valve and LP spray water valve? • Disc is not applicable in Linear Control Valve and hence Plug will be offered instead. Pleas confirm acceptance. •Against requirement of Seal, valve soft goods kit will be offered. Please confirm acceptance. •Please clarify what is to be offered against pilot valve, since it is not clear. • Please clarify what is to be offered against mentioned safety valves and control valve Requirement is not clear. • Since actuator cylinder is mentioned bare actuator without control block and Yoke will b offered. Please confirm acceptance.	Bid specifications to be followed. Referred spares are applicable for all LP valves. • Noted • Noted • Not required • Not required • Complete set for Actuator cyclinder with Control equipment to be supplied.
1228	Volume V / Part B	Ch 9 : Mandatory Spares	17 of 103	2.1 (M)	HPBP All type of internals like stem, disc, seal, bushings, pilot valves, seat of HP & LP bypass valves and its spray valves with one set of fasteners, one set of actuator cylinder, spring set, pins, couplings and its fasteners	Please clarify whether below spares are applicable for only HP Bypass valve or even applicable to HP spray stop valve and HP spray control valve? • Disc is not applicable in Linear Control Valve and hence Plug will be offered instead. Pleas confirm acceptance. •Against requirement of Seal, valve soft goods kit can be offered. Please confirm acceptance. •Please clarify what is to be offered against pilot valve, since it is not clear. • Seat of HP & LP Bypass valves and its spray water valves is mentioned. So does it means aga LP Bypass seat to be offered under this section too? Please clarify. • Fastener requirement is only for HP BP valve/ valves or even applicable for LP Bypass valve Please clarify. • Since actuator cylinder is mentioned bare actuator without control block and Yoke will b offered. Please confirm acceptance.	Bid specifications to be followed. • Noted. • Confirmed. • Not required • Applicable for HPBP. • Applicable for both LPBP & HPBP. • Complete set for Actuator cyclinder with Control equipment to be supplied.
STG Spares							
1229	Volume II	Chapter 9	14 of 103	2.1.A.I	MS pipe/casing U-seal ring as per Drawing	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1230	Volume II	Chapter 9	15 of 103	2.1.A.II	MS pipe /casing U-seal ring-Unmachined	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1231	Volume II	Chapter 9	15 of 103	2.1.A.III	Inner/Outer casing U-seal ring as per Drawing	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1232	Volume II	Chapter 9	15 of 103	2.1.A.IV	Inner-Outer casing U-seal ring -Unmachined	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1233	Volume II	Chapter 9	15 of 103	2.1.A.V	Inner/Outer I-seal ring-Unmachined	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1234	Volume II	Chapter 9	15 of 103	2.1.A.VI	HPT exhaust Pipe/Casing U-seal ring Unmachined	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1235	Volume II	Chapter 9	15 of 103	2.1.A.VII	HPT exhaust Pipe/Casing U-seal ring as per Drawing	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1236	Volume II	Chapter 9	15 of 103	2.1.A.IX	Breach Nut	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1237	Volume II	Chapter 9	15 of 103	2.1.A.XVI	HP inlet & HP exhaust assembly (U-sealing, lock washers, connecting nuts/ cap nuts between pipe & casing)	In our design HP inlet and HP exhaust pipes are welded with casing So it is not applicable in our design & hence no spare offered against this clause	Bid specifications to be followed.
1238	Volume II	Chapter 9	15 of 103	2.1.A.XX	Combined thrust and journal bearing (Complete with torous, intermediate pieces sole/base plate and matching seats & all other fixing/assembly materials required to complete thrust & journal bearings assembly except housing)	Already covered in clause no.2.1.D.a,hence not consider in this clause	Clarification noted
1239	Volume II	Chapter 9	15 of 103	2.1.B.a	Inlet pipe angle ring-Unmachined	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1240	Volume II	Chapter 9	15 of 103	2.1.B.b	Extraction Pipe Angle ring unmachined	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1241	Volume II	Chapter 9	15 of 103	2.1.B.h	IP inlet & IP exhaust assembly (U-sealing, lock washers, connecting nuts/ cap nuts between pipe & casing)	In our design IP inlet pipes are welded with casing So it is not applicable For IP exhaust, Between IP exhaust and COP fasteners will be provided	Bid specifications to be followed.
1242	Volume II	Chapter 9	16 of 103	2.1.C.a	Expansion – 1 Bellows	Based on our design number of expansion bellows will be provided against this clause.	Bid specifications to be followed.
1243	Volume II	Chapter 9	16 of 103	2.1.C.b	Expansion – 2 Bellows		Bid specifications to be followed.
1244	Volume II	Chapter 9	16 of 103	2.1.C.c	Expansion – 3 Bellows		Bid specifications to be followed.
1245	Volume II	Chapter 9	16 of 103	2.1.C.e	LPT inlet pipe bellows	All ready covered in clause 2.1.C.a,b,c hence not consider against this clause	Bid specifications to be followed.
1246	Volume II	Chapter 9	16 of 103	2.1.C.g	Clamping Pieces and locking plates for free standing blades	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1247	Volume II	Chapter 9	16 of 103	2.1.C.h	Free standing rotating blades	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1248	Volume II	Chapter 9	16 of 103	2.1.C.k	LP inlet & HP exhaust assembly (U-sealing, lock washers, connecting nuts/ cap nuts between pipe & casing)	LP inlet assembly applicable fasteners will be provided against this clause. LP exhaust assembly fasteners are not applicable as per our design & hence not offered.	Bid specifications to be followed.
1249	Volume II	Chapter 9	16 of 103	2.1.C.m	LP shaft gland seals (Complete set for replacement of front & rear with fixing material)	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1250	Volume II	Chapter 9	16 of 103	2.1.C.p	LP Turbine rear bearing (Complete set of bearing assembly including torous, intermediate pieces and matching seats, sole/ base plate and all other fixing/ assembly materials required to complete one bearing assembly without housing)	Already covered in clause no.2.1.D.a,hence not consider against this clause	Clarification noted
1251	Volume II	Chapter 9	16 of 103	2.1.E.c	Jacking oil to each bearing NRV	Jacking oil NRV of each bearing is part of bearing itself and it is already covered in clause no.2.1.D.a, hence not covered against this clause	Bid specifications to be followed.
1252	Volume II	Chapter 9	17 of 103	2.1.G.a	Main Oil pump assembly complete with Bearings	Shaft driven MOP is not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1253	Volume II	Chapter 9	17 of 103	2.1.G.b	HPT/ MOP gear coupling		Bid specifications to be followed.
1254	Volume II	Chapter 9	17 of 103	2.1.G.c	MOP suction Oil Injector assembly		Bid specifications to be followed.
1255	Volume II	Chapter 9	17 of 103	2.1.G.e	AOP assembly	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1256	Volume II	Chapter 9	17 of 103	2.1.H.a	Coupling nuts and bolts of MOP, HP, IP, LP, generator and exciter	Not applicable for MOP, Between HP and IP already covered in clause no. 2.1.A.XVII Between IP and LP already covered in clause no. 2.1.B.i Between LP and generator already covered in clause no. 2.1.C.l , Hence not consider against this clause	Bid specifications to be followed.
1257	Volume II	Chapter 9	17 of 103	2.1.I.a	Stationery Blades/Nozzle	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1258	Volume II	Chapter 9	17 of 103	2.1.I.b	Rotating Blades	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.
1259	Volume II	Chapter 9	17 of 103	2.1.I.d	25% nozzle segments & moving blades and complete set of sealing strips with caulking material (If hydraulically operated).	Not applicable in our design hence no spare offered against this clause	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1260	Volume II	Chapter 9	17 of 103	2.1.J.a	All type of internals like stem, disc, seal, bushings, pilot valves, seat of HP valves, safety valves and control valves with one set of fasteners, one set of actuator cylinder, spring set, pins, couplings and its fasteners	Whichever items are applicable based on our design will be supply against this clause	Bid specifications to be followed.
1261	Volume II	Chapter 9	17 of 103	2.1.K.a	All type of internals like stem, disc, seal, bushings, pilot valves, seat of IP valves, safety valves and control valves with one set of fasteners, one set of actuator cylinder, spring set, pins, couplings and its fasteners	Whichever items are applicable based on our design will be supply against this clause	Bid specifications to be followed.
1262	Volume II	Chapter 9	17 of 103	2.1.L.a	All type of internals like stem, disc, seal, bushings, pilot valves, seat of LP valves, safety valves and control valves with one set of fasteners, one set of actuator cylinder, spring set, pins, couplings and its fasteners	Whichever items are applicable based on our design will be supply against this clause	Bid specifications to be followed.
1263	Volume II	Chapter 9	18 of 103	2.1.U.a	Gland system condenser assembly	Water side and steam side gaskets and fasteners will be considered against this clause.	Bid specifications to be followed.
1264	Volume II	Chapter 9	18 of 103	2.1.X.a	Turbine & Generator shaft journal bearings (Complete set of bearing assembly including torous, intermediate pieces sole/base plate and all other fixing/assembly materials required	Turbine bearings are already covered in clause no. 2.1.D.a. Generator bearings are already covered in clause no. 1.01.03 of GENERATOR & AUXILIARIES Ch 9 : Mandatory Spares Sheet | 61 of 103. Hence not considered in against this clause	Clarification noted
1265	Volume II	Chapter 9	18 of 103	2.1.BB	Bladders, filters, seal/O rings	Please clarify the exact requirement against this clause.	Bladders, filters, seal/O rings shall be supplied for all equipment having these components.
STG C&I							
1266	Volume V - Part A	Instrumentation & Control Works	4 of 96	2.03.01-ii (1)	TG System 1. Steam Turbine and Generator (TG) C&I system comprising of Turbine Protection System Function (TPS) including ..... for Main and BFP Turbine, HP/LP Bypass Control System,.... ,complete BFP turbine and its auxiliaries OLCS and CLCS controls, 2. Other Miscellaneous TG system controls:- (1.) Condenser on load tube cleaning & SCS Control	The controls for BFP turbine and auxillaries, HP/LP Bypass Control System, Complete BFP turbine and its auxiliaries OLCS and CLCS controls shall not be envisaged in main steam turbine control system.	These controls may be implemented in Unit DCS. Further, functional grouping of controllers may be decided during detailed engineering.
1267	Volume V - Part A	Instrumentation & Control Works	6 of 96	2.04.02	Unified HMI is to be provided for complete Unit DDCMIS (i.e. SG, TG, BOP systems) even if separate control systems shall be envisaged for critical STG Protection systems. The detailed functional requirements for the Unified HMIPIS are indicated at Part-B, subsection chapter 3, DDCMIS and its associated contents. In order to fulfill the above functional requirement, the requisite interfacing hardware and software has to be considered by the Bidder without any cost implication to the Owner. All the performance requirement of Unit DDCMIS including command response time shall be demonstrated with Unified HMI. The solution offered for Unified HMI will be tested as part of Major Design Feature Testing. Unified system needs to be maintained for the subject project.	The turbine related system are operated from ST-OPS. In addition to this to enable operation from plant DCS all other signals are provided over OPC link. TG is a standalone system and based on bidder standard practice. Unified HMIPS & Cross HMI operation can not be envisaged.	Bid specifications to be followed.
1268	Volume V - Part A	Instrumentation & Control Works	9 of 96	2.11.00	(b) Marshalling cabinets separate from system cabinets for terminating inputs from field, MCC/SWGR etc., for further wiring to control system and for terminating outputs from control system to MCC/SWGR etc. (c.) Relay cabinet-housing relays for providing contact outputs by control system to other system wherever contacts are used in circuit/scheme of Control supply/power supply of more than 24 V and in cases where the VA burden is more than the VA burden the Output module can drive. Alternatively, these relays can also be mounted in termination/marshalling cabinets also. It may be noted that relays cannot be mounted in system cabinets. Make of relays and relay board shall be from same OEM.	No separate Marshalling cabinet & Relay cabinet will be provided for bidder supplied TCS/TPS. For the termination of the cables from the field, field termination board (FTB) is provided at back of the system cabinets. The relays are placed in the system cabinet only as per OEM standard pracatice.	Bid specifications to be followed.
1269	Volume V - Part A	Instrumentation & Control Works	10 of 96	3.00.00	k) Turbine supervisory system (TSS) including vibration analysers, vibration monitoring system, axial shift, eccentricity measurement system etc. for Main Turbine and BFP Turbine etc. Hardware and software provisions for diagnosis and analysis of plant auxiliaries vibration as indicated under Appendix-I to Part-A, Vol. V, "Contract Quantities other than DDCMIS item". l) Complete hardware and software system for turbine stress computation, fatigue analysis for all affected critical components of the turbine, computation of Residual Life Analysis and long term storage of the relevant monitoring of turbine critical components.	(k) Turbine Supervisory System of BFPT is not part of the main turbine supervisory system. Vibration analysis System for main turbine and BFPT is also not part of the main turbine supervisory system. (i) Turbine Stress Control & Fatigue analysis is part of the Turbine Control System and no seperate hardware and software is envisaged for the same.	(k) Vibration analysis of main turbine and BFP turbine shall be part of main plant vibration monitoring analysis system. (i) Noted.
STG-Electrical							

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1270	Volume IV	Ch1: Electrical Scope of Work	10 of 58	1.06.00	1.06.00 CODES AND STANDARDS 1.06.01 Equipment In case of a conflict between IEC and other standards, IEC shall govern. The provisions of tender specifications (except the clause of codes and standards of individual specification) shall however have precedence over all other standards.	In case of conflict between IEC/other standards and tender specification, it shall be mutually discussed and agreed by owner and bidder on case to case basis. Owner is kindly requested to confirm acceptance.	Bid specifications to be followed.
1271	Volume IV	Ch1: Electrical Scope of Work	57 of 58	1.49.01	1.49.00 TESTS 1.49.01 Type Tests a) The Bidder shall carry out type tests listed under Schedule 8A and 8B of Volume I Book 2 of 3. The Bidder shall supply the equipment to the site only after receiving MDCC (Material Dispatch Clearance Certificate) from the Owner. Without receiving consent/MDCC from Owner, supply of the equipment at site shall not be considered. b) The Bidder shall only submit the reports of the type tests listed under Category II in CEA guidelines and which are not covered in (a) above for respective equipment which should have been carried out within last five (5) years from the date of bid opening. These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and the test (s) should have been conducted at an independent laboratory or should have been witnessed by a Client. In case the Bidder is not able to submit report of the type test (s) 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 free of cost in the presence of the Owner and submit the reports for approval. c) Bidder shall meet the requirements of type tests on electrical equipment's as stipulated in relevant chapters of technical specifications.	As per industry practice, Bidder understands that the Bidder shall only submit the reports of the type tests for main Generator, Excitation Transformer and AVR-Excitation system. Type tests on main Generator, Excitation Transformer and AVR-Excitation system shall be performed only in case valid type test certificates of tests performed in last 10 years are not available. Owner is kindly requested to confirm acceptance.	a) Schedule 8A & 8B of price schedule in Section-VII, book 2 of 3 stands deleted. b) Validity of test reports for the tests which will not be conducted, Latest Guidelines of CEA will be applicable.
1272	Volume IV	Ch 2: Generator and Accessories	2 of 43	2.03.00	2.03.00 SYSTEM OF COOLING 5. Capacity with one Gas Cooler out: Capable of delivering at least two third of the rated and max continuous MVA with one cooler out of service and ten (10) percent of tubes plugged in remaining coolers that are in service without exceeding the temperature limits of thermal Class 130 (B) and thermal Class 155 (F) respectively.	Since bidder's Generator design adopts two hydrogen gas cooler of sectionalized design with two sections each, bidder requests owner to change the specification as follows: "Capacity with one Gas **Cooler / Cooler Section** out: Capable of delivering at least two third of the rated and max. continuous MVA with **one cooler / cooler section** out of service and ten (10) percent of tubes plugged in remaining **coolers / cooler sections** that are in service without exceeding the temperature limits of Thermal Class 130 (B) and Thermal Class 155 (F) respectively."	Confirmed
1273	Volume IV	Ch 2: Generator and Accessories	2 of 43	2.03.00	2.03.00 SYSTEM OF COOLING 6. Gas Drier: Two full capacity Desicant Hydrogen gas driers with on line dew point monitoring system.	Bidder requests owner to provide Gas Drier with as per OEM recommendation. Accordingly, owner is requested to modify the clause as follows: "Gas Drier: Two full capacity **Desiccant / Refrigeration type** Hydrogen gas driers with on line dew point monitoring system."	Confirmed
1274	Volume IV	Ch 2: Generator and Accessories	4 of 43	2.04.00	2.04.00 OPERATIONAL REQUIREMENTS 7. Short Circuit withstanding capacity: …. However generator to be type tested for sudden short circuit test as per cl. 4.16 of IEC 60034-3.	The owner is requested to modify the clause as follows considering industry practice:- Generator sudden short circuit test to be performed at suitable conditions to determine transient and sub transient reactance measurement and to ensure stability of winding in line with 2.11.03 of Chapter-2 of Vol-IV.	Bid specifications to be followed, however in clause 2.04.00, Sr. No. 7 at page 4of 43 of Chapter 2 of Vol.IV following line is deleted: However generator to be type tested for sudden short circuit test as per cl.4.16 of IEC 60034-3.
1275	Volume IV	Ch 2: Generator and Accessories	4 of 43	2.04.00	2.04.00 OPERATIONAL REQUIREMENTS 9. Generator Neutral Earthing: Non-effectively earthed through a distribution transformer, loaded with a resistor. The core design to permit the flow of earth fault current of at least 15 amperes for one (1) second without any core damage.	The owner is requested to modify the clause as follows considering industry practice: "9. Generator Neutral Earthing: Non-effectively earthed through a distribution transformer, loaded with a resistor. The core design to permit the flow of earth fault current of at least 15 amperes for one (1) second **without any major core** damage."	Confirmed
1276	Volume IV	Ch 2: Generator and Accessories	4 of 43	2.04.00	2.04.00 OPERATIONAL REQUIREMENTS 9. Generator Neutral Earthing: Non-effectively earthed through a distribution transformer, loaded with a resistor. The core design to permit the flow of earth fault current of at least 15 amperes for one (1) second without any core damage.	Generator Neutral Grounding system shall be designed according to Volume IV, Chpater-01, Clause 1.11.03, "b) Generator Neutral Grounding System: The Generator Neutral Grounding System shall be designed to limit phase-to-ground fault current to approximately 5 - 10 A." Owner is kindly requested to confirm acceptance.	Intent is clear, clause no. 2.04.00, Sr. No. 9 at page 4 of 43 of Chapter 2 of Vol.IV is for operational requirement of the Generator, however clause no. 1.11.03 (b) at page 16 of 58 of Chapter 1 of Vol.IV is applicable for the Neutral Grounding System connected with Generator.
1277	Volume IV	Ch 2: Generator and Accessories	6 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 4) 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 Montoring Kit.	As per Volume-IV, Chapter-35 "Electrical Lab Equipment, Sr. no 33", Generator online partial discharge monitoring system is already being supplied with suitable slot couplers or coupling capacitors (as applicable) along with portable Partial Discharge Monitoring Kit. (1 set per project) Hence, bidder understands additional set of generator partial discharge monitoring system/equipment shall not be provided. Owner is kindly requested to confirm acceptance.	Generator online partial discharge monitoring system is not required, accordingly following Clauses stands deleted: i) Sr. No. (13) (F) (Online partial discharge (PD) monitoring) of clause no. 2.05.00 at page 11 of 43 of Chapter 2 of Vol.IV. ii) Sr. No. 33 (Generator on-line Partial Discharge Real Time Monitoring System) of clause no.35.03.00 at page 25 of 31 of Chapter 35 of Vol.IV

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1278	Volume IV	Ch 2: Generator and Accessories	7 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 5) Winding Connection and Terminal Bushings d) Bushing: …. The bushing shall withstand twice the power frequency test voltage of the winding.	Test voltage for Generator terminal bushings power frequency test shall be according to relevant IEC 60137 standard. Owner is kindly requested to confirm acceptance.	Confirmed.
1279	Volume IV	Ch 2: Generator and Accessories	8 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 9) Bearings: Self aligning type sleeve bearings either mounted on separate pedestals or on the end shields.	As per industry standard practice, owner is requested to modify the clause as follows: "9) Bearings: Self aligning type sleeve **/ Tilting pad type** bearings either mounted on separate pedestals or on the end shields."	Confirmed.
1280	Volume IV	Ch 2: Generator and Accessories	11 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 13) Generator Instrumentation: D) Vibration monitoring System: At least six (6) numbers of optical sensor type vibration picksups 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.	As per industry standard practice, owner is requested to modify the clause as follows: "D) Vibration monitoring System: At least six (6) numbers of dual axis optical System 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 trend recording. Suitable connection between the pickups and Turbine Supervisory system for vibration monitoring shall be provided. **Also a standalone system for the vibration monitoring system is also acceptable.**"	Confirmed, however bidder shall provide details and past performance of the system during detailed engineering.
1281	Volume IV	Ch 2: Generator and Accessories	11 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 13) Generator Instrumentation: F) Online partial discharge (PD) monitoring: The system offered shall be applicable to the turbo Generator of large rating confirming to IEEE-1434/IEC600034-27 2. Permanently connected independent sensing unit for each generator shall be provided along with necessary terminal equipment. 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.	As per Volume-IV, Chapter-35 "Electrical Lab Equipment, Sr. no 33", Generator online partial discharge monitoring system is already being supplied with suitable slot couplers or coupling capacitors (as applicable) along with portable Partial Discharge Monitoring Kit. (1 set per project) Hence, bidder understands additional set of generator partial discharge monitoring system/equipment shall not be provided. Owner is kindly requested to confirm acceptance.	Generator online partial discharge monitoring system is not required, accordingly following Clauses stands deleted: i) Sr. No. (13) (F) (Online partial discharge (PD) monitoring) of clause no. 2.05.00 at page 11 of 43 of Chapter 2 of Vol.IV. ii) Sr. No. 33 (Generator on-line Partial Discharge Real Time Monitoring System) of clause no.35.03.00 at page 25 of 31 of Chapter 35 of Vol.IV
1282	Volume IV	Ch 2: Generator and Accessories	12 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 13) Generator Instrumentation: G) Rotor Flux Monitoring: Sensors to be provided complete with all software and hardware to detect turn to turn shorting in field wininding.	As per industry standard practice, owner is requested to modify the clause as follows: "G) Rotor Flux Monitoring: Sensors to be provided complete with all software and hardware to detect turn to turn shorting in field winding. **Also a standalone system for the vibration monitoring system is also acceptable.**"	Confirmed, however bidder shall provide details and past performance of the system during detailed engineering.
1283	Volume IV	Ch 2: Generator and Accessories	12 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 14) Generator Drying Arrangement 15) Transportation	Generator drying and Transportation arrangement shall be as per bidder's standard and proven practice as per Clause 2.06.00, Chapter-2, Volume IV (same section the referred clause). Owner is kindly requested to confirm acceptance.	Confirmed
1284	Volume IV	Ch 2: Generator and Accessories	12 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 16) Specific Requirements 1. The generator shall be designed for continuous operation with 110% flux as a percentage of flux at rated values.	As per industry standard practice, the generator shall be designed as for flux which meets below criteria as mentioned in clause 2.02.01 of the Chapter-2 of Volume-IV. ((+)3% to (-)5% frequency variation of, terminal voltage variation of (-/+ 5%) as per IEC-60034 and combined voltage & frequency variation of 5%.) Owner is kindly requested to confirm acceptance.	Confirmed
1285	Volume IV	Ch 2: Generator and Accessories	12 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 16) Specific Requirements 6. When tested on open circuit and at rated speed and voltage, the telephone influence factor of the turbine generator shall not exceed 1.5%	As per IEC 60034, "telephone influence factor" is not applicable. Instead, Total harmonic distortion (THD) shall be followed according to IEC 60034. Owner is kindly requested to confirm acceptance.	Confirmed
1286	Volume IV	Ch 2: Generator and Accessories	12 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 16) Specific Requirements 7. Generator and exciter will be provided with sufficient space heater along with necessary interlocking such that heaters get automatically switch on and off when generator is off and on.	OEM standard and proven practice shall be followed for storage and drying arrangement as specified in other clauses of the Chapter-2, Volume-IV. Owner is kindly requested to confirm acceptance.	Confirmed, however bidder shall provide details and past performance of the system during detailed engineering.

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1287	Volume IV	Ch 2: Generator and Accessories	12 of 43	2.05.00	2.05.00 DESIGN AND CONSTRUCTIONAL FEATURES 16) Specific Requirements 10. Overload Capability: With balanced current, the short time thermal capability of the generator armature shall permit operation at 150% of the rated armature current for at least 30 seconds, starting from stable temperature at rated load.	Generator overload (overcurrent) capability shall be subject to provisions of IEC 60034-3. Owner is kindly requested to confirm acceptance.	Confirmed
1288	Volume IV	Ch 2: Generator and Accessories	14 of 43	2.06.00	2.06.00 GAS SYSTEM 4 Driers: Type : Desiccant type with in-situ reactivation facility shall be provided.	As per industry standard practice, owner is requested to modify the clause as follows: "4 Driers: Type : Desiccant **/ Refrigeration** type with in-situ reactivation facility shall be provided."	Confirmed, however bidder shall provide details and past performance of the system during detailed engineering.
1289	Volume IV	Ch 2: Generator and Accessories	14 of 43	2.06.00	2.06.00 GAS SYSTEM 6 On line dew point measurement: On line dew point monitoring system shall be provided across the inlet and outlet lines to the drying system along with alarm/annunciation in case of high moisture content in the generator casing hydrogen. (Interfacing with DCS TGMMI)	Bidder's standard and proven practice applied in Indian supercritical and ultra-supercritical thermal power plants shall be followed for quantity of Hydrogen make-up. Owner is kindly requested to confirm acceptance.	Tender specification shall prevail
1290	Volume IV	Ch 2: Generator and Accessories	15 of 43	2.06.00	2.06.00 GAS SYSTEM 9 Portable Gas analyzer Similar as detailed above under clause "Gas Analyzer" shall be provided for supervision of the gas purging operation.	As per Volume-IV, Chapter-35 "Electrical Lab Equipment, Sr. no 31", "31. Portable Hydrogen Purity Meter" is already being supplied. Hence, bidder understands additional Portable Hydrogen Purity Meter shall not be provided. Owner is kindly requested to confirm acceptance.	Noted, Sr No. 31 (Portable Hydrogen Purity Meter) of clause no.35.03.00 at page 25 of 31 of Chapter 35 of Vol.IV is deleted.
1291	Volume IV	Ch 2: Generator and Accessories	15 of 43	2.06.00	2.06.00 GAS SYSTEM 10 Hydrogen pressure and purity … H2 Flow Transmitter at the discharge manifold to access the quantity of makeup	Bidder's standard and proven practice applied in supercritical and ultra-supercritical thermal power plants shall be followed for quantity of Hydrogen make-up. Owner is kindly requested to confirm acceptance.	Confirmed
1292	Volume IV	Ch 2: Generator and Accessories	16 of 43	2.07.00	2.07.00 SEAL OIL SYSTEM b) Number of pumps Two (2) number 100% AC motor driven pumps for each stream. One (1) number 100% DC motor driven pump.	Following Seal Oil Pumps are offered which is also as per OEM standard and proven design being followed in Supercritical and Ultra-supercritical thermal power plants: Air Side: 2x100% AC Motor Driven Pump 1x 100% DC Motor Driven Pump H2 Side: 1x100% AC Motor Driven Pump Owner is kindly requested to confirm acceptance.	Confirmed
1293	Volume IV	Ch 2: Generator and Accessories	17,18 of 43	2.07.00	2.07.00 SEAL OIL SYSTEM j) Temperature/ Flow Measurement Temperature gauges/Element and flow meters shall be provided at all appropriate locations. At the Inlet & outlet of the cooler temperature elements shall be provided for monitoring at TGMMI	Bidder's standard and proven practice applied in Indian supercritical and ultra-supercritical thermal power plants shall be followed for referred instrumentation. Accordingly, tender shall be revised as follows: "At the Inlet & outlet of the cooler temperature elements shall be provided for monitoring at TGMMI (As applicable)" Owner is kindly requested to confirm acceptance.	Bid specifications to be followed.
1294	Volume IV	Ch 2: Generator and Accessories	17,18 of 43	2.07.00	2.07.00 SEAL OIL SYSTEM k) Pressure gauges, Transmitter and switches Pressure gauges and switches shall be provided at least at the following locations i) At the inlet and outlet of pumps (at Pump Discharge header Pressure Transmitter shall be provided. iv) At the oil supply header Pressure Transmitter shall also be provided.	Bidder's standard and proven practice applied in Indian supercritical and ultra-supercritical thermal power plants shall be followed for referred instrumentation. Accordingly, tender shall be revised as follows: "Pressure gauges and switches shall be provided at least at the following locations: i) At the inlet (as applicable) and outlet of pumps iv) At the oil supply header (as applicable)" Owner is kindly requested to confirm acceptance.	Confirmed

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1295	Volume IV	Ch 2: Generator and Accessories	27 of 43	2.09.00	2.09.00 GENERATOR EXCITATION SYSTEM 2.09.05 Voltage regulator g) At least following instruments and control devices suitably clubbed on a plate/console shall be supplied for being mounted on unit control panel. Further, it shall be possible to exchange information with station DDCMIS through suitable protocol. - A center zero balance indicator to indicate the channel difference signal. - Generator field current indicator. - Generator field voltage indicator. - Rotor winding temperature recorder. - Auto channel-1 to Auto channel-2 & auto/manual changeover indications. - Generator field breaker/excitor field breaker control & instrumentation. - PSS control and instrumentation. - Auto and manual channel control of excitation level. - Field flashing (for static exciation system) and field forcing condition indications.	Bidder's standard and proven practice, ongoing industry practice applied in Indian supercritical and ultra-supercritical thermal power plants shall be followed for referred instrumentation. Static Excitation System / Automatic Voltage Regulator shall be connected to Turbine Control System (TCS or TG-DDCMIS) and Panels for Auto/manual synchronization suitably for voltage regulation purpose. Owner is kindly requested to confirm acceptance.	Bid specification to be followed, however following changes is being made in clause no. 2.09.05 (g) at page 27 of 43 of Chapter 2 of Vol.IV: i) Following line stands deleted : "A center zero balance indicator to indicate the channel difference signal". ii) "Rotor winding temperature recorder" is replaced with " Rotor winding temperature recorder in DCS".
1296	Volume IV	Ch 2: Generator and Accessories	27 of 43	2.09.00	2.09.00 GENERATOR EXCITATION SYSTEM 2.09.06 Main Features Of Brushless Excitation System (If Applicable)	Since static excitation system is proposed, any clauses within referred clause and other relevant clauses/sections in the complete tender specification are not applicable. Owner is kindly requested to confirm acceptance.	The query is not relevant as clause is applicable in case bidder supply Brushless excitation system.
1297	Volume IV	Ch 2: Generator and Accessories	30 of 43	2.09.00	2.09.00 GENERATOR EXCITATION SYSTEM vii) Features Of Static Excitation System (If Applicable) 2) Excitation Transformer a) Type: Indoor, epoxy moulded dry type, 3 phase step down transformer with class F insulation complete with flanges and terminal lugs for connection to the generator terminals through isolated phase bus ducts. The transformer shall conform to IS:11171. b)Temperature rise 70 deg.C over an ambient temperature of 50 Deg.C.	For applicable rating for this project, there are no sufficient approved excitation transformer suppliers in India which complies all technical requirements of specification & "Make in India requirements". Bidder's supplied Excitation Transformer shall confirm to IEC-60076-11 and Thermal Class 155 (F) insulation. Accordingly, bidder proposes change in referred clause as follows: "b) Temperature rise: 90 deg.C over an ambient temperature of 50 deg.C without fan/blower and 85 deg C. over an ambient temperature of 50 deg.C with fan/blower". Owner is requested to confirm acceptance.	Noted. Further, In case static excitation system is offered, suitable arrangement for isolation of excitation transformer from Generator bus duct and charging of excitation transformer from 11kV/6.6 KV electrical system (as alternative source for excitation system) for testing of excitation system shall also be provided. Necessary switchgear and cables for this purpose shall be provided by bidder.
1298	Volume IV	Ch 2: Generator and Accessories	30 of 43	2.09.00	2.09.00 GENERATOR EXCITATION SYSTEM vii) Features Of Static Excitation System (If Applicable) 8) 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 UCB.	In line with industry practice owner is requested to change the specification as follows: The generator field breaker shall be of AC or DC (multipole or single pole) air break type, suitable for operation from local panel as well as from Unit Control Room (UCR). Owner is kindly requested to confirm acceptance.	Confirmed
1299	Volume IV	Ch 2: Generator and Accessories	33 of 43	2.11.00	2.11.00 TYPE TESTS 2.11.01 The Bidder shall carry out the type tests as listed in this specification on the equipment to be supplied under this contract. 2.11.03 List of Type Tests to be conducted i) Minimum type test for which type test reports need to be submitted are	As per industry practice, Bidder understands that the Bidder shall only submit the reports of the type tests for main Generator, Excitation Transformer and AVR-Excitation system. Type tests on main Generator, Excitation Transformer and AVR-Excitation system shall be performed only in case valid type test certificates of tests performed in last 10 years are not available. Owner is kindly requested to confirm acceptance.	Bid specification to be followed, however following changes is being made inclause No. 2.11.00 at page No. 33 & 34 of 43 of Chapte 2 of Vol.IV : a) In clause No. 2.11.03 (i) at page No. 33 of 43 following sentence stands deleted: " Minimum type test for which type test reports need to be submitted are ". b) In clause No. 2.11.04 (i) at page No. 33 of 43 of following sentence stands deleted: " Minimum type test for which type test reports need to be submitted are". c) In clause No. 2.11.04 (i) (d) at page No. 34 of 43 following sentence stands deleted " The Oscillatory SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002" d) . In clause No. 2.11.04 (ii) (a) at page No. 34 of 43 ":All type and special tests on excitation transformer as per IEC-60076-11" is replaced with following : a) Excitation transformer as per IEC-60076-11. i. Short circuit Test ii. Lighting Impulse Test iii. Temperature rise Test (with and without fan/blower) iv. Noise level Test e) In clause No. 2.11.04 (ii) (f) at page No. 34 of 43

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							following sentence stands deleted " The Oscillatory SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002" f) In clause No. 2.11.04 (iii) at page No. 34 of 43 of " Brushless excitation system (if applicable)" is replaced with "Test Reports to be submitted for Brushless excitation system (if applicable) " g) f) In clause No. 2.11.04 (iv) at page No. 34 of 43 " Static Excitation system (if applicable) " is replaced with "Test Reports to be submitted for Static Excitation system (if applicable) "
1300	Volume IV	Ch 2: Generator and Accessories	33 of 43	2.11.00	2.11.00 TYPE TESTS 2.11.01 The Bidder shall carry out the type tests as listed in this specification on the equipment to be supplied under this contract. 2.11.03 List of Type Tests to be conducted i) Minimum type test for which type test reports need to be submitted are... c) Determination of voltage waveform factor and Total Harmomic Factor. f) Impulse withstand voltage test on terminal bushing.	Regarding referred type tests, c) Total Harmonic Factor (THF) is not applicable now as per IEC 60034. Instead, Total Harmonic Distortion factor (THD) shall be considered f) Impulse withstand voltage test on terminal bushing shall be performed at vendor's works. Owner is kindly requested to confirm acceptance.	Confirmed
1301	Volume IV	Ch 2: Generator and Accessories	34 of 43	2.11.00	2.11.00 TYPE TESTS 2.11.01 The Bidder shall carry out the type tests as listed in this specification on the equipment to be supplied under this contract. 2.11.03 List of Type Tests to be conducted ii) Static excitation system (if applicable) Type test for which type test reports need to be submitted are a) All type and special tests on excitation transformer as per IEC-60076-11. b) Type tests on field breaker as per IEEE/ANSI C-37-18. f) Input and output surge withstand capability test: The Oscillatory SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002 The Fast transient SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002/ IEC 60255-22-04-2008.	As per Industry practice, owner is requested to change the specification as follows: " Type test for which type test reports need to be submitted are a) Excitation transformer as per IEC-60076-11. i. Short circuit Test ii. Lighting Impulse Test iii. Temperature rise Test (with and without fan/blower) iv. Noise level Test b) Type tests on field breaker as per IEEE/ANSI C-37-18 or IEC 60947-2 f) Input and output surge withstand capability test: The Fast transient SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002 / IEC 60255-22-04-2008."	Bid specification to be followed, however following changes is being made inclause No. 2.11.00 at page No. 33 & 34 of 43 of Chapte 2 of Vol.IV : a) In clause No. 2.11.03 (i) at page No. 33 of 43 following sentence stands deleted: " Minimum type test for which type test reports need to be submitted are ". b) In clause No. 2.11.04 (i) at page No. 33 of 43 of following sentence stands deleted: " Minimum type test for which type test reports need to be submitted are". c) In clause No. 2.11.04 (i) (d) at page No. 34 of 43 following sentence stands deleted " The Oscillatory SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002" d) . In clause No. 2.11.04 (ii) (a) at page No. 34 of 43 ":All type and special tests on excitation transformer as per IEC-60076-11" is replaced with following : a) Excitation transformer as per IEC-60076-11. i. Short circuit Test ii. Lighting Impulse Test iii. Temperature rise Test (with and without fan/blower) iv. Noise level Test e) In clause No. 2.11.04 (ii) (f) at page No. 34 of 43 following sentence stands deleted " The Oscillatory SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002" f) In clause No. 2.11.04 (iii) at page No. 34 of 43 of " Brushless excitation system (if applicable)" is replaced with "Test Reports to be submitted for Brushless excitation system (if applicable) " g) f) In clause No. 2.11.04 (iv) at page No. 34 of 43 " Static Excitation system (if applicable) " is replaced with "Test Reports to be submitted for Static Excitation system (if applicable) "

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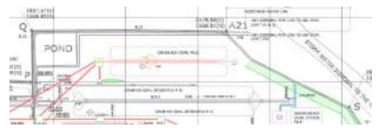
1302	Volume IV	Ch 2: Generator and Accessories	34 of 43	2.11.00	2.11.00 TYPE TESTS 2.11.01 The Bidder shall carry out the type tests as listed in this specification on the equipment to be supplied under this contract. 2.11.03 List of Type Tests to be conducted iv) Static Excitation system (if applicable) a) Excitation panels .. b) Degree of protection test for Excitation system panels. c) Tests on thyristors as per relevant IS.	Bidder understands listed tests are to be categorized as "LIST OF TESTS FOR WHICH REPORTS HAVE TO BE SUBMITTED". Owner is kindly requested to confirm acceptance.	Bid specifications to be followed.
1303	Volume IV	Ch 2: Generator and Accessories	39 of 43	DATA SHEET FOR GENERATOR	DATA SHEET FOR GENERATOR 2.0 GENERATOR QUANTITIES 2.2 Telephone Influence Factor: Less than 1.5%	As per IEC 60034, "telephone influence factor" is not applicable. Instead, Total harmonic distortion (THD) shall be followed according to IEC 60034. Owner is kindly requested to confirm acceptance.	Confirmed
1304	Volume IV	Ch 2: Generator and Accessories	41 of 43	DATA SHEET FOR GENERATOR	DATA SHEET FOR GENERATOR 5.0 EXCITATION SYSTEMS 5.1 Static/ Brushless Excitation System 5.1.1 Main exciter: .... 5.1.2 Main Exciter Winding : 5.1.3 Degree of protection for the exciter enclosure 5.1.4 Pilot / auxiliary exciter (permanent magnet generator)	Since static excitation system is proposed, any clauses within referred clause and other relevant clauses/sections in the complete tender specification are not applicable. Owner is kindly requested to confirm acceptance.	Whichever excitation system bidder will provide, relevant clauses shall be applicable.
1305	Volume IV	Ch 2: Generator and Accessories	43 of 43	DATA SHEET FOR GENERATOR	DATA SHEET FOR GENERATOR 8.0 TESTS 8.2 Running trials shall be conducted in the shop with the generator, exciter and AVR connected up and combined as a unit ''*" on the test bed - Yes/No - Required	Generator, AVR/Excitation System and Auxiliaries shall be tested individually at respective vendor's shops as a standard industry practice. Owner is kindly requested to confirm acceptance.	Noted, Tests for individual equipments shall be carried out at vendor's / sub-vendor's shop and tests for combined unit shall be performed at site.
1306	Volume IV	Ch 9 : Isolated Phase Bus Ducts & Neutral Grounding Equipment	12 of 26	9.04.13	9.04.00 SPECIFIC REQUIREMENTS 9.04.13 Current Transformer The current transformers shall be epoxy cast-resin, single core ring type, mounted within the bus duct enclosure and suitable for operation at an ambient temperature existing within the bus duct enclosure which may be in range of 90 deg. C to 100 deg.C.	Generator Current Transformers shall be installed on Generator Terminal bushings as per OEM standard and proven practice. Owner is kindly requested to confirm acceptance.	Confirmed
1307	Volume IV	Ch 9 : Isolated Phase Bus Ducts & Neutral Grounding Equipment	22 of 26	ANNEXURE	ANNEXURE LIST OF TRANSDUCERS FOR GENERATOR BUSDUCT CT'S/PT'S	Bidder understands the listed transducers are same as specified in 3.03.10 Transducers of Ch 3: Elec Control & Relay Panels of Volume-IV. Owner is kindly requested to confirm acceptance.	Confirmed
1308	Volume II	Ch 1: Intent of Specification	8 of 10	ANNEXURE	4.8 Special Tools & Tackles and Test/Measuring Equipment 4.8.1 One set of all special tools and tackles including testing, calibrating and measuring instruments required for erection, assembly, disassembly and maintenance and testing of all equipment/systems covered under the scope of the bidder shall be supplied by the bidder as per relevant clause indicated in Volume-II Chapter 5 and as specified elsewhere in Scope of Supply, Volume-II of Technical Specifications.	Special tools & tackles shall be as per bidder's design, erection and commissioning requirement. Such list will be submitted along with offer. Owner is kindly requested to confirm acceptance.	Confirmed
1309	Volume II	Ch 8: FG & LD	8 of 10	ANNEXURE	5.0 GUARANTEES UNDER CATEGORY-III 5.8 Generator excitation system The performance of generator excitation system as specified shall be demonstrated.	Excitation tests possible at site shall be demonstrated. Necessary approvals and conditions from grid side, if required, to be arranged by Owner. Owner is kindly requested to confirm acceptance.	Confirmed
Coal Handling Plant							

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1310	Volume II Volume II Volume II Volume II Volume VI Volume VI	Ch 1: Intent of Specification Ch 1: Intent of Specification Ch 1: Intent of Specification Ch 02: Scope of Work Ch 11: Buildings Description Ch 14: CHP	1 of 10 1 of 10 2 of 10 5 of 7 17 of 18 1 of 22	1.1 1.1 1.1 2.6 11.22 Ch 14 CHP	.....all electrical systems including switchyard, complete control and instrumentation and complete Civil, structural and Architectural works specified including Railways Siding/Tracks) e)…….Coal Handling System including railway siding & railway tracks including track electrification, signaling etc., as per requirements of the Indian Railways, f).....railway siding and railway tracks, bridges and culverts for crossing of railways track inside plant area, landscaping and other miscellaneous buildings and structures. 64. Railway siding system and locomotive shed. RAILWAY SIDING SYSTEM Necessary statutory clearances/approval from Railways/Highway Authority / PWD shall be obtained by Contractor at his own cost.	We understand that extent of railway siding work is mainly governed by requirement of respective zonal railway authority. Additionally, Feasibility report, Detail project report (DPR) and Engineering Scale Plan (ESP) of the proposed plant are also not yet finalised from Indian railway. Hence, it is not possible for EPC bidder to estimate the overall cost of railway siding work. Hence, Bidder request to exclude railway siding work from EPC Bidder scope of work. The above practice also followed in recent NTPC and other Central & States EPC Power Projects. Owner to confirm the bidder understanding	Bid specifications to be followed in the scope of bidder.
1311	VOLUME - VII TENDER DRAWINGS	-	-	Plot plan	Uncrushed coal stock pile	Bidder understands the uncrushed coal stock pile is not in scope of Bidder. **If uncrushed coal stock pile is in bidder scope, pls share the complete details of uncrushed coal stock pile requirement including size with height detail, type of structure- open or closed type, dust suppression requirement, reclaiming details and etc** **Kindly furnish**	Provision of Uncrushed coal stockepile stands deleted.
1312	Volume III - Mechanical Works Volume III - Mechanical Works	Ch:19 Coal Handling System Ch:19 Coal Handling System	Sheet 65 of 120 Sheet | 3 of 120	11.0 Data Sheet: Wagon Tippler & Accessories 1.1.3	(5) Type of Wagons that can be Handled at a time are BOX, BOXN, BOXNHA, BOXNLW, BOXNHL, BOXN25,DFC & other type of open wagons for coal as per RDSO standard and design used by Indian Railways to move coal. Two(2)no of needed Belt conveyor streams in parallel (1W+ 1S) of min 1200 tph rated capacity each together with Auxiliary Equipment / dust control system are proposed to meet the requirement of the plant.	Owner to note the contradiction in CHP capacity as mentioned below: The capacity of belt conveyor (1W+1S) with Minm 1200 TPH(Rated) mentioned in clause no: 1.1.3, page no: 3 of 120 and 1400 mm belt width conveyors in clause no: iv, page no: 26 of 120 chp tender spec. While using DFC wagon with capacity as 85 T & 25 tips/Hr operation, the capacity of conveyor required as 2125 TPH (Rated) & 2340 TPH(Design). The speed of conveyor shall increased to 4.105 m/s to achieve the design capacity with 1400 mm BW. In view of above, Bidder understands that DFC wagons are not envisaged for this proposed unit and the DFC wagon are not applicable for CHP design. Owner is requested to confirm the Bidder's understanding that DFC wagons are not envisaged.	Rated capacity of belt conveyors (1W+1S) is revised to 1400 TPH. Thus, all associated equipments & systems of CHP shall be provided for 1400 TPH conveying capacity.
1313	Volume III - Mechanical Works Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 65 of 120 Sheet | 3 of 120	11.0 Data Sheet: Wagon Tippler & Accessories 1.1.3	(5) Type of Wagons that can be Handled at a time are BOX, BOXN, BOXNHA, BOXNLW, BOXNHL, BOXN25,DFC & other type of open wagons for coal as per RDSO standard and design used by Indian Railways to move coal. Two(2)no of needed Belt conveyor streams in parallel (1W+ 1S) of min 1200 tph rated capacity each together with Auxiliary Equipment / dust control system are proposed to meet the requirement of the plant.	In view of non applicability of DFC wagon, Bidder requests Owner to fix the capacity of coal handling plant considering Box type wagons and not the minimum capacity as 1200 TPH in order to keep all Bidder's at par in line with practice followed in NTPC, Central and State Power Projects. Kindly refer Annexure-M4 Owner is requested to issue an amendment for the fixed capacity of coal handling plant.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1314	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 04 of 120	1.1.8 Scope of Work (Mechanical Works)	Design & construction of tippler complex including all its equipment/ components/ structures etc shall conform to RDSO: G33 [latest revision].	The minimum outhaul rail length of 750 m is requirement as per RDSO guidelines after WTC location. Bidder unable to meet RDSO guidelines at outhaul track with proposed location of wagon tippler complex in rail layout. Bidder proposes to have wagon shifter arrangement at present wagon tippler complex location in the absence of adequate outhaul track length. Owner request to confirm the requirement of wagon shifter arrangement with present rail layout. Also, Owner is requested to check the location of Wagon Tippler complex to meet RDSO requirement.	Bid specifications to be followed, however wagon shifter arrangement is not envisaged.
1315	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 04 of 120	1.1.8 Scope of Work (Mechanical Works)	Design & construction of tippler complex including all its equipment/ components/ structures etc shall conform to RDSO: G33 [latest revision].	The minimum outhaul rail length of 750 m is requirement as per RDSO guidelines after WTC location. Bidder unable to meet RDSO guidelines at outhaul track with proposed location of wagon tippler complex in rail layout. In view of above, Bidder understands that Owner will handle half rack instead of full rack to avoid issue of non availability of outhaul straight length of 750 m as per RDSO. Kindly confirm Bidder's understanding.	Confirmed
1316	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 09 of 120	1.1.11 Scope for Structural Steel Works	Steel frame construction Junction towers, Sampling Tower & Crusher House Buildings etc with RCC roof and RCC floors complete with side cladding of permanently color coated zincalume sheet	Bidder understands that there is no requirement of sampling tower in CHP system. Owner is requested to confirm Bidder's understanding	Confirmed.
1317	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 24 of 120	3.0 Design basis	3.4 Further suitable holding down pulley shall be provided at concave curve of all conveyors.	Bidder confirm that concave curve radius of conveyor will be adequately designed such that no holding pulleys are required above concave curve area. Owner is requested to confirm the acceptance of the same.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1318	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 26 of 120	4.0 CONVEYOR COMPONENTS [B] Idler Units	ix) Suitable deflector roller of at least 219.1 mm OD x 10mm thk shell on 70mm dia. [min.] shaft at hub mounted on Plummer block and lagged with 6mm thk neoprene rubber lagging shall be provided for each conveyor at each end.	Bidder proposes to supply the deflector roller without 6mm thk neoprene rubber lagging which is similar to conveyor idlers detail. Owner is requested to confirm the acceptance of the same.	Bid specifications to be followed
1319	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 53 of 120	2.0 Data Sheet: Suspended Electromagnet	2.15) Non-Magnetic Idlers of 6 mm thk. (min) Aluminum & lagged with 5mm thk. neoprene rubber shall be provided suitably on conveyor in the magnetic zone	Bidder proposes to use non-magnetic idlers made of Stainless Steel/ Aluminium tube lagged with 5mm neoprene rubber lagging in conveyor portion over Suspended Electromagnet/ Metal detector is mounted. This is similar to Buxar CHP project. Owner is requested to confirm the acceptance of the same.	In Table at Sheet 53 of 120 against S.No. 2.15 in 3rd Coulmn, the word "Äluminium" be read as "Aluminium / Stainless Steel"

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1320	Volume III - Mechanical Works	Ch:19 Coal Handling System	Sheet 15 of 120	1.5.6 Stockpile Details 1.5.6 1.1.8 Scope of Work (Mechanical Works)	Width of stockpile at base as per Plot plan Length of each stockpile as per Plot Plan. Reversible Yard Belt Conveyors# 3RYBC-1A	Max. Stockpile Height / Width at base : 12 m Height x 50m width at base mentioned in clause no: 2.21 of 2.0 Data sheet: Bidirectional Stacker cum Reclaimer in page no: 89 of 120 Considering the above and SCR machine parking requirement & conveyor take off distance from stockpile, the available length of stockpile is around 200 m within boundary of plot plan. With this length of stock pile, the stock pile capacity is ~115000T. Kindly confirm the stockpile capacity as mentioned above. 	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1321	Volume III Mechanical Works	Ch:19 Coal Handling System	Sheet 79 of 120	M-21 -Cl. No.1.2	Dry Fog (Dual Fluid - air & water) Dust Suppression System shall be mounted on machine covering various transfer points for Stacker cum Reclaimer M/C. All transfer points shall have dust tight enclosure & provided with dry fog type dust suppression application point which shall also include dry fog application at boom discharge (to stockpile).	Bidder requests Owner to accept plain water DS system with machine mounted pump & tank as optional of DFDS system as per practice followed in all NTPC, Central and States Power Projects.	Bid specifications to be followed
1322	Volume III Mechanical Works	Ch:19 Coal Handling System	Sheet | 91 of 120 Sheet | 92 of 120	M-24 (S. No.1.7) M-25 (S. No.1.7)	Pumps # 3P-1A/1B and water tank# 3WTK-1A shall be located at pump house #3PMH-1A near Tippler Complex # 3WTC-1. Water will be supplied through two (2) no. independent Centrifugal Pumps (1W+1S) [Tag No.3P-2A/2B] up to nozzles. One water tank (Tag # 3WTK-2A) shall be provided located in pump house # PMH-1A.	Common Pump set (1W+1S) & common tank may be considered for 3P-1A/1B and 3P 2A/2B, as both systems are applied at wagon tippler complex area. Bidder request customer to accept the same.	Accepted
1323	Volume III Mechanical Works	Ch:19 Coal Handling System	Sheet | 94 of 120	M-26 (S. No.2.3)	i) DFDSS # 1 shall cover discharge & receipt points of underground equipment / conveyors in Tippler complex # WTC-1, discharge & receipts of equipment / conveyors in bldg# 3JT-1. [Pump House # 3PMH-1A] ii) DFDSS #2 shall cover discharge & receipts of equipment / conveyors in bldg# 3CRH-1/ JT-2/JT-3/JT-4 [Pump House # PMH-2] iii) DFDSS #3 shall cover discharge & receipts of underground equipment/conveyors in 3RC-1/RHC [Pump House # 3PMH-3B] iv) DFDSS #4 shall cover discharge & receipts of equipment / conveyors in JT-8/9 & discharge points of Tripper Conveyors. [Pump House # PMH-4]	Bidder understands that numbers of CHP Pump House/compressor house/Tank & DFDS system shall be considered as per design calculation & layout requirement. It may be combined during detail engineering stage based on layout requirement. Please confirm Bidder's understanding.	03 Nos. Pump houses to be provided instead of 5 Nos. and their location shall be finalized during detailed engineering
1324	Volume VII TENDER DRAWINGS	111-11-5100	-	Flow diagram-Coal Handling Plant		Bidder understands that there is no dust suppression for Track Hopper in Bidder's scope. Please confirm Bidder's understanding as track hopper is not envisaged for the proposed unit.	Confirmed.
1325	Volume III Mechanical Works	Ch:19 CoalHandling System	Sheet 103 of 120	M-31 Coal sampling system	Auto coal analyser shall be installed for instant GCV monitoring of coal being fed into the units.	In continuation to query no 488 of "PGCL_DBCRTPP EPC_PBQ_Mech. BOP-Part-2_Lot-2" , Owner to note that auto coal analysers are not envisaged in non of NTPC Project, i.e NTPC Khargone, NTPC Tanda,NTPC Lara, NTPC Talcher, SCCL Singareni Projects…etc. Conventional coal sampling unit is envisaged instead of auto coal analysers. Kindly refer Annexure-M12. In view of above, Bidder understands that no coal analyser are not envisaged for this proposed unit. Kindly confirm Bidder's understanding.	Auto Coal Analyzer shall be provided as per Attachment-6.
1326	Volume III Mechanical Works	Ch:19 CoalHandling System	Sheet | 4 of 120	1.1.6, ii	Miscellaneous Services under Scope of Bidder. The bidder shall do the complete O &M of the coal handling plant till handing over of the complete power plant.	Owner to note that Owner has already established O&M team and for EPC Bidder, it is not feasible to do the O&M of coal handling plant, In view of this, Bidder requests Owner to exclude O&M of CHP from Bidder's scope of work in line with practice followed in NTPC, Central & States Projects. Kindly confirm and issue a suitable amendment.	Bid specifications to be followed
Ash Handling Plant							

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1327	III II III	21 8 21	7 of 21 39 of 57 13 of 21	21.9.1 5.32, A) 1.3	The bottom ash and economizer ash shall be evacuated once in a shift in two hours fifteen minutes considering 3 jet pumps working simultaneously. ....The total time for evacuating eight (8) hour collection of bottom ash from a unit corresponding to collection rates specified shall not exceed 135 minutes... Storage capacity of ash : 8 hours bottom ash generated while firing worst coal (minimum)	Considering the high ash content of 44% in worst coal, Bidder envisages to consider bottom ash cleaning twice in a shift of eight (8) hours. Accordingly, bidder envisage five (5) hour bottom ash hopper effective storage capacity. The same is being followed by NTPC for 800 MW boiler. Refer Annexure-M1 for the same. Request owner to relook the requirement and issue amendment.	Bid specifications to be followed.
1328	III II II	21 8 8	7 of 21 39 of 57 40 of 57	21.10.1 5.32,C) 5.32,D)	Ash collection at various points expressed in percentage shall be considered as follows for ash handling system design: Bottom ash collection including economizer ash : 25% Ash collection in SCR, APH/Duct hoppers : 5% Ash collection in ESP hoppers : 85% The ash collected in SCR hoppers, APH hoppers and duct hoppers shall be evacuated through feeder ejectors and transported to ash slurry pump. The total time for evacuating eight (8) hour collection of coarse ash from a unit corresponding to collection rates specified shall not exceed 60 minutes The fly ash collected in in every shift of eight (8) hours corresponding to specified ash collection rates shall be removed in five (5) hours.	Owner is requested to recheck the ESP hopper ash collection rate (85%).	Bid specifications to be followed.
1329	VII	111-29-0200	-	-	As per plot plan FA silo location is nearer to plant. Type of fly ash handling system vacuum +pressure type two stage fly ash pressure conveying system.	It is observed that ESP farthest hopper to main FA silo location is approximately 375 meter only. In view of this, owner is requested to allow fly ash single stage fly ash pressure conveying system from ESP to main FA silo as alternate option of two stage (vacuum+pressure) FA conveying system. Also, in single stage pressure conveying system, fly ash wet mode disposal shall be carried out below main FA silo by employing suitable fly ash wetting equipment and fly ash slurry will be conveyed upto ash slurry pump house for further disposal to ash pond inline with tender specification. Owner is requested to issue suitable amendment.	Bid specifications to be followed.
1330	VII	Flow di no: 111-13-5203	-	-	flow diagram of fly ash handling system, 160 nos. ESP hoppers are shown.	Bidder understand that 160 nos. ESP hoppers are indicative only, Number of ESP hoppers shall be decided by ESP OEM proven design. Request owner to confirm bidder's understanding.	Confirmed.
1331	III VII	21 Flow di no: 111-13-5203	4 of 21 7 of 21 5 of 21 5 of 21	21.5.1 21.9.3 21.5.6 21.5.7	Eight (8) fly ash conveying streams shall be provided to convey dry fly ash from buffer hoppers to fly ash silos as shown in the flow diagram. Fly Ash Handling System (both wet and dry mode), Fly ash system shall be designed to remove fly ash in maximum five (5) hours per shift of 8 hours while firing worst coal and considering six (6) streams operating simultaneously. Six (6) (4W+2S) rotary oil free lobe type conveying air blowers Sixteen (16) (8W+8S) vacuum pumps Buffer hoppers 16 nos. Collector tank 8 nos working Air washers 8 nos. Wetting unit 8 nos. Four (4) fly ash pressure conveying streams,	Bidder understands that numbers of equipment mentioned for vacuum conveying system are indicative only and the same shall be considered as per existing practice is being followed in NTPC Projects and SJVN Buxar Project. Kindly refer Annexure-M2.	Following changes are made in Chapter-21 of Vol-III:- i) In Clause 21.5.1 at Sheet 3/4 of 21, "oil free, lobe / helical type Conveying Air Blowers" be read as "Transport Air Compressors" and "Eight (8) fly ash conveying streams" be read as "Three (3) fly ash conveying streams". ii) In Clause 21.5.6 at Sheet 4 of 21, "Six (6) (4W+2S) rotary oil free lobe type conveying air blowers" be read as "Six (6) (3W+3S) Transport Air Compressors". iii) In Clause 21.5.7 at Sheet 4 of 21, "Sixteen (16) (8W+8S)" be read as "Twelve (12) (6W+6S)". iv) In 4th coulmn against S.No. 12.1 of Table at Sheet 15 of 21, "16 Nos." be read as "12 Nos." v) S.No. 17.0 (17.0 to 17.4.5) pertaining to Conveying Air Blowers in Table at Sheet 17 of 21 stands deleted. vi) In 3rd coulmn against S.No. 22.1 of Table at Sheet 19 of 21, "16 (8W+8S)" be read as "12 (6W+6S)." vii) Drawing No. 111-13-5203 Rev1 stands accordingly revised.
1332	III	21	7 of 21 5 of 21	21.9.4 21.6	Ash Disposal System Capacity of ash disposal system shall be minimum 850 M3/Hr. Adequately sized jetting nozzles shall be provided below each collector tank to further convey the slurry to the ash slurry sump through pipes by gravity.	In absence of input, request owner to provide the acceptable velocity range for gravity flow in FA slurry pipe from collector tank to ash slurry sump. Request owner to recheck and issue amendment.	Velocity shall be minimum 1.2 m/sec under gravity with 1 degree slope.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1333	III	21	7 of 21	21.10.2	Density of eco ash	Bidder understands that Eco. ash density shall be considered as 850 kg/m3 Owner is requested to confirm the Bidder's understanding.	Confirmed for volumetric calculations.
1334	III	21	19 of 21	22	storage capacity of buffer hopper	Owner is requested to specify the storage capacity of buffer hopper.	15 minutes storage capacity of buffer hopper shall be provided
1335	III VI	21 15	- 1 of 2	- 15.2	location of Vacuum pumps, ESP fluidizing blower along with heaters Following facilities shall be provided near the silo as per Vol. III of specification. iii) Vaccum Pump house.	Bidder understands that Vacuum Pump House is not applicable. Bidder understands that Vacuum pumps, ESP fluidizing blower along with heaters shall be located near to 1st field of ESP hoppers as per standard practice followed in existing HPGCL Yamuna Nagar, NTPC & SEBs Projects. Owner is requested to confirm Bidder's understanding.	Vacuum pumps, shall be located near the 1st Field of ESP. Fluidizing blowers alongwith heaters shall be located inside the building.
1336	II	8	27 of 57	3.9.2, d)	d) Ash Handling System List of drives with corresponding weight age factors thereof for which power consumption (at reference design condition) is to be guaranteed 1. Bottom Ash Clinker Grinders 2. BA Water Pumps ….. 6. HP Seal water pumps 7. LP Seal water pumps 8. Fluidizing air blowers	There are certain drives which do not run continuously in the Ash handling plant such as HP Seal water pumps, LP Seal water pumps & Fluidizing air blowers. Bidder understands that these pumps/blowers shall not be considered for Aux Power Calculation in line with practice followed in NTPC Projects. Kindly refer Annexure-M11. Owner is requested to Confirm Bidder's understanding.	Bid specifications to be followed.
PT PLANT							
1337	Vol-III Vol-VII	Chapter- 5 (Water treatment plant) Flow diagram - filtered water system-111-12-3500	3 of 14 -	5.2.1 i) -	Coagulant aid (Polyelectrolyte) Dosing system consisting of 2nos. dosing tanks having minimum total effective capacity of 24 hours requirement with 20% margin and 2 x 100% capacity dosing pumps complete with associated piping and valves	As per the tender drawing No. 111-12-3500 (Flow diagram - filtered water system) there are four polyelectrolyte dosing pumps (two for clariflocculator & two for sludge thickener). Discrepancy is observed between vol -III and tender drawing. Kindly check and confirm.	Bidder shall provide 2X100% poly electrolyte dosing pumps for clarifier and 2X100% poly electrolyte dosing pumps for sluge thickner as per drawing no 111-12-3500 Rev 2.
1338	Vol-III	Chapter- 5 (Water treatment plant)	4 of 14	-	Bidder shall provide all the consumables including chemicals till the handing over the plant and additional chemicals of two (2) months requirement.	Bidder understands that consumables including chemicals shall be considered till date of commercial operation (COD). Kindly confirm Bidder's understanding.	Bid specifications to be followed.
1339	III	21 5	11 of 21 6 of 14	21.13 5.0, g),i)	The specification of clarifier shall be same as specified in chapter 4.0 Rise rate-1.2 Cu.M/hr/m2 Water Depth-3.0	For all NTPC specification and SJVN Buxar Project as per enclosed Annexure-M3, the reactor clarifier is accepted instead of Clarifloculator. Hence, Bidder understands that reactor clarifier (HRSCC) is also accepted as an alternative to Clarrifloculator in view of space constraints and better performance. Accordingly, rise rate and water depth shall be designed considering reactor clarifier. Kindly confirm the Bidder's understanding.	Noted. Specification of HRSCC are as per attachment-17
1340	Vol-III Vol-VII	Chapter- 5 (Water treatment plant) Flow diagram - filtered water system-111-12-3500	3 of 14 -	j)	j) Six (6) Rapid Gravity Filters (4W+2S) of adequate capacity with dual media filtering material as	In addition to query no 536 and 538 of "HPGCL_DBCRTPP EPC_PBQ_Mech. BOP-Part-2_Lot-2" Bidder proposes rapid gravity filters for PT-DM only and not for PT-CW in line with practice followed in NTPC Projects Kindly refer Annexure-M10. Kindly confirm acceptance.	Bid specifications to be followed.
DM PLANT							

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1341	Volume III Mechanical Works Volume III Mechanical Works Vol-VII	Ch 8: DM Plant Ch 8: DM Plant Flow diagram - DM plant	9 of 15 9 of 15	ii) v)	**Degassed Water Storage Tank:** Two (2) nos. RCC tanks (One for each degasser Tower) having 3mm thick jointless solvent free epoxy lining/PPG lining **Degassed Water Transfer Pumps:** Two (2) (1W+1S) 100% taking suction from each degasser tank Degassed Water Storage Tank: One Number is shown	Discrepancy observed in referred drawing and tender specification regarding Degassed water storage tank and water transfer pumps. Owner is requested to confirm the numbers of Degassed water storage tank and water transfer are to be provided.	One Degasser tank with two compartmets shall be provided in line with drawing 111-12-3501 sheet 1 of 3 Rev1. 2 x 100% degassed water transfer pumps shall be provided as indicated in Chapter 8, Sheet 9 of Volume III and drawing 111-12-3501, sheet 1 of 3 Rev1. The pumps shall take suction from both compartments of tank.
1342	Vol-III	Design flow per stream (net) DATA SHEETS – DM PLANT	7 of 15	2 (iii)	Design flow per stream (net) : 50 (minimum) m3 / hr	Owner is requested to fix the capacity of DM plant instead of 50 m3/hr as minimum, to keep all Bidders at par in line with practice followed in NTPC Projects.	Design flow per stream (net) be read as "50 m3 / hr." instead of "50 (minimum) m3 / hr" in Table against S.No. (iii) at Sheet 7 of 15 of Ch-8, Vol-III
ETP							
1343	Vol-III	Chapter- 11 (Effluent treatment plant) 111-12-3504	18 of 23 19 of 23 22 of 23 20 of 23	8.00.00 datasheet 12.00.00 20.01.06 13.01.03	Reactor clarifier capacity - 450 m3/hr Dula media filter capacity - 150 m3/hr (2W+1S) As per the Flow diagram - Effluent treatment plant, 75 m3/hr clarified water shall be utilized for various purpose. RO permeate capacity/stream - 100 m3/hr, recovery - 80% UF permeate flow - 160 (after considering water for backwash and fast flush)	As per specification RO permeate capacity shall be RO feed 100 m3/hr. RO Feed capacity : 100/0.8 = 125 m3/hr. (With 80% Recovery in RO system) UF Feed capacity : 125/0.9 = 139 m3/hr. (With 90% Efficiency in UF system) DMF Feed capacity : 139/0.98 = 142 m3/hr. (With 2% loss in backwash and rinse water) Clarifier Feed capacity : 142/0.97 = 146 m3/hr. (With 3% loss at sludge system) Kindly check and update Clarifier, DMF and UF capacity in line with RO permeate flow.	Shall be decided during detailed engineering.
1344	Vol-VII	Tender drawing 111-12-3100			As per the tender drawing, filter water shall be used for FGD process water.	Cooling tower blow down water quality is suitable for FGD process water as per practice followed in NTPC, Central & States Power Projects, hence, cooling tower blow down shall be used for FGD process water. Please Confirm acceptance.	Confirmed.
1345	Vol-III	Chapter- 11 (Effluent treatment plant) Chapter- 11 (Effluent treatment plant) 111-12-3504	2 of 23 18 of 23	11.1 8.00.00 datasheet 12.00.00 20.01.06 13.01.03	The Waste Water management scheme shall be based on 100% recycle of treated effluent for a zero Discharge concept. Each identified effluent stream shall be subjected to required treatment and then shall be equalized in the central monitoring basin. Reactor clarifier capacity - 450 m3/hr Dula media filter capacity - 150 m3/hr (2W+1S) As per the Flow diagram - Effluent treatment plant, 75 m3/hr clarified water shall be utilized for various purpose. RO permeate capacity/stream - 100 m3/hr, recovery - 80% UF permeate flow - 160 (after considering water for backwash and fast flush)	Bidder propose to use the CW blowdown for Ash disposal since we are having wet ash disposal and the water quality meets process requirement. Hence, RO ETP is not required. Bidder confirms to comply with Zero Liquid Discharge without RO ETP. Also, Bidder understands that the water consumption requirement shall be optimized and shall decide the need for RO ETP considering bottom ash and coarse ash in wet disposal form and disposal of fly ash in dry form to Silos. The above is inline with practice followed in NTPC, Central & States Power Projects. Kindly confirm Bidder's understanding.	Bid specifications to be followed.
HVAC - Air conditioning and Ventilation							
1346	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	3 of 36	Cl. No. 25.3.14	For air handling unit (AHU) serving main plant control area, where microprocessor based equipment are located, the dehumidified air shall be filtered at three different stages i.e., pre (coarse) filter followed by fine filter followed by HEPA filter before discharge it to air conditioned space. For all other areas, AHU's shall be provided with two stage of filtration i.e., pre filter & fine filter. All fresh air supply shall also be filtered using pre & fine filter.	It is understood that AHU system serving main CCR-CER room of TG building at 17.0 mt elevation shall only be provided with HEPA filter, which can be fixed in ducts or AHU plenum on discharge side. For all other areas AHU shall be provided with only pre filters and fine filters. Please confirm.	Bid specifications to be followed.
1347	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	5 of 36	Cl. No. 25.3.19	During normal operation period, all the working equipment shall run on AC power supply. However, in case of complete black out condition, DG sets being provided are required to cater the load of some of the air conditioning equipment so that **control rooms and CER** remain air conditioned. The equipment to run on the DG set are: - 1 no. Chilling machine - 1 no. Chilled water pump - 1 no. Condenser water pump - 1 no. Cooling tower fan - AHU's for CR & CER - 1 no. Fresh air fan.	Bidder understands that this clause is applicable specifically for TG building and control & CER rooms mentioned in referred clause is for Main CCR-CER control room at 17mt in TG building. Please confirm Bidder's understanding.	Confirmed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1348	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	5 of 36	Cl. No. 25.3.20	**Redundancy of Equipment** a) For main plant areas (control room, control equipment room, UPS room and SWAS room - Vapor compression type Chilling Units 2 x 100% - Condensing Unit - 2 x 100% - Condenser water pumps - 2 x 100% - Chilled water pumps - 2 x 100% - FRP cooling towers - 2 x 100% - Air handling units (DX type) - 2 x 100% (Per AHU room) - Air handling units - 2 x 100% Multiple AHUs of similar (Chilled water type) capacities per AHU room. AHU shall be variable voltage frequency driven (VVVFD)	For Main CCR-CER control room at 17.mt, it is not feasible to cater the cooling requirement via 2x100% (1 working and 1 standby) AHU, as known based on past project reference. Kindly allow use of multiple AHUs with 1 standby of equal capacity (i.e. N+1) configuration also especially for CCR-CER area. "N" shall be number of working units and equivalent one (1) standby shall be provided. Please confirm and update.	Noted
1349	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	5 of 36	Cl. No. 25.3.20	**Redundancy of Equipment** b) ESP Control Building - Water Cooled/Air Cooled Condensing units/ Precision Air Conditioners - 2 x 100% - Condenser water pumps - 2 x 100% (if applicable) - FRP cooling towers (with VVFD Fan)- 2 x 100% (if applicable) - **Secondary Chilled Water Pumps (with VVFD)- 2 x 100%** - Air handling units- 2 x 100% AHU shall be variable voltage frequency driven (VVVFD).	Water cooled / Air cooled condensing units / Precision Air conditioners are refrigerant based DX-type AC system. Accordingly "secondary chilled water pumps (with VVFD) - 2x100%" are not applicable for this building and its AC system. Please confirm and update.	Bid specifications to be followed. Applicability of chilled water pumps shall be reviewed during detailed engineering. The drives shall be without VVFD.
1350	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	5 of 36	Cl. No. 25.3.20	**Redundancy of Equipment** b) ESP Control Building - Water Cooled/Air Cooled Condensing units/ Precision Air Conditioners - 2 x 100% - Condenser water pumps - 2 x 100% (if applicable) - FRP cooling towers (with VVFD Fan)- 2 x 100% (if applicable) - Secondary Chilled Water Pumps (with VVFD)- 2 x 100% - Air handling units- 2 x 100% AHU shall be variable voltage frequency driven (VVVFD).	Bidder understands that "Air Handling units - 2x100%" mentioned in this clause are DX-type (refrigerant) based AHU. Accordingly, DX-AHU + Air cooled condensing units (ACCU) (2x100% configuration for both) are acceptable alternative for this building as per clause. Please confirm.	Confirmed.
1351	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	6 of 36	Cl. No. 25.3.20	**Redundancy of Equipment** d) FGD Control room - Screw/ Centrifugal Type Water Chilling units 2 x 100% - Condenser water pumps (with VVFD) - 2 x 100% - Chilled water pumps - 2 x 100% - FRP cooling towers (with VVFD Fan) - 2 x 100% - Air handling units - 2 x 100% (with VVVFD)	As per past project reference, FGD control room is clubbed with ESP main control room. hence, Bidder understands that in cae of common ESP cum FGD control Building, dedicated DX type AC system (AHU+ACCU) as per point "b) ESP control building" shall be provided. Please confirm Bidder's understanding.	Confirmed.
1352	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	28 of 36	Cl. No. 25.7.14.3	a) Finish F-1 Step – 1 Wrapping of Poly- Bonded Hessain (PBH- to act as vapour seal) on outer surface of insulation with 50 mm overlap stitching and sealing of overlap with synthetic adhesive like CPRX or equivalent compound. 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. 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 water proofing compound shall be added to 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 and finishing is not proper aesthetically. Bidder proposes to use aluminium cladding as finishing as per finish F-3. Please confirm	Noted

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1353	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM Ch 25 : Air Conditioning & Ventilation System	35 of 36 15 of 36	Cl. No. 25.8 25.7.3	e) D-X Air Conditioning System - The control and interlocks described above for water chilling plants are applicable for this system also. - Further the compressor starting/ running shall be interlocked with the flow switches in condenser water circuit as well as with AHU motors. - The standby condenser water pumps, fresh air fan & standby AHU shall be started automatically when the working equipment are stopped/ tripped. Auto/ Manual selector switches and working/ standby selector switches for the pumps, fresh air fans and AHU shall be provided in the panel Condensing Unit (Water cooled D-X Type): Note: up to 50 TR capacity chilling/ condensing unit can be of air/water cooled type. However beyond this capacity unit shall be water cooled type only.	As per referred clause 25.7.3, Bidder understands that air cooled condensing units are also acceptable with DX-AHU upto 50TR capacity. Thus, the referred clause 25.8 is applicable only when water cooled condensing units are provided as per capacity. Hence, Bidder understands that the referred cluse 25.8 is not applicable for air cooled condensing units. Please confirm Bidder's understanding.	Confirmed
1354	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	09 of 36	Cl. No. 25.5.2.1	The areas to be ventilated by Evaporative Cooling system are as follows: a) All floors and area of turbine hall (TG building) other than the areas which are air conditioned. b) Switchgear rooms and cable gallery areas of turbine building. c) Any other evaporative area where equipment heat load is high and requires ventilation of evaporative cooling spaces.	Battery Rooms, toilets, AC chiller plant room, H2 and CO2 cylinder rooms, etc coming in TG building are area which are provided with mechanical dry ventilation system in line with clause 25.5.2.3 and all past project references. Please confirm.	Confirmed.
1355	Volume III Mechanical Works	CHAPTER - 25 / AIR CONDITIONING & VENTILATION SYSTEM	09 of 36	Cl. No. 25.5.2.1	The areas to be ventilated by Evaporative Cooling system are as follows: a) All floors and area of turbine hall (TG building) other than the areas which are air conditioned. b) Switchgear rooms and cable gallery areas of turbine building. c) Any other evaporative area where equipment heat load is high and requires ventilation of evaporative cooling spaces.	Bidder understands that Effective height of operating floor at 17.0mt in Turbine building is considered upto 4.5mt only from FFL for sizing Air washer unit capacity as followed in all other projects. Please confirm Bidder's understanding.	Effective height of operating floor at 17.0mt in Turbine building shall be 06 mtr. From FFL.
Hydrogen generation Plant							
1356	Volume III Volume III	CHAPTER – 33 CHAPTER – 3	2 of 11 6 of 19	33.1.2 e) 3.4.21	e) Fuel storage tanks, hydrogen storage complex, etc., shall be designed in accordance with statutory agency guidelines. i) 200 Hydrogen gas cylinders iii)100 Carbon Dioxide Cylinders	Owner to note that requirement of storage shed for H2 and CO2 cylinder is not mentioned in Tender Specification and Plot Plan. Owner to confirm whether storage shed for the envisaged H2 and CO2 cylinders has to be provided by Bidder. If storage shed for H2 and CO2 cylinders has to be provided by bidder, Owner to please furnish the following to keep all Bidders at par : 1. Minimum dimensions of such storage shed 2. Type of storage shed (Open/Semi covered/Covered) 3. Location of storage shed 4. Type of shed (RCC/Structure)	Hydrogen Generation Plant indicated in Chapter-3, Vol-III stands deleted. Associated activities like H2 Generation plant building, Air-conditioning for H2 Generation control room etc. also stands deleted. However H2 and CO2 cylinders storage shed shall be in bidders scope as described else where.
Civil & Structural							
1357	Volume VI Civil, Structural & Architectural Works	Ch 20: Excavation & Filling	4 of 7	Clause 20.6 (e)	Filling in disposal area: Surplus material from excavation which is not required for backfilling shall be disposed of in designated disposal areas within the lead for disposal as 5 km crow fly distance from the site. The spoils shall not be dumped haphazardly but should be spread in layers approximately 250 mm thick when loose and compacted with the help of compacting equipment. In wide areas, rollers shall be employed and compaction done to the satisfaction of the Engineer at the optimum moisture content which shall be checked and controlled by the contractor.	Bidder requests owner to suggest suitable land for disposal of surplus earth as shall be excavated from various facilities e.g. - Rain water harvesting pond - Raw water reservoir (Optional) - Other excavated surplus earth	Shall be decided during detailed engineering.
1358	Volume VI : Civil, Structural & Architectural Works	Chapter-17(Architectural Works)	5 of 21	Cl. No. 17.6.4.1	Trees of different category and height shall be planted as per prior approval from Owner. In addition to above, Bidder has to develop Green belt by planting around 80,000 of trees in approximate 32 hectares of land ,location as approved by Engineer in charge. Green belt area as mentioned above is approximate. Actual area to be decided as/MoEF&CC guidelines.	Greenbelt development are usually in Owner's scope as extensive Plantation and its periodic maintenance can be taken up after completion of facilities. Also, there are specialized contractors approved by Forest department who can directly take up green belt development work. This is a practice followed in all EPC tenders floated by central and state utilities. In view of the above, Bidder requests Owner to exclude overall green belt development work from EPC bidder's scope of work. Please confirm.	Green belt development as per tender specifications is in the scope of bidder. Maintenance of green belt till commissioning of plant or minimum 1 year after completion of Green belt development whichever is later is also in the scope of bidder. Green belt development shall be done by specialized contractor approved by forest department and HPGCL.

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1359	Volume VI Civil, Structural & Architectural Works	Ch 03: Instruction to Bidders	1 of 5	CHAPTER – 3	CHAPTER – 3 INSTRUCTION TO BIDDERS 3.1 DATA TO BE FURNISHED BY BIDDER AT THE TIME OF BID	Many data and informations as mentioned under clause 3.1 are approximately considered during bid proposal stage and required to be finalized during detail engineering stage. Hence, Bidder understands that every information mentioned under clause 3.1 are not relevant during proposal and not applicable during submission of bid. Only, relevant data to be furnished by Bidder at the time of Bid. Please confirm.	Noted. The same shall be subject to HPGCL approval.
1360	Volume VI Civil, Structural & Architectural Works	Ch 11: Buildings Description	2 of 18	Cl. No. 11.1.5	Temporary Workshop and Garage The CONTRACTOR 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. Land to develop Temporary Workshop and Garage shall be arranged by contractor at his own cost outside plant boundary	Bidder understands that Temporary Workshop and Garage is temporary structure may be constructed by Contractor as per their requirements. If constructed, these may be taken away after completion of work. Please confirm.	Confirmed.
1361	Volume VI Civil, Structural & Architectural Works	Ch 02: Scope of Work	5 of 7	Cl. No. 2.6	77 Clearing and removing the buried items if any in the whole proposed plant area and the same is to be deposited to the Client. Any infrastructure buried underground shall be demented/relocated by bidder without any additional cost.	Bidder requests Owner to provide drawings of infrastructure/utilities buried underground so that Bidder can asses quantum of work.	Bidder to visit the site and collect the information.
1362	Volume VI Civil, Structural & Architectural Works	Ch 23: Concrete Road & Rigid Pavement	2 of 2	Cl. No. 23.1	The Cross section for road shall be as follows: i) The Sub-grade shall be 250 mm thick Granulated Sub-base compacted to 95% dry density. ii) **250 mm thick metal finish.** iii) 100mm thick dry lean concrete iv) A separation membrane shall be used between concrete slab and the sub base. Membrane shall be impermeable plastic sheeting of 125 microns thick laid flat without creases v) Pavement 250 mm thick M30 mix, with single mat reinforcement of 12 dia @ 300 c/c both ways.	Bidder understands that, **250 mm thick metal finish** means additional granulated subbase. Owner to confirm. Bidder requests Owner to provide road cross section drawing.	Confirmed.
Electrical							
1363	Vol-IV	Ch 16: AC & DC Motors	8 of 22	Cl. No. 16.15.02	Pull out torque at rated voltage shall not be less than 205% of full load torque. It shall be 275% for crane duty Motors.	Bidder proposes that Motor Pull out torque will be offered based on the Application requirement and it will be subjected to tolerance as per IEC60034-1. Owner may please accept Bidder's proposition	Cl.No. 16.15.02, Sheet 8 of 22, Chapter-16, Vol-IV be followed.
1364	Vol-IV	Ch 16: AC & DC Motors	9 of 22	Cl. No. 16.20.01	Outdoor Motors…….. IP 55 (Additional canopy to be provided by Bidder).	Bidder proposes that canopy requirement shall be based on OEM requirement/design and not be mandatory for all outdoor motors. Owner may please accept Bidder's proposition	Bid specifications to be followed.
1365	Vol-IV	Ch 16: AC & DC Motors	16 of 22	Cl. No. 16.40.00	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.	Bidder proposes that DTT for air is not required, as any increase in air temperature will lead to rise in motor winding temp & bearing temp, for which necessary protections shall have to be given. (Winding RTD & Bearing RTD as per tender requirement shall be provided). Owner may please accept Bidder's proposition	Noted.
1366	Vol-IV	Ch 16: AC & DC Motors	10 of 22	Cl. No. 16.24.01	Noise level for all the motors shall be limited to 85dB(A) except for BFP motor for which the maximum limit shall be 90dB(A). at 1m from operating motor measured in accordance with IS: 10265.	Bidder understands that, noise requirement of 85 dB(A) as per IEC60034-1 Edition 14 - 2022 (Rotating Electrical Machines - Rating & Performance). Owner may please confirm.	Bid specifications to be followed.
1367	Vol-IV	Ch 16: AC & DC Motors	10 of 22	Cl. No. 16.23.00	Vibration shall be limited within the limits prescribed in IS: 12075 / IEC 60034-14. Motors shall withstand vibrations produced by driven equipment. HV & MV motor bearing housings shall have flat surfaces, in both X and Y directions, suitable for mounting 80mmX80mm vibration pads. Vibration pads with screwed holes along with vibration probes shall be provided at both DE and NDE.	Bidder understands that, Vibration shall be limited within the limits prescribed in IS: 12075 / IEC 60034-14 and shall be as per Grade-A in line with above standard. Owner may please confirm.	Bid specifications to be followed.
1368	Vol-IV	Ch 16: AC & DC Motors	16 of 22	Cl. No. 16.39.00	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. However, for air compressor, being high speed drive, each motor bearing shall be provided with minimum two numbers of duplex RTDs connected to two numbers of dual input transmitters with display unit. The RTDs shall be 3 wire duplex platinum resistance type having a value of 100 ohms at 0 Deg C.	Bidder proposes to provide two (2) bearing RTDs Owner may please accept Bidder's proposition	Noted.
1369	Volume IV Electrical Works _____ Volume IV Electrical Works _____ Volume IV Electrical Works	Ch 4 : GIS _____ Ch 4 : GIS _____ Ch 4 : GIS	19 of 88 _____ 19 of 88 _____ 79 of 88	4.07.05 (a) _____ 4.07.06 _____ Annexure-A (17)	Type spring charged with Anti-pumping and trip free features. _____ Spring Operated Mechanism _____ Driving mechanism of circuit-breaker: Stored energy spring	Bidder propose to consider the operating mechanism of Circuit breaker as pneumatic mechanism or electrically spring charged mechanism or electro-hydraulic mechanism or a combination of these. Owner may please accept.	Bid specifications to be followed.

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1370	Volume IV Electrical Works	Ch 4 : GIS	15 of 88	4.05.01 (b)	The circuit breakers shall be horizontal mounted and shall withstand the forces imposed by the earthquake.	Bidder propose to consider the mounting position of circuit breaker as either vertical or horizontal as per OEM type tested design. Owner may please accept.	Bid specifications to be followed.
1371	Volume IV Electrical Works	Ch 4 : GIS	53 of 88	4.28.05	Bus Bar protection scheme decentralized type shall be provided for each main bus of 400 KV GIS.	Bidder proposes centralized Busbar protection system as an alternative to decentralized type Busbar protection system. Owner may please accept.	For 400kV system both decentralized or centralized busbar protection scheme can be supplied. Moreover bidder shall supply spare module/relays/aux. relays etc, required for one bay as mandatory spare.
General							
1372	Volume II General & Schedules	Ch 1 : Intent of specification	9 of 10	4.10	GENERAL REQUIREMENTS All soft wares provided shall necessarily include the cost for perpetual licenses for use on all the machines and an Annual Maintenance Contract (AMC) which shall include software upgrades as & when released by the software agency for a period of three (3) years after warranty/guarantee period.	Bidder wish to clarify that all major 3D design review software suppliers (viz Autodesk, Aveva, Bentley, etc.) have moved to subscription model and no longer offering perpetual licenses. Software are provided by suppliers on annual subscription basis. In view of above, Bidder request Owner to delete the requirement of perpetual licenses. Further, Bidder will consider annual subscription up to handing over of the plant to the customer. Please confirm.	Bidder shall include providing the annual subscription for 5 years after Final Taking Over.
1373	Volume II General & Schedules	Ch 1 : Intent of specification	8 of 10	4.10	GENERAL REQUIREMENTS All the plant layouts shall be made in computerized 3D modeling system as detailed in the Volume II, Chapter-05 of the Bidding Document. Bidder shall provide the completed plant documentation including integrated 3-D model with equipment drawings, data sheets, P&IDs, BOQ, schematics, logic diagrams, test reports and quality plan, etc. attached to the respective equipment/systems in the 3D model, along with the design review software (network ready) which shall include interference check, walk-through animation, simulation, visual effect, photo realism etc. loaded on a server with 2 work stations (latest configuration for server & workstation) with one A-3 size coloured laser printer and one A-0 size coloured plotter.	Please confirm bidders understanding stated below- All the plant layouts shall be made in computerized 3D modeling system as detailed in the Volume II, Chapter-05 of the Bidding Document. Bidder shall provide the completed plant documentation including integrated 3-D model with equipment drawings, data sheets, P&IDs, BOQ, schematics, logic diagrams, test reports and quality plan, etc. **~~attached~~ associated** to the respective equipment/systems in the 3D model, along with the design review software (network ready) which shall include interference check, walk-through animation, simulation, visual effect, photo realism etc. loaded on a server with 2 work stations (latest configuration for server & workstation) with one A-3 size coloured laser printer and one A-0 size coloured plotter.	Bid specifications to be followed.
Mechanical - Main Plant							
1374	Volume II	Ch 8: FG & LD	4 of 57	3.1	i. Turbine Cycle Heat Rate a) Turbine Cycle heat rate in kcal/kWhr under rated steam conditions at guaranteed condenser pressure with zero make up at 440 MW unit load (i.e. 55% of rated load). b) Turbine Cycle heat rate in kcal/kWhr under rated steam conditions at guaranteed condenser pressure with zero make up at 800 MW unit load (i.e. 100% of rated load). ii. Steam Generator Efficiency a) Efficiency of the steam generator at 105% TMCR (840 MW unit load) with zero make up while firing the design coal at rated steam parameters, rated coal fineness and rated excess air at economizer outlet. b) Efficiency of the steam generator at 100% TMCR (800 MW unit load) with zero make up while firing the design coal at rated steam parameters, rated coal fineness and rated excess air at economizer outlet.	Defination of Turbine cycle Heat rate to be updated as below. Turbine cycle heat rate: Heat Rate = M1(H1-h1)+M2(H3-h2)~~+Mis(h1-his)~~+Mir(H3-hir) --- Pg Please confirm acceptance.	Confirmed.
			15 of 57	3.4	Turbine cycle heat rate: Heat Rate = M1(H1-h1)+M2(H3-h2)+Mis(h1-his)+Mir(H3-hir) --- Pg Pg - Unit output after deducting the power consumption by auxiliaries as listed below and the same shall be 840MW and 800MW respectively for 105%, and 100% TMCR unit load:		
		Ch 2: Turbine Generator & Auxiliaries	34 of 87	1.23.1 b)	840 MW VWO output (i.e. 105% TMCR) under rated steam condition at design condenser pressure with zero make up (GUARANTEED HEAT RATE).		
			35 of 87	1.23.1 c)	800 MW output under rated steam conditions at design condenser pressure with zero make-up (GUARANTEED HEAT RATE).		
1375	Volume II	Ch 8: FG & LD	14 of 57	3.3	Unit Heat rate in kcal/kW hr under rated steam conditions at at guaranteed Condenser pressure with zero make up at 440 MW unit load (i.e. 55% of rated load): Unit Heat Rate (55%) = THR (55%) --- SG_EFF (55%) Unit Heat rate in kcal/kW hr under rated steam conditions at guaranteed Condenser pressure with zero make up at 800 MW unit load (i.e. 100% of rated load): Unit Heat Rate (100%) = THR (100%) --- SG_EFF (100%)		

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1376	Volume II	Ch11 : QAP	47 of 103	2	NPSH (R) test shall be carried out on one Boiler Feed Pump and one booster pump using cold water at pump flows of 25%, 50%, 80%, 100% and 125% of Design Flow at Design Speed. This shall be preferably done at 1 % and 3% head break by Suction Throttling Procedure.	Bidder understand that NPSH (R) test shall be carried out only at 3% head break and not at 1%. Please confirm our understanding.	Bid specifications to be followed.
1377	Volume III	Ch 1: Steam Generator & Auxiliaries Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	5 of 186 6 of 186 5 of 59 10 of 59 14 of 59	1.8 a) 1.8 k) 26.4.1 j 26.6.4 b 26.6.9	All drain, vent, air release, instrument root, isolation drains and sampling lines shall be provided with two valves in series if the pressure is equal to or above 40 Kg/cm2(a) or temperature is above 300 deg C. All instruments tapping point with root valves. Two root valves in series shall be provided for lines above 40 kg/cm2 (a) pressure and temperature above 300 degC. Line drains from Main Steam, Hot Reheat, Cold Reheat, L.P. bypass & high pressure (above 40 kg/cm2) extraction lines shall be provided with double isolation valves in series for each branch - each located at the two extreme ties of the line drain route. All drain and vent lines in piping system with design pressure 40 Kg/cm2 (g) and above or with vacuum service shall be double valved. All drains and vent lines in piping system with design pressure 40 kg/cm2 and above shall have two valves in series.	Discrepancy is seen under clauses of the tender. Bidder shall follow: "All drain, vent, air release, sampling and instrument root lines in piping system with design pressure 40 Kg/cm2 (g) and above with temperature above 300 deg.C or with vacuum service shall be provided with two(2) valves in series (i.e double valve)."	Noted
1378	Volume III	Ch 1: Steam Generator & Auxiliaries Ch 2: Turbine Generator & Auxiliaries	41 of 186 33 of 87 35 of 87	1.11 '1.22 e) 1.23.1	The steam generator heat output under HP heaters out condition shall be at least 100% BMCR heat duty. Steam generator shall also capable of sustained operation with HP heaters out of operation so as to generate at least rated power output by the unit. Ensure TG set capable of operating continuously with any one string of HP heaters out of service, with worst condenser pressure, 1% make-up & Aux. Steam requirement tapped from CRH, generating not less than the rated output without overstressing turbine components. n) HP heaters out of service (One string and both strings) under rated steam conditions at design & worst condenser pressure with 0% & 1% make up with maximum continuous output. o) All HP heaters out of service under rated steam conditions at design & worst condenser pressure with 0% and 1% make-up with rated output.	Bidder understand the below tender requirement as. The steam generator heat output under HP heaters out condition shall not be less than 800 MW or output corresponding to design BMCR heat duty, whichever is lower. ~~shall be at least 100% BMCR heat duty . Steam generator shall also capable of sustained operation with HP heaters out of operation so as to generate at least rated power output by the unit.~~ n) HP heaters out of service (One string and both strings) under rated steam conditions at design & worst condenser pressure with 0% & 1% make up with maximum continuous output not less than rated output or output corresponding to BMCR heat duty whichever is lower. ~~o) All HP heaters out of service under rated steam conditions at design & worst condenser pressure with 0% and 1% make up with rated output.~~ Please confirm our understanding.	Bid specifications to be followed.
1379	Volume III	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	23 of 59	26.6.20 1.19 26.6.2	Specification for Power Cycle Piping: A Pipes Material: Alloy Steel ..... Material: Carbon Steel..... Note 3. ..... 11. .....Material P-22 is applicable for piping with temperature > 510 deg C and up to 550 deg C and P11 is applicable for all other alloy steel piping below 510 deg C. (i) Upto & including 400 °C: ..... ii) Maximum allowable -stress values for ASME SA-335: P-92/T-92 or approved equivalent material as per code shall be reduced by 10% for calculating the thickness of pressure parts. The material used for power cycle piping shall be equal to or better than the following unless specified otherwise:..... iv) Above 605 deg C Austenitic stainless steel, P-92, Super 304H, TP347H or equivalent.	Descrepency is seen in the reffered clauses. Bidder prospose to use following material based on the temperature limited stipulated in codes: (i) Upto & including 427: Carbon steel to ASME SA:106 Gr. B/C or SA 210 Gr. C or approved equivalent ii) Up to & including 510deg C Alloy steel to ASME SA-335: P-11, P-12 or equivalent iii) Up to & including 550 deg C Alloy steel to ASME SA-335: P-22 or equivalent iv) Up to & including 605 deg C Alloy steel ASME SA-335/213: P-91, P 92 or equivalent. v) Up to & including 610 deg C Alloy steel ASME SA-335/213: P 92 or equivalent. vi) Above 610 deg C Austenitic stainless steel, P-92, Super 304H, TP347H or equivalent. Also in clauses 26.6.20 Specification for Power Cycle Piping: we propose to follow the above.	Bid specifications to be followed.
1380	Volume III	Ch 2: Turbine Generator & Auxiliaries	11 of 87	1.10	GLAND SEALING SYSTEM FOR STEAM TURBINE AND TDBFP	Gland Sealing shall be as per OEM proven practice. Please confirm the acceptance.	Bid specifications to be followed. However, the issue can be discussed during detailed engineering.
1381	Volume III	Ch 2: Turbine Generator & Auxiliaries	23 of 87	1.12.2	The material of the NRV's shall be compatible to the material of piping on which they are mounted. However, it shall not be inferior to the following: (a) Alloy steel (WC9) or equivalent compatible for NRVs on CRH line & extractions to H.P. heaters with the connected piping.	Valve material will be as per below snap shot. Accordingly please update Chapter 26, Table A, p.no. 29 of 59. Also it is observed that material for alloy steel and carbon steel valve got changed. Please issue the amendment for the corrected table.	Bidder to follow Volume III, Chapter 26, Table A, Sheet 29 of specifcation.

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1382	Volume III	Ch 2: Turbine Generator & Auxiliaries	56 of 87	6.2	(m) Minimum feed water storage tank capacity shall be based on 6 (six) minutes of BMCR flow (approx.) between normal operating level and low-low level with a filling factor of 0.66.	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. (m) Minimum feed water storage tank capacity shall be based on 6 (six) minutes of TMCR ~~BMCR~~ flow (approx.) between normal operating level and low-low level with a filling factor of 0.66.	Bid specifications to be followed.
1383	Vol-II Volume III Volume II	Ch 8: FG & LD Ch 8: FG & LD Ch 2: Turbine Generator & Auxiliaries Ch 2: Turbine Generator & Auxiliaries Ch 2: Turbine Generator & Auxiliaries Ch 18 : NDCT	5 of 57 ~~5 of 57~~ 8 of 57 11 of 87 ~~37 of 87~~ 40 of 87 74 of 87 74 of 87 22 of 23 3 of 10	Cl. No. 3.1 (iv.) ~~Cl. No. 12.2~~ Cl. No. 3.1 xv Cl. No. 1.1.2.viii ~~Cl. No. 2.viii~~ Cl. No. 2.2 1 (b) Cl. No. 2.2 1 (f) Cl. No. 15 (5) Cl. No. 15 (6)	Condenser Pressure in mm Hg (abs) measured at 300mm above the top row of condenser tubes at 800 MW unit Load, 1% make up, design CW inlet temperature and design CW flow. The cold-water temperature of 33°C shall be guaranteed for the design conditions of CW flow, range, ambient WBT and RH as per the performance test procedure of cooling tower elaborated elsewhere in the specification. Condenser design pressure : As optimized by bidder at 1% make-up and 32.5°C CW temperature for VWO condition but not exceeding 70 mmHg (abs) Condenser Design Parameters : Design cold water temp.= 32.5°C As optimized by the bidder at 1 % make-up and 32.5 deg C CW temperature at VWO Condition but not exceeding 70 mmHg (abs). Other conditions for computing heat balance diagrams: Design condenser pressure : As optimized by the bidder at 1 % make-up and 32.5 °C CW temperature at VWO condition (not more than 77 mm of Hg (abs)). Make up water (as applicable) % throttle flow: 1 % of throttle steam Cooling Tower Datasheet : Cold water temperature (°C) = 33 (guaranteed) Condenser cooling water inlet temperature of 33°C and 9°C temperature rise across the condenser.	There is discrepancy in the CW temperature. Bidder requests owner to provide following final values: 1. Design CW inlet temperature 2. Design Cold Water Temperature Also request Owner to fix the guaranteed condenser pressure inline with recent tenders of NTPC (i.e 65 mmHg.) in order to bring all bidders at par.	CW temperature of 32.5 deg C for condenser design pressure wherever mentioned in the bid specifications, be read as 33.0 deg C.
1384	Volume II Volume III	Sch. B : Technical Particulars (STG) Ch 2: Turbine Generator & Auxiliaries Ch 15: CW & ACW System Ch 16: DMCW System	49 of 64 51 of 64 12 of 87 5 of 37 36 of 87 11 of 12	1.1.3 1.1.4 1.1.4 15.4.3 1.23.1 y) DATASHEET FOR PLATE HEAT EXCHANGERS	Performance data with 0% Make up, all Heaters in Service, 85% Tube Cleanliness with 33 deg C CW temperature and all tubes Working Performance data with 3% Make-up, all Heaters in service, 85% Tube Cleanliness with 33°C C.W. temperature & all tubes working This means 800 MW electric power output at generator terminal under 0% cycle make up at 33°C design cooling water inlet temperature. The temperature at outlet of the Cooling Tower for design purposes shall be 33 deg C considering cooling tower approach of 5 deg C (max) at rated conditions and design inlet air Wet Bulb Temperature to be 28 deg C. y) 840 MW output at 1 % make-up design CW temperature and CW flow. (CONDNESER PRESSURE GUARANTEE CONDITION) Inlet Temperature of water: Secondary (ACW): Inlet – 33 deg C		
1385	Volume III	Ch 1: Steam Generator & Auxiliaries Ch 2: Turbine Generator & Auxiliaries	42 of 186 30 of 87 35 of 87	1.12.1 1.20 a) 1.23.1 r)	HP turbine bypass system shall be sized for 65% BMCR (minimum) steam flow (at Super Heater Outlet) with rated mainsteam parameters at the upstream of valve and CRH steam parameters corresponding to 60% TMCR on the downstream. Ensure HP bypass aggregate capacity not less than 65% of the main steam flow at BMCR condition considering rated main steam parameters at the upstream of valves & CRH steam parameters (pressure and temperature) corresponding to 60% TMCR condition on the downstream. HP-LP bypass operation under rated steam conditions with steam generator output of 60% of BMCR.	Bidder understand that HP-LP bypass operation under rated steam conditions with steam generator output of 65% ~~60%~~ of BMCR. Please confirm our understanding.	Specifications be followed as per Clause 1.20 (a) of Chapter-2 at Sheet 30 of 87 in Vol-III.

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1386		Ch 1: Steam Generator & Auxiliaries Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	44 of 186 9 of 59	1.19 26.6.2	(i) Upto & including 400 °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 (iii) Upto & including 601 °C: Alloy steel ASME SA-335/213: P-91/T-91 or approved equivalent. (iv) Upto & including 610 °C (*): Alloy steel ASME SA-335:P-92/T-92 or approved equivalent (v) Above 610 °C: Austenitic stainless steel, super 304H, TP347H or approved equivalent Note: i) Bidder may use ASME SA-335: P-92 or approved equivalent material up to 610°C for the components which are outside the flue gas path for Superheater, Reheater tubes, headers and interconnecting piping as applicable. In case it is proposed by the bidder to use ASTM-A-335 P-92 or equivalent material, Bidder shall be required to furnish operating references. ii) Maximum allowable -stress values for ASME SA-335: P-92/T-92 or approved equivalent material as per code shall be reduced by 10% for calculating the thickness of pressure parts. The material used for power cycle piping shall be equal to or better than the following unless specified otherwise: i) Up to & including 400 deg C Carbon steel to ASME SA-106 Gr. B/C or SA 210 Gr. C or equivalent. ii) Up to & including 550 deg C Alloy steel to ASME SA-335: P-11, P-12, P-22, P91 or equivalent iii) Up to & including 605 deg C Alloy steel ASME SA-335/213: P-91, P 92 or equivalent. iv) Above 605 deg C Austenitic stainless steel, P-92, Super 304H, TP347H or equivalent.	Bidder propose to follow below material requirements based on it's past executed projects and satisfactory performance. Also, Bidder propose to use allowable stress of SA / A335 P92 / SA / A182 F92 / SA / A213 T92 / SA / A234 WP92 as per ASME B31.1 / BPVC code case without any reduction. 1.19 Materials for Steam Generator Components (i) Upto & including 427 ~~400~~ °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 (iii) Upto & including 605 ~~601~~ °C: Alloy steel ASME SA-335/213: P-91/T-91 or approved equivalent. (iv) Upto & including 610 °C (*): Alloy steel ASME SA-335:P-92/T-92 or approved equivalent (v) Above 610 °C: Austenitic stainless steel, super 304H, TP347H or approved equivalent Note: i) Bidder may use ASME SA-335: P-92 or approved equivalent material up to 610°C for the components which are outside the flue gas path for Superheater, Reheater tubes, headers and interconnecting piping as applicable. In case it is proposed by the bidder to use ASTM-A-335 P-92 or equivalent material, Bidder shall be required to furnish operating references. ~~ii) Maximum allowable -stress values for ASME SA-335: P-92/T-92 or approved equivalent material as per code shall be reduced by 10% for calculating the thickness of pressure parts.~~	Bid specifications to be followed. Upto & including 427 °C: Carbon steel to ASME SA:106 Gr. B/C or SA 210 Gr. C or approved equivalent.
1387		Ch 2: Turbine Generator & Auxiliaries	53 of 87 54 of 87 54 of 87 57 of 87	6.0 (j) 6.1 (b) 6.1 c) 6.3.1 (b)	Tube sheet material shall be carbon steel as per ASTM. A516 Grade 70 or SA 350 LF-2 and shall be welded to shell and water box. Tube support plates of common quality steel of 16mm (min) thickness. Shell of rolled steel as per ASTM A-516 Gr. 70 with SS-304 bands at cut points on shell to prevent damage against flame impingement during torch cutting. Water box channel of carbon steel as per ASTM A-516 Gr. 70 and welded to tube sheet. Shell of carbon steel as per ASTM-516 Gr. 70 and water box channel as per ASTM-A-266 Class-II and shall be welded to tube sheet.	Bidder propose to add additional materials as per past project experience. This has been accepted in supercritical projects including NTPC & other state electricty board projects. Please accept the same. 6.0 (j) Tube sheet material carbon steel as per ASTM. A516 Grade 70 or SA 350 LF-2 or SA-508 Gr 3 Cl-I and shall be welded to shell and water box. Tube support plates of common quality steel of 16mm (min) thickness. LOW PRESSURE HEATERS AND DRAIN COOLER 6.1 (b) Shell of rolled steel as per ASTM A-516 Gr. 70 with SS-304 bands at cut points on shell to prevent damage against flame impingement during torch cutting. 6.1 c) Water box channel of carbon steel as per ASTM A-516 Gr. 70 and welded to tube sheet. HIGH PRESSURE HEATERS 6.3.1 (b) Shell of carbon steel as per ASTM-516 Gr. 70 and water box channel and channel cover as per ASTM A-266 class-II / ASTM-516 Gr. 70 / SA 533 Type B Cl 2 and shall be welded to tube sheet.	Noted.
1388		Ch 2: Turbine Generator & Auxiliaries	7 of 87 57 of 87 59 of 87	8.0 1. a) 7.1 (a) 7.1 (f) (ii) (1)	One, fifty percent capacity (1x50%) motor driven boiler feed pump for the unit complete with booster pump along with it's drives, mechanical seals, flexible couplings, hydraulic coupling… 2x50% Turbine driven feed pumps (normally working) and 1x50% Motor driven feed pump (stand by) with required margin. 1x50% MDBFP shall meet all the above conditions (i.e. (i) (1) to (5) above).	Bidder understands that MDBFP is a start-up and hot stand-by pump and it is not required for continous operation. Considering the reliability of TDBFP we propose to change the MDBFP configuration to 1x30% instead of 1x50%. In case 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 specifications to be followed
1389		Ch 2: Turbine Generator & Auxiliaries	7 of 87 60 of 87	8.0 1. a) 8.0 1. b) 7.1	One, fifty percent capacity (1x50%) motor driven boiler feed pump for the 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.), ON/OFF type low load recirculation flow control valve, ... Two, fifty percent capacity (2x50%) steam turbine driven boiler feed pumps with required margin complete with booster pumps, step down gear boxes, flexible couplings, mechanical seals, foundation base plates, ON/OFF type low load recirculation flow control valve, ... (l) Minimum recirculation (2) ON-OFF type minimum recirculation valve with valve body designed for 40% of design flow.	Bidder propose to add modulating control valve inaddition to ON-OFF recirculation control valve for better controllability and operability in feedwater pump recirculation. Please accept the same.	Noted
1390		Ch 2: Turbine Generator & Auxiliaries	7 of 87 70 of 87	8.0 1. a) 7.9	One, fifty percent capacity (1x50%) motor driven boiler feed pump for the 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.), ON/OFF type low load recirculation flow control valve, mobile cradle, integral piping and valves, temporary and permanent strainers,... STRAINERS AT BOOSTER PUMP AND BOILER FEED PUMP	Bidder propose only permanent strainer for booster pump and main pump and not temporary strainer. Please accept the same.	Bid specifications to be followed. However, the issue may be discussed during detailed engineering.

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1391		Ch 2: Turbine Generator & Auxiliaries	7 of 87	8.0 1. c)	Two (2) steam turbine drives for the turbine driven boiler feed pumps complete with ESV, control valves, non return valves for single admission drives, permanent & temporary steam strainers…	Bidder propose only permanent strainer for steam turbine drives for the turbine driven boiler feed pumps and not temporary strainer. Please accept the same.	Bid specifications to be followed.
1392		Ch 2: Turbine Generator & Auxiliaries	7 of 87 68 of 87	8.0 1. c) 7.8.7 (a)	Two (2) steam turbine drives for the turbine driven boiler feed pumps complete with ESV, control valves, non return valves for single admission drives, permanent & temporary steam strainers, hydraulic turning 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.... An oil conditioning centrifuge of type as specified at clause no 1.18 (b) of this chapter above except moisture at outlet of purifying system not more than 0.05% by volume.	Bidder propose 1x100% capacity portable centrifuge common for two steam turbine drives / turbine driven boiler feed pumps. This is based on it's past executed projects and has been accepted in supercritical projects including NTPC & other state electricity board projects. Please confirm acceptance.	Bid specifications to be followed.
1393		Ch 2: Turbine Generator & Auxiliaries	7 of 87	8.0 1. d)	Boiler feed pump sets shall be suitable for installation on spring supported Reinforced Cement Concrete (RCC) foundation.	Bidder propose rigid foundation for boiler feed pump sets based on it's past executed projects and has been accepted in supercritical projects including NTPC & other state electricity board projects. Please confirm acceptance.	Clause 8.0 1(d) of Ch-2 at Sheet 7 of 87 be read as "Boiler feed pump sets shall be suitable for installation on spring supported Reinforced Cement Concrete (RCC) foundation / conventional Reinforced Cement Concrete (RCC) foundation."
1394	Volume III Volume VII	Ch 2: Turbine Generator & Auxiliaries Tender Drawings Flow Diagram - Feedwater	7 of 87	8.0 2.	a) 1 X 30% BMCR pneumatically operated Control valve capacity with upstream & downstream Motorized valve with motorized equalizing valve. b) Two motor operated gate valves with motor operated integral bypass valve, one each on upstream and downstream of feed control valve. c) Two motor operated gate valve (each 50% BMCR capacity) with motor operated integral bypass valve in parallel to the feed control valve to bypass the feed control valve in the unit operation range of 30 to 100% BMCR. d) 2X100% BMCR capacity pneumatically operated control valves (1W+1S) with upstream& down-stream Motorized valve with motorized equalizing valve for each line. Feed Regulating Station: 1x30% feed control valve with upstream & downstream Motorized valve with motorized equalizing valve and 2x50% bypass valves with upstream & downstream Motorized valve with motorized equalizing valve.	Please clarify the requirement of "2X100% BMCR capacity pneumatically operated control valves (1W+1S) with upstream& down-stream Motorized valve with motorized equalizing valve for each line". We understand it is not the tender requirement and we have to offer as per below requirement. a) 1 X 30% BMCR pneumatically operated Control valve capacity with upstream & downstream Motorized valve with motorized equalizing valve. b) Two motor operated gate valves with motor operated integral bypass valve, one each on upstream and downstream of feed control valve. c) Two motor operated gate valve (each 50% BMCR capacity) with motor operated integral bypass valve in parallel to the feed control valve to bypass the feed control valve in the unit operation range of 30 to 100% BMCR. ~~d) 2X100% BMCR capacity pneumatically operated control valves (1W+1S) with upstream& down-stream Motorized valve with motorized equalizing valve for each line.~~	Tender drawing no. 111-11-0700 flow diagram feed water system be followed.
1395	Volume III	Ch 2: Turbine Generator & Auxiliaries	11 of 87	1.1.2 (i) 1.1.2 (xi) 1.1.3	Output under economic maximum continuous rating (EMCR) (guaranteed output load) at generator terminals: 800 MW DM water make up to thermal cycle under EMCR condition: 1% of throtal steam flow Economic maximum continuous rating (EMCR) output achieved at generator terminals shall be 800 MW after deducting all electrical power used for excitation, turbine generator control, lubrication, generator cooling and sealing, turbine gland steam exhauster, turbine generator main oil tank vapour extractor and any other such integral auxiliary of turbine generator under rated steam conditions with heat cycle makeup of 1% of throttle steam flow, all extractions in operation and design condenser pressure.. In case of static excitation system, the EMCR output at generator terminals shall be 800 MW plus excitation power requirement.	The conditions corresponding to economic maximum continuous rating (EMCR) at generator terminals shall be 800 MW output under rated steam condition with 15 T/hr of steam extracted from CRH for auxiliary steam and total cycle make up of 1% of throttle steam flow and design condenser pressure . Please confirm acceptance.	Bid specifications to be followed.
1396	Volume III	Ch 2: Turbine Generator & Auxiliaries	36 of 87 36 of 87 74 of 87	1.23.1 2.2 1 m) 15.0 4)	Note: Bidder to submit the HMBD on 800 MW output at 38°C cooling water inlet temperature also. Maximum circulating water temperature deg.C (min.): 38°C (max.) Worst pressure in the condenser: 89 mm Hg (abs)	Bidder understand that the client is looking for HBD on 800 MW output at worst condenser pressure which is similar to 1.23.1 k) 800 MW output under rated steam conditions at worst condenser pressure (89 mm Hg(abs)) with 1% make-up. Please confirm.	Confirmed.
1397	Volume III	Ch 2: Turbine Generator & Auxiliaries	55 of 87	6.1 k)	Design pressure : - Tube side – 105% CEP shut off head at 51.5 Hz.	For condensate extraction pump with VFD, frequency variation will not be applicable for running motor/pump speed. Bidder request owner to consider LP Heater Tube side Design Pressure: CEP shut off head at maximum possible speed of Variable Frequency Drive (VFD) and full vacuum.	Noted.
1398	Volume III	Ch 2: Turbine Generator & Auxiliaries	47 of 87	5.0 h (iv) 5.0 i	Other Capabilities: (i) 2 pumps shall be capable of handling the flow corresponding to Unit EMCR, all HP heaters out, 1% make up and worst condenser pressure at 47.5 HZ. Motor Rating Motor rating at 50 deg. C ambient temperature shall not be less than the maximum load demand of its driven equipment in its entire operation at frequency variations from 47.5 Hz to 51.5 Hz and motor shall not be over loaded during any mode of operation of driven equipment. The selection of the motor KW rating will be based on the selection criterion of motors mentioned in the electrical specification.	For condensate extraction pump with VFD, frequency variation will not be applicable for running motor/pump speed. Bidder request owner to consider below modifications. Other Capabilities: (i) 2 pumps shall be capable of handling the flow corresponding to Unit EMCR, all HP heaters out, 1% make up and worst condenser pressure ~~at 47.5 HZ~~. Motor Rating Variable frequency drive motor with maximum speed of the motor shall atleast be 5% above the highest speed determined of the pump corresponding to the condition indicated at (h) above. Motor rating at 50 deg.C ambient temperature shall not be less than the maximum load demand of its driven equipment corresponding to maximum motor speed indicated above and motor shall not be overloaded during any mode of operation of driven equipment.	Noted.

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1399	Volume III	Ch 2: Turbine Generator & Auxiliaries	61 of 87	7.1	(v) First stage suction specific speed Not in excess of 8000 (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.	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. (v)First stage suction specific speed Not in excess of 10000 ~~8000~~ (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.
1400	Volume III	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	8 of 59	26.6.1.1 (d)	However bidder may consider 20% higher stress as per the provision of ASME B 31.1 (for the piping upto downstream valve at feed regulating station only) for which the requirement of special provision as per stipulation of clause no. 520 of IBR shall be met as a must by the bidder. The valve rating in such case shall be arrived at based on design pressure calculated as per above.	Bidder request owner to accept 20% higher stress as per the provision of ASME B 31.1 (for the piping upto downstream valve at feed regulating station only) considering IBR Reg. 520 is completely ignorant about this technical acceptance. However, valves rating shall be arrived based on the design pressure calculated for the Discharge pressure corresponding to turbine driven BFP trip speed at shut off head flow condition as per ASME B16.34.	Bidder to follow ASME B 31.1 inline with specifications.
1401	Volume III	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	14 of 59	26.6.8	(f) The temperature in the flash tanks shall be maintained by using condensate /feed water spray, as the case may be and in whichever case applicable.	Bidder request owner to accept the spray water source based on it's past executed projects and has been accepted in supercritical projects including NTPC & other state electricity board projects. Bidder request to have service water as spray water for atmospheric flash tank as shown in tender drawing 111-11-1100.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1402	Volume III	Ch 26: Power Cycle Piping, Valves, Fitting & Thermal Insulation	25 of 59	26.6.21.1	All the control station configuration shall be as follows. (a) For Continuous Service requirement: (i) One (1) pneumatically/hydraulically operated control valve. (ii) One (1) motor operated isolation valve at the upstream side of control valve. (iii) One (1) manual operated isolation valve at the downstream side of the control valve. (iv) One (1) pneumatically/hydraulically operated bypass control valve. (v) One (1) motor operated isolation valve at the upstream side of the bypass control valve. (vi) One (1) manual operated isolation valve at the downstream side of the bypass control valve. (vii) Non return valve in the common downstream line, for spray piping. (viii) Drain valves at upstream and downstream of the control valves. (b) For Intermittent Service requirement: (i) One (1) pneumatically/hydraulically operated control valve. (ii) One (1) motor operated isolation valve at the upstream side of control valve. (iii) One (1) manual operated isolation valve at the downstream side of the control valve. (iv) One (1) motor operated inching type regulating bypass valve. (v) One (1) motor operated isolation valve at the upstream side of the bypass valve. (vi) One (1) manual operated isolation valve at the downstream side of the bypass valve. (vii) Non return valve in the common downstream line, for spray piping. (viii) Drain valves at upstream and downstream of the control valves.	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. All the control station configuration shall be as follows. (a) For Continuous Service requirement: (i) One (1) pneumatically/hydraulically operated control valve. (ii) One (1) motor operated isolation valve at the upstream side of control valve. (iii) One (1) manual operated isolation valve at the downstream side of the control valve. ~~(iv) One (1) pneumatically/hydraulically operated bypass control valve.~~ ~~(v) One (1) motor operated isolation valve at the upstream side of the bypass control valve.~~ ~~(vi) One (1) manual operated isolation valve at the downstream side of the bypass control valve.~~ (vii) Non return valve in the common downstream line, for spray piping. (viii) Drain valves at upstream and downstream of the control valves. (b) For Intermittent Service requirement: (i) One (1) pneumatically/hydraulically operated control valve. (ii) One (1) motor operated isolation valve at the upstream side of control valve. (iii) One (1) manual operated isolation valve at the downstream side of the control valve. ~~(iv) One (1) motor operated inching type regulating bypass valve.~~ ~~(v) One (1) motor operated isolation valve at the upstream side of the bypass valve.~~ ~~(vi) One (1) manual operated isolation valve at the downstream side of the bypass valve.~~ (vii) Non return valve in the common downstream line, for spray piping. (viii) Drain valves at upstream and downstream of the control valves.	Bid specifications to be followed. These are the general requirement for control station configuration, however, for specific requirement at various locations, refer respective chapter.
1403	Volume VII	Tender Drawings Flow Diagram - Condensate System Tender Drawings Flow Diagram - Feedwater System			MOV for suction isolation valve and thermal relief valve across the same.	As per Bidder's engineering practise on process requirement and past projects, suction isolation valves on both CEPs and BFPs shall be manual operated lock open valve. Converting the same to MoV will create accidental closure by operator and failure of the pumps. Considering the same, bidder propose to consider manual isolation valves on the pump (both CEPs and BFPs) suction with thermal relief valve discharge to nearest floor drain. Please confirm acceptance.	Bid specification to be followed. The issue can be discussed during detailed Engineering.
1404	Volume VII	Tender Drawings Flow Diagram - Feedwater System			Location of spray to HP bypass station	As per Bidder's engineering practise on process requirement and past projects, Bidder proposes spray to HP bypass station tap-off from upstream of HP heaters for better temperature control. Please confirm acceptance.	Confirmed.
1405	Volume VII	Tender Drawings Flow Diagram - Feedwater System			Safety relief valve downstream of last isolation valve in feedwater recirculation line.	As per Bidder's engineering practise on process requirement and past projects, Bidder proposes recirculation piping upto last isolation valve to be designed for design pressure corresponds upto FRS and downstream of isolation valve for the deaerator safety valve set pressure without any safety valve on the recirculation piping. Please provide confirm the acceptance.	Noted .

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1406	Volume III	Ch 2: Turbine Generator & Auxiliaries	56 of 87	6.2 (o)	Maximum oxygen content shall be 0.005 cc/litre at deaerator outlet measured as per ASTM-D-888 reference method-A or Indigo carmine method at all operating conditions.	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. Please note that ASTM D5543 is for "This test method covers the rapid determination of low-level (<100 µg/L) dissolved oxygen in thermal-cycle steam condensate, deaerated boiler feedwater, boiler water, and deaerated deionized water." whereas ASTM D888 is for general application. Maximum oxygen content shall be 0.005 cc/litre at deaerator outlet measured as per ASTM D5543 ~~ASTM D 888~~ reference method-A or Indigo carmine method at all operating conditions.	Noted.
1407	Volume III	Ch 2: Turbine Generator & Auxiliaries	6 of 87	3.0	One set of test kit for measuring oxygen content at deaerator outlet shall also be provided for the station.	Online oxygen mearing provision is being provided by Bidder. Hence, Offline test kit for measuring oxygen content at deaerator outlet is not required. Customer is requested to accept above.	Bid specifications to be followed.
Coal Handling Plant							
1408	Volume III - Mechanical Works Volume III - Mechanical Works	Ch:19 Coal Handling System Ch:19 Coal Handling System	8 of 120 112 of 120	56. M-40, 1.0	Diesel Locomotives: 4 nos Diesel Locomotives Three (3) – Diesel hydraulic locomotives of 800 HP capacity shall be furnished for handling of coal and yard shunting in the marshalling yard. The diesel hydraulic locomotives shall have the following features	Discrepancy observed regarding numbers of locomotive, Owner is requested to confirm the numbers of locomotive are to be considered.	At S.No. 56 of Clause 1.1.8 of Chapter 19, Sheet 8 of 120 of Vol-III, no. of locomotives be read as 3 No. instead of 4 No.
PT PLANT							
1409	Volume III : Mechanical Works Volume II : General and schedules	DATA SHEET – WATER TREATMENT PLANT FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES	6 of 14 41 of 57	5.0 d) 5.34 a)	Rated Effluent Capacity:1100 (minimum) Each clarifier unit for PT system shall be guaranteed for an effluent capacity of not less than 2200 m3/hr.	Discrepancy observed in referred clauses regarding the capacity of each clarifier. Bidder understands that each clarifier capacity shall be 1100 m3/h3 and not 2200 m3/hr. Please confirm Bidder's understanding.	Rated Capacity of each clarifier shall be minimum 1100 cum/hr as per Clause 5.0(d) of Chapter-5 at Sheet 6 of 14, Vol-III. The guarantees shall also accordingly be at this minimum capacity or actual whichever is higher.
DM PLANT							
1410	Volume III : Mechanical Works Volume II : General and schedules	Ch 8 : DM Plant Ch 4 : Provenness	8 of 15 12 of 42	Guaranteed Effluent Quality from DM Plant 4.4.10	4. MB Outlet : Total Silica ppm as SiO2 : < 0.01 The Bidder /its sub-vendor should have designed, supplied, ----- outlet water quality of silica and conductivity not more than 0.01 ppm as SiO2 and 0.1 micromho/cm respectively, ------- Techno-Commercial bid opening.	Bidder understands that at outlet of MB, the guarantee of reactive silica shall be <0.01 and not for total silica since both colloidal & reactive silica are present in the clarified water. Please confirm Bidder's understanding. Further, Bidder understands that the total silica guarantee shall be <0.02 ppm instead of <0.01 considering both colloidal and reactive silica. Please confirm Bidder's understanding. The above is inline with guarantee followed in NTPC, Central & State Power Projects. Kindly refer enclosed Annexure-M16.	Guaranteed Effluent Quality from DM Plant shall be as per Chapter 8, Volume III of specification except for S.No.-4 (at Sheet 8 of 15). "Total Silica ppm as SiO2 < 0.01 " in 3rd & 4th Coulmn against S.No.-4 of Table at Sheet 8 of 15 be read as:- "MB Outlet Reactive Silica ppm as SiO2 < 0.01 MB Outlet Colloidal Silica ppm as SiO2 < 0.01". Clause 4.4.10 of Ch-4 at Sheet 12 of 42, Vol-II be reread as under:- "Ion Exchange Demineralization Plant The Bidder /its sub-vendor should have designed, supplied, erected and commissioned at least one (1) number of ion exchange based demineralising plant, consisting of at least two (2) streams each of minimum 30 M3/hr capacity, capable of producing outlet water quality of silica and conductivity not more than 0.02 ppm as SiO2 and 0.2 micromho/cm respectively, which should have been in successful operation for at least one (1) year prior to the date of openning of technocommercial bid."
1411	VOLUME III : Mechanical Works	Ch 8 : DM Plant	8 of 15 9 of 15	2. 3.0, i), c.	Guaranteed Effluent Quality from DM Plant: Degasser: Unit CO2 Content ppm as CaCO3 < 5.0 Degasser Tower: CO2 content in treated water ppm as CaCO3 ≤ 5	Discrepancy observed in referred clause regarding CO2 content guarantee. Bidder understands that guarantee of CO2 content shall be ≤ 5 ppm and instead of ≤ 5 ppm as CaCO3 . Kindly confirm Bidder's understanding.	For guranatees at degasser outlet, follow Chapter 8 at Sheet-8 of 15 of Volume III.
ETP Plant							
1412	Volume II : General and schedules	Ch 2 : Provenness: Effluent Treatment Plant	23 of 42	4.6.0.0	The Bidder /Sub- Contractor should have designed , supplied, ---- one number sea water reverse osmosis plant with a permeate water capacity of minimum 30 m3 / hour. ---- one year as on date of LOA.	It is submitted that specified PQR criteria shall restrict sufficient vendors for the package & competitive bidding. QR may please rephrased as: "The Bidder /Sub- Contractor should have designed, supplied, erected and commissioned during the last ten years at least one number reverse osmosis plant with a permeate water capacity of minimum 30 m3 / hour which should have been in successful operation for a period of not less than one year as on date of LOA". Kindly confirm acceptance.	In clause 4.6.0.0 at sheet 23 of 42 of Chapter-4, Vol-II, followimg changes are made:- i) The word "sea" is deleted. ii) The words "as on date of LOA" be read as "prior to the date of opening of techno commercial bid".

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1413	Volume III : Mechanical Works	Ch 09: Condensate Polishing System DATASHEET - CONDENSATE POLISHING	2 OF 15 10 of 15	9.1.1 2.0	There shall be two (2) vessels, each polishing vessel of 50% capacity of Condensate flow corresponding to maximum: - VWO (Valve Wide Open) condition at 1% make-up and designed condenser pressure OR - HP / LP bypass charge condition OR - All HP heaters out of service CONDENSATE POLISHER SERVICE VESSELS PER UNIT : 1 (iii) Total flow in all the service vessels 2500 Tonnes per hour (Minimum) Flow through each condensate polisher service vessel per unit 1250 Tonnes per hour	Bidder has considered that each unit shall have two (2) service vessels (2 W) 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. Other two referred conditions shall not be followed. Please confirm acceptance. Total flow in all the service vessels and Flow through each condensate polisher service vessel per unit shall be decided as per ''Valve Wide Open condition at 1% make-up and designed condenser pressure inline''	CPU shall be sized in line with clause 9.1.1, Chapter 9, Sheet 2 of 15 of Volume III.
1414	Volume III : Mechanical Works Volume VII : Tender Drawings	Ch 09: Condensate Polishing System Flow Digram: Condensate polishing Unit	10 of 15	DATASHEET - CONDENSATE POLISHING UNIT 2.0 (i)	No. of condensate polisher service vessel: Three (3 x 50% Full flow condensate polishing.	As per tender specification and tender drawing, Pre filters are not mentioned at the inlet of CPU vessels. In view of this, Bidder understands that pre filters at the inlet of CPU vessels are not envisaged for the proposed plant. Please confirm Bidder's understanding.	Bidder to take action to ensure results as per clause 9.1.3 of chapter 9 at sheet 2 of 15 in Vol-III.
1415	Volume III : Mechanical Works	Ch 09: Condensate Polishing System	8 OF 15	Note	Bidder shall provide all the consumable including chemicals till the handing over the plant and additional chemicals of two (2) months requirement	Bidder understands that consumables including chemicals shall be considered till date of commercial operation (COD). Kindly confirm Bidder's understanding.	Bid specifications to be followed.
Compressed Air System							
1416	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	5 of 24	Cl. No. 23.4.10	The total Service Air requirement shall be assessed by considering the following guideline: Y = {(E+F)+G+H} x [1+ (mw+ml)/100] where Y = Total service air requirement (continuous) E = Service Air requirement (continuous) for SG, TG & auxiliaries. F = Service Air requirement (continuous) for WTP and other facilities. F = 2.5 NM3/min (minimum) G= Service Air Requirement for AHP H= Service Air Requirement for CHP mw = Wear & tear margin (10%) ml = Leakage margin (10%)	Service Air for cleaning purpose is not envisaged in CHP and AHP areas considering dust environment. Please confirm.	Bid specifications to be followed. Alternatively, bidder may provide service air from CHP compressor.
1417	Volume III Mechanical Works vs Volume VII Tender Drawings	CHAPTER – 23 / COMPRESSED AIR SYSTEM vs Dwg. No. 111-14-6100	5 of 24 vs Flow Diagram	Cl. No. 23.4.10 vs Flow Diagram - Compressed Air System	The total Service Air requirement shall be assessed by considering the following guideline: Y = {(E+F)+G+H} x [1+ (mw+ml)/100] where Y = Total service air requirement (continuous) E = Service Air requirement (continuous) for SG, TG & auxiliaries. F = Service Air requirement (continuous) for WTP and other facilities. F = 2.5 NM3/min (minimum) G= Service Air Requirement for AHP H= Service Air Requirement for CHP mw = Wear & tear margin (10%) ml = Leakage margin (10%)	Clause 23.4.10 indicates to include Service air requirement of CHP in Compressor sizing. Whereas flow diagram does not indicate any tap off for CHP from Service air network. As per our past project experience and also as depicted in respective chapters of Coal Handling Plant, DS/ DE/ other auxiliary system under CHP are to be provided with dedicated compressed air arrangement. Hence it is understood that compressed air requirement of CHP is not to be included in main plant compressor sizing. Please confirm.	Bid specifications to be followed. CHP area shall be considered for service air compressor sizing. Accordingly, service air piping shall be provided for CHP areas. Alternatively, bidder may provide service air in CHP area from dedicated CHP compressor.
1418	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	5 of 24	Cl. No. 23.4.10	Each Service Air Compressor shall have capacity identical to that of each IA compressor but in no case less than the value Y as computed above. While calculating the air requirement of bidder's equipment/ plant/ systems for continuous requirement of service air, no diversity factor shall be considered and they are assumed to be of "Simultaneous Requirements". The intermittent requirement of service 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 0.6.	Diversity factor is not specified for intermittent Instrument air consumption. Diversity factor of 0.4 shall be considered as is inline with practice followed in NTPC Projects. Kindly refer enclosed Annexure M-13. Owner is requested to confirm.	Diversity factor for intermittent instrument air consumption shall not be less than 0.60.
1419	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	6 of 24	Cl. No. 23.4.16	Each Air Receiver shall be so sized that even in the event of total stoppage of air inflow to the same, the pressure in the Air Receiver shall not fall below 5.5 kg/cm2 (g) within two minutes of such stoppage, while maintaining an out flow of air at a rate equal to the rated capacity of a single compressor, during the aforesaid period. In no case, the size of each Air Receiver shall be less than that arrived from IS: 7938	As per IS: 7938, 'T' is the time for which receiver supplies air from upper to lower pressure limits. This is applicable for reciprocating compressors. In case of Screw compressors the loading & unloading of air compressors shall be carried out from the pressure transducer at discharge side of the compressor. Bleed down time 2 min. is extremely high which shall result in abnormal size of air receivers. The compressor takes not more than 23 sec. to achieve full capacity. Moreover there are receivers provided for standby compressor and, additional unit air receivers have also been asked for in the specification. So we request to optimize Bleed down time to 10 sec. in line to the requirement of all other consultant/ customer.	Three (3) Air Receivers, each of 15 cu.m capacity shall be provided in line with specification.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1420	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	5 of 24	Cl. No. 23.4.9	Each air compressor shall have its own control panel with indication lights for power on; service hour-run meter; load hour-run meter; inlet air filter differential pressure high; outlet air pressure & temperature (analogue gauge); oil filter differential pressure high; separator element differential high; motor overload; low oil level; compressor temperature high; oil temperature before and after oil cooler (analog gauge). The compressor shall trip on motor overload; low oil level; and compressor temperature high.	Please note that the same shall be as per compressor OEM standard and its proven design, taking into consideration all the safety aspects for successful running of compressors. Please accept.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1421	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	8 of 24	Cl. No. 23.5.1 & Cl. No. 23.5.2	Instrument Air Compressor a) Three (3) (2W+1S), oil free, dry screw type, water cooled, horizontal multistage rotary screw compressors. Each IA compressor capacity shall be 50 Nm3/min (minimum) or as computed by procedure for capacity determination of IA and SA in clause no. 23.4.10 above, whichever is higher, at pressure 8.5 kg/cm2 (g) (minimum) at the outlet of after cooler. & Service Air Compressor Three (3) (2W+1S), oil free, dry screw type, water cooled, horizontal multistage rotary screw compressors. Each SA compressor capacity shall be 50 Nm3/min (minimum) or as computed by procedure for capacity determination of IA and SA in clause no. 23.4.10 above, whichever is higher, at 8.5 kg/cm2 (g) pressure minimum at the outlet of after cooler.	A Screw type compressor is requested in tender specification. The Bidder requested Owner to allow Centriugal compressor as an alternative to Screw compressor as is inline with practice followed in NTPC Projects. Kindly refer enclosed Annexure M-14. Please confirm acceptance on Centrifugal compressor.	Confirmed.
1422	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	8 of 24	Cl. No. 23.5.1 & Cl. No. 23.5.2	Instrument Air Compressor g) PLC based control panel for control and monitoring of the Compressed air system, field instruments, control cables, etc & Service Air Compressor f) PLC based control panel for control and monitoring of the Compressed air system, field instruments, control cables, etc	Skid mounted Microprocessor based control system shall be provided for compressors integral control as per OEM practice. Additionally, Stand-alone System as per Vol-V of specification shall be provided by bidder. Separate PLC for CAS is not envisaged by bidder. Please accept.	Bid specifications to be followed. However bidder to note that as per Volume V, Chapter 18, clause 18.06.00 main plant DDCMIS shall act as standalone system and shall control individual compressor as per the referred clause. Separate PLC for controlling and monitoring of each compressor is not required.
1423	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	10 of 24	Cl. No. 23.6.1	Each compressor shall be provided with name plate, base plate, anchor bolts and shim packs, anti-vibration pads, eye bolts, operation & maintenance tools.	Please note that in case of Oil free screw compressors, same shall be rested on foundation without any anchoring. This is in line with the industry practice and manufacturer proven design. Please accept.	Noted
1424	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	10 of 24	Cl. No. 23.6.2	Lubrication System The lubricant pump shall be shaft driven. An auxiliary motor driven pump shall be provided, if required by the manufacturer to supply pre start and shut down system. All lube oil pumps shall be rotary positive displacement type, having stainless steel rotors and steel casing. The pump discharge system shall be protected by a relief valve	Please note that the lubrication pump designs shall be as per OEM standard and its proven design, taking into consideration all the safety aspects for successful running of compressors. Please accept.	Noted
1425	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	8 of 24 vs 10 of 24	Cl. No. 23.5.1 vs Cl. No. 23.6.7	Three (3) (2W+1S) Heat of Compression (HOC) type Air Drying Plants along with Pre-filter & After-filter in the air inlet & outlet of Air Dryer respectively to ensure dry moisture free Instrument quality air. Capacity of each drier shall be 1.1 times to capacity of each IA compressor. vs Air Drying Plants Three (3) HOC type air drying plants shall be provided (two working and one standby) for instrument air. The capacity of each air drying plant shall be same as that of the Instrument air compressors.	There is a discrepancy between these two clause with respect to drier capacity. Bidder considers to follow clause 23.6.7 and accordingly air drying plant capacity will be same as Instrument air compressor capacity as is inline with practice followed in NTPC Projects. Kindly refer enclosed Annexure M-15. Please accept.	Specifications be followed as per clause 23.6.7.
1426	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	10 of 24	Cl. No. 23.6.7.2	Technical requirements Adsorbers shall be sized so that even when the compressor is operating at part load, complete regeneration shall be achieved within the cycle time and quality of air (dew point) shall be maintained throughout the design cycle period.	Please note that oil free screw compressors are being envisaged as per specification, which operates either at no load or full load. Bidder have furnished its offer considering load / unload feature of compressors. Part load operation of compressor is not envisaged by bidder. Please accept	Noted
1427	Volume III Mechanical Works	CHAPTER – 23 / COMPRESSED AIR SYSTEM	11 of 24 vs 20 of 24	Cl. No. 23.6.5 vs Datasheet	Air Receivers The design pressure and temperature shall be minimum 10 kg/cm 2 (g) and 50ºC respectively. Receivers shall be designed in accordance with Section VIII, Division 1 of ASME code or equivalent. vs 7.2.4 Air Receiver Design pressure / Temperature Minimum 1.5 times compressor discharge pressure (or 12.75 kg/cm2 (g) minimum) / 80 ºC (minimum))	Discrepancy in the mentioned clauses. The design pressure and temperature shall be as per OEM design based on desired operating pressure provided in tender specification. Request owner to accept.	Specifications be followed as per Clause 7.2.4 Sheet 20 of Volume III.
1428	Volume VII Tender Drawings	Dwg. No. 111-14-6100	52 of 120	-	Dedicated instrument air receivers shown : - Air receiver , 1 no., Cap - 2 m3 for WTP / DM Plant - Air receiver , 2 no., Cap - ?? m3 for main plant.	Kindly confirm capacity of air receivers for Main plant.	Three (3) Air Receivers (instead of 2 nos), each of 15 cu.m capacity shall be provided for Main Plant.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
Fuel oil Package							
1429	Vol-III	Ch 5 : Fuel Oil Handling System	PAGE 2 of 8	22.1.2	LDO from road tankers is unloaded to the existing unloading header by gravity which shall then be pumped to the existing LDO storage tanks through existing unloading pumps. The LDO from the existing LDO storage tanks is pumped to the existing day oil tanks through LDO forwarding pumps. It is proposed to tap the LDO required for the proposed 800 MW unit at Unit # 2 day LDO tank inlet header. Necessary booster pumps shall be installed in the existing Unit # 2 day farm area to transfer the LDO from the existing LDO forwarding header to the proposed 800 MW LDO Day tank.	Owner is requested to provide the following:- a) Location of Terminal Point for connecting the bidder's pipe with owner's LDO tank inlet header b) Pressure available at terminal point c) Size of owner's pipeline.	a) Location of Terminal Point is Unit-2 LDO day tank spare nozzle of 4 inch size. b) Flooded section. c)Tank nozzle size is 4 inches.
1430	Vol-III	Ch 5 : Fuel Oil Handling System	PAGE 2 of 8	22.1.2	LDO from road tankers is....Necessary booster pumps shall be installed in the existing Unit # 2 day farm area to transfer the LDO from the existing LDO forwarding header to the proposed 800 MW LDO Day tank.	Owner is requested to inform the type of building or shelter to be considered for booster pumps.	LDO booster pumps shall be located inside a shed with side sheeting.
1431	Vol-III	Ch 5 : Fuel Oil Handling System	PAGE 2 of 8	22.2.2	Two (2) (1W+1S) LDO Booster pumps each of 50 M3/hour capacity (or matching the capacity of existing LDO transfer pump) each complete with all the accessories of drive and mounting as specified for forwarding the LDO from existing header to LDO day tank.	Owner is requested to provide the capacity of existing LDO transfer pump.	Bidder to visit site for the requisite details.
1432	Vol-III Vol-VI	Ch 5 : Fuel Oil Handling System Ch 11: Buildings Description	PAGE 2 of 8 PAGE 13 of 18	22.1.2 11.18	LDO from road tankers is unloaded to the existing unloading header by gravity which shall then be pumped to the existing LDO storage tanks through existing unloading pumps. The LDO from the existing LDO storage tanks is pumped to the existing day oil tanks through LDO forwarding pumps. It is proposed to tap the LDO required for the proposed 800 MW unit at Unit # 2 day LDO tank inlet header. Necessary booster pumps shall be installed in the existing Unit # 2 day farm area to transfer the LDO from the existing LDO forwarding header to the proposed 800 MW LDO Day tank. FUEL OIL HANDLING SYSTEM Unloading pump houses to unload oil from road tankers or rail wagons shall be of single storey structural steel frame structure with GI sheet roofing and Brick walls. A paved platform shall be provided between the pump house and the rail wagon / road tanker parking area with plain cement concrete over rubble soling, sloped towards a peripheral drain. The drain will be led to a sump with oil water separator. No cable trenches will be permitted in the pump house.	Bidder understand that unloading pump house mentioned in civil section is not envisaged. Owner is requested to confirm bidder's understanding.	Confirmed.
1433	Vol-III	Ch 1: Steam Generator & Auxiliaries	PAGE 22 of 186	1.19 (Sr. No. 1)	Fuel Oil System..... Two (2) (1W+1S) rotary positive displacement type LDO pumps with motor, coupling, coupling guards etc. Pumps shall have VFD.	VFD is not envisaged for fuel oil pressurization pump as per our executed projects. Owner is requested to review the requirement.	VFD not required.
1434	Vol-III	Ch 1: Steam Generator & Auxiliaries	PAGE 22 of 186 PAGE 85 of 186	1.19 (Sr. No. 7&8) 11.3 (Sr. No. 4)	One (1) drain oil tank of 5 M³ capacity and with **one oil transfer pump with motor**, duplex filter at suction and other accessories for steam generator to transfer drain oil from boiler area to LDO storage tank(s). Control of the same shall be implemented in SG C&I system One (1) drain oil tank in pressurizing pump house area having 10 M3 capacity and **one oil transfer pump with motor**, duplex filter at suction and other accessories to transfer drain oil from pump house to LDO storage tank(s). Control of the same shall be implemented in FOPH control system. Drain pumps No. of pumps 2 (1W+1S)	Due to discrepancy, bidder is considering one number of pump for each drain oil tank. Owner is requested to confirm bidder's understanding.	2 x 100% drain pumps shall be provided for each drain tank.
1435	Vol-III	Ch 1: Steam Generator & Auxiliaries	PAGE 22 of 186	1.19 (Sr. No. 7&8) 1.19 (Sr. No. 6)	One (1) drain oil tank of 5 M³ capacity and with one oil transfer pump with motor, duplex filter at suction and other accessories for steam generator to transfer drain oil from boiler area to **LDO storage tank(s)**. Control of the same shall be implemented in SG C&I system One (1) drain oil tank in pressurizing pump house area having 10 M3 capacity and one oil transfer pump with motor, duplex filter at suction and other accessories to transfer drain oil from pump house to **LDO storage tank(s).** Control of the same shall be implemented in FOPH control system. All drain oil piping from drain point to drain oil tanks, from drain oil tank to drain oil pump and from drain oil pump to discharge pit along with all valves and fittings.	Bidder understand that drain oil from drain oil tank shall be discharge to LDO day tank. Owner is requested to confirm bidder's understanding.	Bidder's understanding is correct.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1436	Vol-III	Ch 1: Steam Generator & Auxiliaries	PAGE 87 of 186	11.3 (Sr. No. 5.)	Construction of LDO pressuring pumps and drain oil pumps shall comply with following: Type of Pump : Rotary, positive displacement, horizontal pump fitted with relief valves	Bidder understand that vertical single screw pumps can also be considered for drain oil system. Owner is requested to confirm bidder's understanding.	Confirmed
1437	Vol-III Vol VII	Ch 22: Fuel Oil Handling System	PAGE 2 of 8 42 of 120	12.2.1 Tender Drawings	One (1) 250 M3 capacity LDO day tank. The tank shall be located in the proposed boiler area. LDO DAY TANK 200M3 capacity	Discrepancy is found in the referred clause. Request owner to clarify the capacity of Day tank	Capacity of LDO day tank shall be 250 M3 as per clause 12.2.1.
Quality							
1438	Sec-IV, GCC _____ Volume II General & Schedules	GCC _____ Ch 11 : Quality Assurance Requirements	52 of 80 _____ 1 of 14	35.0 _____ -	New Clause	We request Owner to introduce a new clause as follows: " *(a) Raw material for Pressure Parts and Raw Materials for the Factory Fabricated Steel Structures used under this Contract shall be new and unused (not reconditioned) and of recent manufacture which shall in no case be of a date of manufacture older than two years from the date of delivery at Bidder / Bidders' sub-supplier works.* *(b) Reinforcement steel and Structural steel for fabrication at site, shall in no case be of a date of manufacture older than two years from the date of delivery at the yard/site.* *Exception from the above criteria shall in no case exceed 1% of the Total Contract Price. "*	Not Acceptable
1439	Volume III Mechanical Works, Section 3 : Electrostatic Precipitator	Ch 1: SG & Auxiliaries	177 of 186	Note-1	A spacing of 400 mm for the last two series fields is also acceptable in which case the collection area of these field shall be such that the total effective specific collection are (SCA) of the ESP is not less than the specified SCA for which the effective collection area will be worked out based on the following formula. (Corresponding to 400mm, SCA shall be 195 m2/m3/ sec) Total effective specific collection area = (Collection area of fields with 300 mm collection area spacing + collection area of field with 400 mm spacing x 400/300) divided by gas flow.	In offered technology which has extensive global references, collecting electrode spacing is 400 mm for all fields. Same is accepted by all major power utilities including NTPC. Hence bidder shall offer minimum SCA of 195 m2/m3/ sec (at Design and Guarantee point) with 400 mm spacing considering all field working condition.Bidder request owner to kinldy accept the same.	Bid specifications to be followed.
1440	Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries	Sheet | 92 of 186	i	IDF - Pressure drop through FGD - 200 mm WC or actual whichever is higher	Minimum pressure drop across FGD shall be 150mm WC instead of 200 mm WC as stated. Kindly modify the clause accordingly.	Clarified that Pressure drop through FGD shall be considered as 150 mmWC or actual whichever is higher.
1441	Volume IV / Electrical Works	Ch1: Electrical Scope of Work	37 of 58	1.27.02	All LV motors rated 0.37kW and higher with S1 duty shall compulsorily be of energy efficiency level IE3 as per IS 12615:2011.	Bidder would like to clarify that MRS motor of Pulveriser is a 10 Pole motor and standard defines efficiency class for motors upto 8pole. Hence Efficiency class of MRS motor of Pulveriser will be as per manufacturers standard. Owner may please confirm.	For motors of 10 pole and above proven practice of manufacturer shall be acceptable provided bidder submits supporting documents/details in this regard during detailed engineering.
1442	Volume IV / Electrical Works	Ch 16: AC & DC Motors	4 of 22	16.04.01, ii	Continuous duty LT motors rated above 0.37kW up to 160 KW Output rating (at 500 C ambient temperature), shall be Efficiency class-IE3, conforming to IS 12615, or IEC:60034-30	Bidder would like to clarify that MRS motor of Pulveriser is a 10 Pole motor and standard defines efficiency class for motors upto 8pole. Hence Efficiency class of MRS motor of Pulveriser will be as per manufacturers standard. Owner may please confirm.	For motors of 10 pole and above proven practice of manufacturer shall be acceptable provided bidder submits supporting documents/details in this regard during detailed engineering.
1443	Volume IV / Electrical Works	Ch 16: AC & DC Motors	4 of 22	16.04.03, ii	Inverter duty motors shall be self-ventilated without any auxiliary blower. Force ventilation shall be subject to Owner approval.	Bidder would like to clarify that MRS motor of Pulveriser is a VFD driven motor and due to additional heating, forced cooling blower will be used. Owner may please accept the same.	For motors of 10 pole and above proven practice of manufacturer shall be acceptable provided bidder submits supporting documents/details in this regard during detailed engineering.
1444	Volume IV / Electrical Works	Ch 34: Variable Frequency Dirve	2 of 17	34.03.01	…….....12-pulse (having two channels, each channel with six pulse design)/Active front end for drives above 90kW up to 160kW…….....	Bidder would like to clarify that for MRS application VFD, the performance parameters mentioned in specification can be obtained through Six (6) pulse design, therefore the MRS VFD will be a 132kW drive with Six (6) pulse design. Owner may please accept the same.	For motors of 10 pole and above proven practice of manufacturer shall be acceptable provided bidder submits supporting documents/details in this regard during detailed engineering.
1445	Volume IV / Electrical Works	Ch 34: Variable Frequency Dirve	9 of 17	34.08.06	Bypass Feature	Bidder would like to clarify that as MRS is variable speed application, MRS will never run with VFD in bypass mode. Therefore, MRS VFD will be without bypass mode option. Owner may please accept the same.	For motors of 10 pole and above proven practice of manufacturer shall be acceptable provided bidder submits supporting documents/details in this regard during detailed engineering.
SG & Associated Auxiliaries - C&I							
1446	Vol III	Ch 1: Steam Generator & Auxiliaries	15 of 186	1.15.1/xiv	Remote (UCB) operated shut off gate between RC feeder and coal mill.	Please clarify the meaning of UCB. Bidder clarifies that the shut off gate between RC feeder and coal mill is operated from SG DDCMIS. Please accept.	UCB (Unit control Board) is UCD (Unit Control Desk) to be located in Unit control room as mentioned in Appendix-I to C&I Section Part-A, Vol.V Shut off gate between RC feeder and coal mill shall be operated from DDCMIS & UCD located in Unit control room. Therefore, Bid specification to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1447	Vol III	Ch 1: Steam Generator & Auxiliaries	19 of 186	1.15.10	On line fuel measurement facility for accurate measurement of coal mass flow rate/air fuel ratio in each pulverized fuel (PF) pipe for coal pulveriser. The equipment shall comprise of sensors working on micro wave technology. The error in measuring.	As per Bidder standard proven practices, Fixed Orifice is provided at the Mill outlet pipes and no online mesurement is not envisaged. However Rota probs, Dirty Pitot tubes will be provided. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1448	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	2 of 96	2.01.00,viii.1	Software for determination of optimum Controller parameters	Please specify the intent of using optimum controller and its functionality requirement.	Bid specifications to be followed.
1449	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	5 of 96	2.03.02	However, control systems for BOP part of unit DDCMIS & Off-site DDCMIS shall be of same make & model and PLC systems as applicable for balance plant packages shall also preferably be of same make & model.	PLC systems as applicable may not be of same make and model. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1450	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	6 of 96	2.03.05	The Bidder shall provide HART based control systems only with suitable interface for unit DDCMIS for centralized configuration, maintenance, diagnosis & record-keeping for all electronic transmitters, control valves & analyzers with HART protocol.	Analyser are generally not available with HART protocol. Hence, bidder understands that analyzers with HART Protocol shall be provided as per availability in the market. Customer is requested to kindly confirm acceptance to our request.	Noted for analyzers only.
1451	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	6 of 96	2.03.03	The functional grouping of the above systems shall be as per the guidelines given in annexure – III of contract quantities for DDCMIS, Appendix I to part A.	Bidder shall try to adhere to the functional grouping guidelines given by the customer wherever possible. However customer is requested to accept functional grouping as per bidder's standard & proven practices also. Customer is requested to kindly confirm acceptance to our request.	Functional grouping included in tender is tentative. SG OEM standard functional grouping shall be reviewed and finalized during detailed engineering.
1452	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	8 of 96	2.08.02	For each of the DDCMIS/ DDCMIS based controls being provided for any system, 1 set of programming tool/laptop for each such system shall be provided to view & change logic/program/settings. The Bidder shall furnish a comprehensive list of such systems within 6 months of NOA.	DDCMIS based controls shall be from centralised engineering/programming stations.separate programming laptop is not appliable. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1453	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	10 of 96	3.00.00(q)	Coal Bunker Level Monitoring System (For each coal bunker of coal feeder using 3D type acoustic wave level transmitter – 1 No. and strain gauge method system – 1set.).	As per Bidder standard design, only One (1) no. of 3D Acoustic wave level transmitter is more accurate for each coal bunker level measurement compared to Strain Gauge method and hence bidder does not provide strain gauge measument. Customer is requested to kindly confirm acceptance to our request.	Noted.
1454	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	10 of 96	3.00.00(j)	On Line Carbon in Ash Analyzers System	On Line Carbon in Ash Analyzers System is not recommended by bidder as it is not proven for correct measurements.Hence bidder requests exclusion from its scope.Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1455	Vol. V: Part B	Ch 4: Main Equipment Related C&I system	10 of 19	4.13.00	The system shall utilize non sampling/extraction type microwave technology for online monitoring/measurement of the unburnt carbon in fly ash with minimum 4 nos. probes measurement to have complete profile per location.	On Line Carbon in Ash Analyzers System is not recommended by bidder as it is not proven for correct measurements.Hence bidder requests exclusion from its scope. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1456	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	14 of 96	4.00.00/Notes-6	For measurement of level of tanks/vessels/sumps containing oil, chemicals or water, Ultrasonic type level transmitters shall be provided. 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.	Bidder requests to accept additionally DP-Type , radar -type transmitters where ever suitable. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however the issue can be discussed during detailed engineering.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1457	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	14 of 96	4.00.00/Notes-7	Level switches / pressure switches / flow switches/any other process switch etc. for OLCS / Alarms / Interlocks / Protection. Pressure switches at inlet, outlet of individual pumps and discharge header of pumps for protection and auto start / stop & alarms shall be provided.	Bidder requests to accept additionally transmitters also for the said purpose. Customer is requested to kindly confirm acceptance to our request.	Noted.
1458	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	14 of 96	4.00.00/Notes-8	Level switches for sump/tank/vessel/container/heaters level high/normal/low/very low interlocks shall be provided.	Bidder requests to accept additionally transmitters also for the said purpose. Customer is requested to kindly confirm acceptance to our request.	Noted.
1459	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	14 of 96	4.00.00/Notes-10	DPG, DPT & DPS across the filters/strainers shall be provided.	DPT shall be provided across filters/strainers. Customer is requested to kindly confirm acceptance to our request.	Confirmed.
1460	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	15 of 96	4.00.00/Notes-18	Process switches like pressure switch, level switch etc. shall be provided with triple redundancy for all the applications required for Trip & protection of HT drives, boiler, Turbine & Generator and the applications, whose non-availability may lead to loss of generation. In addition, Transmitters & gauges shall also be provided for monitoring purpose. Further usage of switches for any other application based on functional/process requirement shall be decided by owner during detailed engineering.	As per bidder's standard and proven practice only transmitters are used for trip and protections instead of switches. Customer is requested to kindly confirm acceptance to our request.	Noted.
1461	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	15 of 96	4.00.00/Notes-19	Bidder to also refer Appendix V to Part A for further details of Field Instruments.	Appendix V not found in Vol V: Part A. Customer is requested to kindly provide these details.	Appendix V to Part A is not applicable and stands deleted
1462	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	17 of 96	7.04.00	Complete Instrumentation cables shall be armored.	Bidder requests to accept unarmoured cable for complete instrumention cables. Customer is requested to kindly confirm acceptance to our request.	Noted. However cables for CHP, PA system applications shall be armoured.
1463	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	17 of 96	7.05.00	Heat resistant instrumentation cable shall be provided for all instruments / equipment/ drives / devices located in hot areas such as Burner tilt, Hot air gates etc. This cable shall be laid from instruments / equipment / drives / devices from hot area application to a field JB / panel located in areas where ambient temperature is around 50 Deg. C.Heat resistant instrumentation cable shall have same specification as of instrumentation cable specified under Sub-Section chapter 9, Instrumentation and control Cables, Part-B of Technical specification, except that insulation and outer sheath material shall be Teflon. This cable shall be suitable for continuous operation at 205 Deg C.	Bidder clarifies that Heat resistant instrumentation cables are provided only in the Burner area. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1464	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	24 of 96	Appendix-I/Notes-2 and 3	Redundancy in binary outputs for OLCS drives: BOP System: For 10% of drives distributed in various functional groups (Exact application shall be finalized during detailed engineering.) Redundancy in analog outputs for CLCS drives: BOP System: For 10% of drives distributed in various functional groups (Exact application shall be finalized during detailed engineering.)	Redundancy in DO or AO in BOP System shall be applied only if the equipment trip results in loss of plant MW (double failures are not considered in design as per standard industrial design practice) as approved during detailed engineering, but in no case the quantity of redundant DO shall be higher than 10% of total DO and quantity of redundant AO shall be higher than 10% of total AO. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1465	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	24 of 96	1.01.00/b	Guidelines for functional grouping of controllers	Bidder shall try to adhere to the functional grouping guidelines given by the customer wherever possible. However customer is requested to accept functional grouping as per bidder's standard & proven practices also.	Functional grouping included in tender is tentative. OEM standard functional grouping shall be reviewed and finalized during detailed engineering.

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1466	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	26 of 96	Annexure-I	General I/O requirements	I/O modules will be as per proven DDCMIS OEM standard from Customer approved vendors. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1467	Vol. V: PART A & Part B/Ch 3: DDCMIS		11 of 96 & 79 of 86	4.00.00 (c)i	However, for temperature elements including bearing/ winding temp of motors / pumps temperature transmitters shall be provided, with philosophy as defined at e (i). & TABLE – 3.2:DRIVE CONTROL PHILOSOPHY (Typical)	As per Vol-V, Part-A, 4.00.00 ('e), bearing/winding temperature of motor/pumps shall be provided with Temperature Transmitter. Hence, 4-20 mA AI signal will be wired in the DCS. However "Table-3.2", indicates that RTD signal will be wired in the DCS for Pump/motor winding/bearing temperature. Both of the above mentioned statements are contradicting. Please accept 4-20 mA AI signal temperature transmitter output for RTD signals shall be connected to DDCMIS.	Specifications be followed as per TABLE – 3.2:DRIVE CONTROL PHILOSOPHY,Part B/Ch 3: DDCMIS,pg 79 of 86. Temperature transmitter shall be provided along with RTD / Thermocouple.
1468	Vol. V: PART A	DISTRIBUTED DIGITAL CONTROL, MONITORING & INFORMATION SYSTEM (DMIS)	28 of 96		Table Drive I/O	a.HPGCL shall provide the descriptions of the two(2) no of Analog input signals (4-20mA) mentioned for HT, LT , Elect Breakers(Non-Synch), Elect Breakers(Synch). b.Further, please clarify if the above mentioned Analog input signals are Galvanic type or non-galvanic type. c.Total no. of binary inputs for LT drives is indicated as 4, but No. of changeover input is indicated as 1 and No. of non-changeover input is indicated as 1 i.e. total 2 DIs. Please clarify. d.Total no. of binary inputs for MOD/MOV & MOVI/MODI drives are indicated as 4, but No. of changeover input is indicated as 1 and No. of nonchangeover input is indicated as 1 i.e. total 2 DIs. Please clarify. e.For AC-MOV1 & AC-MOV2 total number of binary input is indicated as only 2. Please recheck & clarify. For SG & SG BOP packages ,Bidder proposes to use the following no of hardwired signals as per standard and proven practice for each category of drive mentioned below, HT Motor (HT): DO-2 DI-2 DISOE-2 AI-1 LT Motor(LT)(Outgoing Breaker Operated Motor Feeder(90kw and above): DO-2, DI-3, DISOE-1, AI-1(case to case basis) LT Motor(LT)(Outgoing Breaker Operated Motor Feeder(30 kw upto 90kw): DO-2, DI-3, DISOE-1, AI-1(case to case basis) LT Motor(LT)(Outgoing Breaker Operated Motor Feeder(below 30 kw): DO-2, DI-3 Soot Blower Drive: DO-2, DI-4 Motor Operated Valve/Damper-On-Off type: DO-2, DI-3 Motor Operated Valve/Damper-Inching type: DO-2, DI-3, AI-1 Dual Coil Solenoid Operated Valve: DO-2, DI-3 Single Coil Solenoid Operated Valve: DO-1, DI-1 ERV: DO-1, DI-6, AI-2 FEGT: DO-3, DI-8, AI-2 Control Valve: AO-1, AI-1 Customer is requested to kindly confirm acceptance to our request.	Table Drive I/O Part A , pg 28 of 96 is deleted. Specifications be followed as per TABLE – 3.2:DRIVE CONTROL PHILOSOPHY,Part B/Ch 3: DDCMIS,pg 79 of 86. Drive control philosphy shall be finalized during detailed engineering.
1469	Vol. V: PART A & Vol. V:Part B/Ch 3: DDCMIS		28 of 96 & 79 of 86		Table Drive I/O & DRIVE CONTROL PHILOSOPHY(Typical)	Number of I/Os (for various drives), indicated in both the mentioned table are not at all matching. For example: As per "Table - Drive I/O's" the number of I/Os for HT drive are 6 DI & 2 DO & 2 AI. However, as per "Table-2" the number of I/Os for HT drive are 8 DI & 2 DO. Customer is requested to kindly confirm acceptance to our request.	Table Drive I/O Part A , pg 28 of 96 is deleted. Specifications be followed as per TABLE – 3.2:DRIVE CONTROL PHILOSOPHY,Part B/Ch 3: DDCMIS,pg 79 of 86. Drive control philosphy shall be finalized during detailed engineering.
1470	Vol. V: PART A		70 of 96	1.00.00	Separate sets of FG(s) are to be provided for each of the process blocks defined below. The functions of two different process blocks cannot be mixed.	Bidder shall try to adhere to the functional grouping guidelines given by the customer wherever possible. However customer is requested to accept functional grouping as per bidder's standard & proven practices also.	Functional grouping included in tender is tentative. SG OEM standard functional grouping shall be reviewed and finalized during detailed engineering.
1471	Vol. V: PART A		70 of 96	3.01.00	Guidelines for Functional Grouping of Controllers The stream wise process redundancy is to be maintained in SG C&I DDCMIS. That is, if there are more than one main equipment (e.g., A/B/C streams) in a process block, these are to be allocated to different FGs, unless allowed explicitly. In the FGs, thus obtained, main equipments of similar streams are to be allocated. For example, if one FG caters to stream-A main equipment	Bidder shall try to adhere to the functional grouping guidelines given by the customer wherever possible. However customer is requested to accept functional grouping as per bidder's standard & proven practices also. Customer is requested to kindly confirm acceptance to our request.	Functional grouping included in tender is tentative. SG OEM standard functional grouping shall be reviewed and finalized during detailed engineering.
1472	Vol. V: PART A		71 of 96	3.01.01	Burner Management System	Bidder shall try to adhere to the functional grouping guidelines given by the customer wherever possible. However customer is requested to accept functional grouping as per bidder's standard & proven practices also. Customer is requested to kindly confirm acceptance to our request.	Functional grouping included in tender is tentative. SG OEM standard functional grouping shall be reviewed and finalized during detailed engineering.
1473	Vol. V: Part B	Ch 1: General Information and Design Criteria	4 of 10	1.03.02	All the 4-20 mA output signals from transmitters/other control system shall be able to drive minimum 600 Ohms load resistance.	Please refer clause no:2.01.01 of Vol V:Part B/Ch 2: Field & Measuring Instruments Sheet | 2 of 64 where the minimum load impledence of the transmitters is mentioned as 500 ohms.Please clarify what is the final minimum load impedence value.	Bid specifications to be followed.
1474	Vol. V:Part B	Ch 1: General Information and Design Criteria	4 of 10	1.04.00	Bidder shall ensure that various C&I instruments /equipment like vibration monitoring system, 4-20mA 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 interchangeability and efficient spare parts management.	Bidder will try to minimize the different makes however It is not feasible to comply fully with this requirement owing to numerous packages and suppliers involved across the globe.	Bid specifications to be followed.

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1475	Vol. V:Part B	Ch 1: General Information and Design Criteria	7 of 10	1.07.01	ENVIRONMENTAL CONDITIONS IP32/42****** With a suitable canopy at the top to prevent ingress of dripping water.	Please note that DDCMIS Panels/ PLC panels, BMS/ BPS panels, Vibrations panels etc. located in air conditioned environment shall not be provided with canopy . Customer is requested to kindly confirm acceptance to our request.	Noted
1476	Vol. V:Part B	Ch 2: Field & Measuring Instruments	2 of 64	2.01.01/2	Accuracy:± 0.1% of calibrated span (minimum) (upto turn down ratio of 10:1).	Bidder understands that ± 0.1% accuracy is applicable for transmitters with turndown ratio of 5:1 as well.	Noted
1477	Vol. V:Part B	Ch 2: Field & Measuring Instruments	2 of 64	2.01.01/4	10:1 for vacuum/very low pressure applications. 5:1 for very high pressure application. 100:1 for other applications.	Customer shall define the measurement range for vaccum/very low pressure,very high pressure and other application transmitters. Customer is requested to kindly confirm acceptance to our request.	Bidder to follow their standard practice.
1478	Vol. V:Part B	Ch 2: Field & Measuring Instruments	8 of 64	2.05.00	Electronic Water Level Indicator Application - HP heaters & Boiler Separator Storage tank and Aux. Boiler Drum.	Bidder clarifies that electronic drum level indicator is not applicable for super critical boiler supplied by Bidder. Bidder will provide DP type level transmitters forwater separator level measurement as standard and proven practice . Customer is requested to kindly confirm acceptance to our request.	Noted
1479	Vol. V:Part B	Ch 2: Field & Measuring Instruments	9 of 64	2.06.01 (9)	Sheath 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. Customer is requested to kindly confirm acceptance to our request.	Sheath OD shall be finalized based on the Thermo well sizing calculation during detailed engineering.
1480	Vol. V:Part B	Ch 2: Field & Measuring Instruments	12 of 64	2.06.03	Metal Temperature Thermocouple 5) Protective sheath - SS321 6) Protective sheath dia - 8 mm OD 11) Length of T/C - Minimum 30 Mtr	Bidder clarify that Protective sheath material, diameter & Length shall be as per OEM proven standard practice.	Sheath dia shall be finalized based on the Thermo well sizing calculation during detailed engineering.
1481	Vol. V:Part B	Ch 2: Field & Measuring Instruments	13 of 64	2.06.05	TEST THERMOWELLS (TW) Applicable Standard:ASME PTC 19.3 TW - 2010	TEST THERMOWELLS (TW) will be as per ASME PTC 19.3 TW - 2016. Customer is requested to kindly confirm acceptance to our request.	Noted
1482	Vol. V:Part B	Ch 2: Field & Measuring Instruments	24 of 64	2.12.01	Orifice Plate: Root valve material:316 SS	Root valve material shall be as per piping design, and not necessarily SS316. Customer is requested to kindly confirm acceptance to our request.	Noted
1483	Vol. V:Part B	Ch 2: Field & Measuring Instruments	39 of 64	2.14.00	Solenoid valves shall be provided as per NAMUR standard with control valves / pneumatic control valves hooked up with process interlock requirements and where direct tripping is involved. The number of ways for solenoid valve shall be provided as indicated below:	Bidder clarifies that Solenoid valves are not NAMUR type as per bidder standard and proven practice. Customer is requested to kindly confirm acceptance to our request.	Noted
1484	Vol. V:Part B	Ch 2: Field & Measuring Instruments	39 of 64	2.14.00	For operation of the fuel oil corner nozzle valves, fuel oil trip valves etc., double coil solenoid valve (latch coil & relatch coil) shall be adopted. Single coil usage requires always power and loss of power leads to closure of above valves resulting the unit trip or loss of generation.	Bidder clarifies that Double / Single coil solenoid valve shall be selected based on the application requirement. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1485	Vol. V:Part B	Ch 2: Field & Measuring Instruments	50 of 64	2.19.06	One number each Integral Operating Work station separate for ESP control room, for ash Handling system control room, FGD control room and at CHP control room for coal bunkers.	Bidder clarifies 1 no. of work station shall be provided for Coal Bunker Level Monitoring at Unit CCR. Any connectivity required to CHP control room shall be taken from the above work station through station LAN. Customer is requested to kindly confirm acceptance to our request.	Noted.
1486	Vol. V:Part B	Ch 3: DDCMIS	4 of 86	3.07.00	Signal Exchange: In case a controller utilizes some inputs generated/processed by any other controller/functional group and the requirement of controller response time is not met due to inadequate communication rate/procedure, then hardwired signal exchange shall be provided for such inputs. Control & protection signal exchange between any functional groups controllers and sub systems shall be hardwired only.	Control, protection and monitoring signal exchange between any functional groups controllers and sub systems on the same network of same make systems shall be soft signals instead of hardwired as per bidder's standard and proven practice. Customer is requested to kindly confirm acceptance to our request.	Communication between FGs of different sets of controllers shall be through DDCMIS network.
1487	Vol. V:Part B	Ch 3: DDCMIS	5 of 86	3.08.07	Twenty(20) percent spare relays wired of each type and rating, mounted and wired in relay cabinets. All contacts of relays shall be terminated in terminal blocks of relay cabinets. In each of the relay cabinets, 10 % spare terminal blocks shall be provided so that additional relays can be mounted and wired.	As per Volume VII C&I TD wiring drawings, and Volume V Part A, interposing relays are part of SWGR/ MCC. Spare clause are not applicable for these relays which are not part of DCS panels. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1488	Vol. V:Part B	Ch 3: DDCMIS	6 of 86	3.12.02	**System Programming & Documentation Facility** In addition, latest state of the art work-station based system documentation facility shall be provided to generate, retrieve, store & all system documentation, logic, control loops, cable interconnection, etc. to achieve paperless documentation for the complete plant.	Bidder clarifies that these requirements for SG-DCS shall be provided based on the features available from the Customer approved DCS supplier's. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1489	Vol. V:Part B	Ch 3: DDCMIS	7 of 86	3.17.01(k)	Monitor sensor wire break/open circuit/short circuit and take suitable actions in logic/loop. (This will include blocking of trip signals in case of RTD failure).	Bidder clarifies only either NO or NC contacts are used for binary signals for interlock, protection and monitoring. Customer is requested to kindly confirm acceptance to our request.	Noted.

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1490	Vol. V:Part B	Ch 3: DDCMIS	7 of 86	3.17.01(O)	Galvanic/optical channel to channel Isolation shall be built in Module. The current limitation shall not be considered as channel isolation.	Incase Galvanic/optical channel to channel isolation is not in built in Module, then external isolation barrier can be used for 4-20mA Live Analog input signals. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1491	Vol. V:Part B	Ch 3: DDCMIS	7 of 86	3.17.00	Analog signal conditioning & processing	Analog I/O modules will be as per proven DDCMIS OEM standard from Customer approved vendors. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1492	Vol. V:Part B	Ch 3: DDCMIS	8 of 86	3.18.00	Binary signal conditioning & processing	Binary I/O modules will be as per proven DDCMIS OEM standard from Customer approved vendors. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1493	Vol. V:Part B	Ch 3: DDCMIS	10 of 86	3.20.02	b.Triple/dual analog sensors are required both in CLCS and OLCS for control purpose, then all of these triple/dual sensors shall be wired to the controller where CLCS loop is configured. If based on the same set of sensors, any protection action is required in OLCS (e.g., protection stop of drive) in another controller(s), then CLCS Controller shall provide three digital outputs for each such controller from three separate output modules (at defined LVM-Limit Value Monitor blocks inside Controller). The three such digital outputs of CLCS controller shall be acquired in each of the OLCS controllers in three separate digital input modules. Similar philosophy will be used when triple/dual analog sensors are required in OLCS in multiple controllers for protection function. C. If triple/dual/single binary sensors are required in OLCS in multiple controllers for protection function in these controllers, each of these sensors shall be shared among these controllers. Each of these sensors shall be directly shared from marshalling TBs without any 'active' multiplying hardware ('active' defined as hardware which requires a separate power supply for its functioning). Further, removal/insertion of any of such multiple modules shall not affect availability of such signal(s) to other modules.	Controller and control bus spare capacities as per contract are already ensured, and also the control bus is redundant. Hence, any signal interface required between controllers shall be through the reliable control bus only. Customer is requested to kindly confirm acceptance to our request.	b) Bid specifications to be followed. c) Signal exchange for protection, hardwired of drives between controllers shall be through I/O modules instead of marshalling TBs.
1494	Vol. V:Part B	Ch 3: DDCMIS	10 of 86	3.20.02	Triple/dual analog sensors are required both in CLCS and OLCS for control purpose, then all of these triple/dual sensors shall be wired to the controller where CLCS loop is configured. If based on the same set of sensors, any protection action is required in OLCS (e.g., protection stop of drive) in another controller(s), then CLCS Controller shall provide three digital outputs for each such controller from three separate output modules (at defined LVM-Limit Value Monitor blocks inside Controller). The three such digital outputs of CLCS controller shall be acquired in each of the OLCS controllers in three separate digital input modules.	Control, protection and monitoring signal exchange between any functional groups controllers and sub systems on the same network of same make systems shall be soft signals instead of hardwired as per bidder's standard and proven practice. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1495	Vol. V:Part B	Ch 3: DDCMIS	41 of 86	3.43.04	The soot blowing system shall be fully automatic & sequentially controlled through SG C&I control system. Alternately, a SMART soot blowing system based on heat flux sensors and flue gas exit temperature may be implemented with a fall back to sequential control, if required. Soot blower Control (SBC) system complete with provision for individual operation of any soot blower and facility to bypass any soot blower shall be provided with following:	Conventional soot blowers shall be provided as per bidder standard proven practice. Customer is requested to kindly confirm acceptance to our request.	Noted. However, sootblower system shall be fully automated and sequentially controlled through SG C&I control system.
1496	Vol. V:Part B	Ch 3: DDCMIS	60 of 86	3.49.02	The Servers/Workstations/PCs/Laptop to be provided by the Bidder should be latest available in the market at the time of supply to prevent early obsolescence and shall be subject to Owner's approval. The software packages to be included with the server/OWS/PCs shall also be the latest version available at the time of supply.	The Servers/ Workstations/ PCs/ Laptop & software package shall be of latest version available at the time of placement of order. Customer is requested to kindly confirm acceptance to our request.	For DDCMIS/PLC based system/packages, bidder to follow specifications of work stations/servers/laptops as specified in Cl.No.3.49.03, Chapter-3/Part-B, Vol-V. For non-DDCMIS/Non-PLC packages, minimum requirement for servers / work stations shall be i7 type or higher.
1497	Vol. V:Part B	Ch 3: DDCMIS	68 of 86	3.50.00	Intelligent SNMP manageable mini-UPS for 60 minutes backup shall be provided with all accessories and software.	As the Main Plant UPS is considered for all OWS/Server/Programming Stations, separate mini UPS will not be envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1498	Vol. V:Part B	Ch 3: DDCMIS	73 of 86	3.52.01	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 process and C&I expert. Once PID is tuned the same shall not be disturbed and autotune may jeopardize the plant operation and control stability.Hence automatic tuning is not required. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1499	Vol. V:Part B	Ch 4: Main Equipment Related C&I system	1 of 19	4.01.04	In case of tangentially fired boiler, the Bidder shall arrange flame detectors in such a manner that coal flame detectors are available both above and below each coal burner and separate oil flame detectors are provided for each oil burner. In case Bidder has discriminating type flame detectors capable of detecting and discriminating both oil and coal flame, with the help of a single scanner, the same can also be utilized for monitoring both oil and coal flame per burner. For any other type of firing i.e. non-tangential type the flame detectors shall be provided for each coal and oil burner responding only to the flame of its associated burner.	Bidder clarifies that as per OEM boiler design, flame detectors both above or below each coal burner are not required.In each windbox there are two coal burnes and in between there is one oil burner each associated with one flame scanner. Customer is requested to kindly confirm acceptance to our request.	Noted

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1500	Vol. V:Part B	Ch 4: Main Equipment Related C&I system	5 of 19	4.07.01	Bidder shall include in his proposal a Furnace and flame viewing system. The flame cameras shall be suitable for direct online continuous viewing in the central control room of the coal and oil flame and condition of the furnace internals including slagging of the water walls and any other deterioration in the furnace condition. The nos. and type of such flame cameras to be included in the proposal shall be selected by the bidder appropriate to his boiler design subject to minimum 4 nos. camera. Separate set of cameras shall be provided for viewing flame and furnace internals based on proven technology for the intended application. The system shall comply to NFPA requirements.	Bidder clarifies that as per OEM boiler design, two cameras are provided which is adequate to meet operational and functional requirement. Customer is requested to kindly confirm acceptance to our request.	Noted
1501	Vol. V:Part B	Ch 4: Main Equipment Related C&I system	9 of 19	4.12.00	Two nos. of 3D Acoustic wave level transmitters shall also be employed for measuring the levels of coal bunker available above the coal feeder/mill. In addition to above, Coal bunker level monitoring system (strain gauge type level measurement) shall also be supplied resulting in triple redundant measurement. Median or average coal bunker level will be chosen for monitoring and for process operations.	Only 2 no of 3D Acoustic wave level transmitter for coal bunker level monitoring shall be provided which is adequate. Customer is requested to kindly confirm acceptance to our request.	Noted.
1502	Vol. V:Part B	Ch 8: Process Connection and Piping	3 of 11	8.02.03	1/4-inch size light drawn tempered copper/SS tubing conforming to ASTM B75 shall be used. It shall be at least 0.065 inch and shall be PVC coated.	PVC coating is not applicable for SS tubing. Kindly, confirm this understanding.	Noted
1503	Vol. V:Part B	Ch. 9– Instrumentation & Control Cables	3 of 36	9.01.03.11	All type of the cables used for emergency trip push buttons, Fire alarm, detection & protection system, safety critical circuit, trip protection circuit and for other services specified elsewhere in the specification shall be fire survival cable conforming to IEC 60331, BS6387 (CWZ), BS6207 standard and this specification. The instrumentation cables in the other area shall be FRLS conforming to IEC 60332 standards and this specification.	Fail safe contacts and fail safe interlocks on bad value analog signals (i.e. trip will actuate in case of power failure or cable cut) are used for Emergency trip push buttons, safety critical circuit, and trip protection circuit, hence FRLS type cables shall be used without the need of fire survival cables. Customer is requested to kindly confirm acceptance to our request.	In clause 9.01.03.11 of Ch-9 at Sheet 3 of 36 in Vol-V, the words "emergency trip push buttons" be read as "emergency turbine trip push buttons".
1504	Vol. V:Part B	Ch. 9– Instrumentation & Control Cables	3 of 36	9.01.03.15	All wiring leaving a junction box or enclosure shall leave from terminal blocks and not from other devices in the enclosure.	TBs inside enclosure/ racks are not applicable as each instrument head has a dedicated cable entry, and this would reduce a un-necessary break junction point in the cable circuit. Customer is requested to kindly confirm acceptance to our request.	Noted.
1505	Vol. V:Part B	Ch. 9– Instrumentation & Control Cables	26 of 36	9.07.00/9	Optical fiber cables (OFCs): Inside Building Area – to be laid on separate cable sub-trays	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. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1506	Vol. V:Part B	Ch 11: Control Valves With Actuators	2 of 10	11.02.04	All SH/RH block valves, shut off valve of LDO & HFO and HP/LP bypass control valve shall have leakage class MSS-SP-61.	Bidder clarify that leakage class MSS-SP-61 is applicable only for On-Off valves. The same is not envisaged for Control Valves. Customer is requested to kindly confirm acceptance to our request.	Noted
1507	Vol. V:Part B	Ch 11: Control Valves With Actuators	5 of 10	11.06.00	The travel time of the pneumatic actuators shall not exceed 10 seconds.	Travel time may not be limited to 10 secs based on valve design and process application. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1508	Vol. V:Part B	Ch 11: Control Valves With Actuators	5 of 10	11.07.02	Separate moisture separator unit for ensuring dryness of air entering I/P as well as the power cylinder is to be supplied with each control valve and control damper.	Dry Instrument Air is supplied to each control valve. Hence, separate moisture separator is not applicable. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1509	Vol. V:Part B	Ch 11: Control Valves With Actuators	9 of 10	11.09.01/2	General Requirements for Critical Application Control Valves -. Valve Trim:Trim of severe/critical service valve shall be of multi stage & multi path design with sufficient no. of discrete pressure drop stage to eliminate the chance of erosion, cavitations, noise, vibration through out the control range of valve.	Valve design shall be as per OEM standard based on the process requirement. Customer is requested to kindly confirm acceptance to our request.	Noted
1510	Vol. V:Part B	Ch 11: Control Valves With Actuators	9 of 10	11.09.01/4	General Requirements for Critical Application Control Valves -. Actuator:Actuator type should be pneumatic double acting piston/electro-Hydraulic. All the control valves, isolation, block valves and bypass valves with HP bypass and LP bypass system shall also be provided with electro-hydraulic actuators only.	Only Water separator control valves shall be electro-hydraulic and all other control valve shall be pneumatic in the Boiler area. Customer is requested to Customer is requested to kindly confirm acceptance to our request.	Noted
1511	Vol. V:Part B	Ch 14: Annexure-A Control System for BOP/Offsite Packages	10 of 12	General-9	For each PLC and Microprocessor based control system, without OEWS (Operating cum Engineering Work Station), Laptop along with software shall be provided for engineering. In addition, LAPTOPs shall be provided as per above Table in Annexure A.	1 common laptop with engineering license for all same make PLCs shall be provided. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1512	Vol. V:Part B	Ch 15: Environment Monitoring Systems	4 of 26	15.01.03/14	For Hot-extractive sampling type and Dilution extractive type systems, the entire system including analysers, sample handling/ conditioning system etc offered shall be sourced from/assembled at Original Analyser manufacturer (OAM) works i.e., all components involved shall be imported or sourced from OAM only and no indigenous component shall be used.	Please note that sample handling system shall be sourced from approved local sub vendors of original analyzer manufacturer (OAM). Customer is requested to kindly confirm acceptance to our request.	Clause 15.01.03/14 (Last para) at Sheet 4 of 26 of Chapter 15, Part-B in Vol-V be read as under:- "For Hot-extractive sampling type and Dilution extractive sampling type systems- the components involved in sample handling system shall be sourced from Original Analyser Manufacturer (OAM) approved reputed suppliers having successful trouble free operations duly certified by OAM. Further, sampling handling system design shall be vetted by OAM. Neccessary 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 OAM works shall also be accepted".
1513	Vol. V:Part B	Ch 15: Environment Monitoring Systems	17 of 26	15.02.25	The analysers must function properly in Indian conditions without any defect between 0 to 50 deg C ambient temperature, 0 to 100% relative humidity and in high ambient dust level.	Since analyesers are located in Air-conditioned area , requirements of this clause is not applicable. Customer is requested to kindly confirm acceptance to our request.	Panel mounted analysers shall be supplied along with in built panel mounted AC units.
1514	Vol. V:Part B	Ch 17: Quality Assurance and Testing and Guarantees	3 of 32	17.02.04.05	All instruments and control equipment supplied against this contract shall be factory calibrated at least at five (5) points through out the range and checked for their functional/performance requirements. The instruments shall also be calibrated at site prior to commissioning.	Bidder wants to claify that 5 point calibration is not applicable for all instruments & control equipment. 3 point calibration shall also be considered. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed. The issue can be discussed during detailed Engineering.
1515	Vol. V:Part B	Ch 18: Control Philosophies for BOP Packages	2 of 34	18.02.01/ii	Wagon tippler PLC Connectivity: All time critical, interlock, control & protection signals will be hardwired to Main CHP DDCMIS which shall be decided during detailed Engineering.	There will be Soft-link Connectivity between Wagon Tippler & CHP DDCMIS,which will serve the Process requirement. Hence, we are not considering any hard-wiring due to long-distance between main CHP Control Room & Wagon Tippler Control Room . Customer is requested to kindly confirm acceptance to our request.	Bid pecifications to be followed.
1516	Vol. V	Ch 23: Material Supply, Ware Housing, Erection, Testing and Commisioning	7 of 20	23.02.03	All tubings and fittings shall be of 316 SS as a minimum.	Bidder wants to clarify that tubings & fittings material will be as per process temperature & pressure as SS316 is not recommened for 600 degree temperature and above. Customer is requested to kindly confirm acceptance to our request.	Bid pecifications to be followed.
1517	Vol VII	Flow Diagram-Air & Flue Gas	17 of 120		-	The no of CO analyzers(3 no LHS & 3 no RHS) at Eco Outlet, O2 analyzers (3 no LHS & 3 no RHS) at Eco Outlet shown in the Flow diagram is not matching with the no of CO anlyzers, O2 analyzers at the ECO Outlet listed in the "List of Flue Gas Analyzers" mentioned in the Vol V:Part A Sheet 47 of 96/G1. HPGCL shall confirm that the "List of Flue Gas Analyzers" mentioned in the Vol V:Part A Sheet 47 of 96/G1" is final. Customer is requested to kindly confirm acceptance to our request.	Specifications be followed as per Table against G1 at Sheet 47 of 96 in Vol-V/ Part-A.
1518	Vol VII	DWG. NO:114-04-0102	75 of 120	-	Steam tracing	Steam tracing is not applicable for this project site ambient. Customer is requested to kindly confirm acceptance to our request.	Noted
1519	Vol VII	DWG. NO:114-04-0107	81 of 120	-	Vent connection in air service hook-up.	Vent connection in air service hook-up is not applicable. Customer is requested to kindly confirm acceptance to our request.	Noted
1520	Vol VII	DWG. NO:114-04-0108	82 of 120	-	Vent connection in upper impluse line of level instrument connection.	Vent connection in upper impulse line of level instrument connection is not applicable as the upper impulse line is connected to the tank for natural venting.Vent connection shall be required only if a local high point is created in the level instrument chamber, as shown in the DWG. No:114-04-0110. Customer is requested to kindly confirm acceptance to our request.	Noted
1521	Vol VII	DWG. NO:114-04-0111	85 of 120	-	M33x2 stub	Per ASME B31.1 power piping, ASME B1 20.1 NPT stubs shall be acceptable. Customer is requested to kindly confirm acceptance to our request.	Noted
1522	Vol VII	DWG. NO:114-04-0103	66 of 120	-	Tender Drawings for C&I- BMS Configuration shown as TMR configuration for BMS control system and other SG blocks	Bidder clarify that BMS control system and other SG blocks are Non SIL system which will not be in TMR configuration. Only BPS is considered as TMR configuration and SIL certified. Customer is requested to kindly confirm acceptance to our request.	Noted
1523	Vol VII	DWG. NO:111-01-1000	15 of 120	-	Flow Diagram-Pulveriser (Vertical Mill): Venturi is indicated at pulverizer inlet 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. Customer is requested to kindly confirm acceptance to our request.	Bid Specifications to be be followed, however the issue may be discussed during detailed engineering.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1524	Vol VII	DWG. NO:111-01-1200	17 of 120	-	Flow Diagram-Air and Flue gas : Aerofoil is indicated before windbox inlet for combustion air.	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. Customer is requested to kindly confirm acceptance to our request.	Bid Specifications to be be followed, however the issue may be discussed during detailed engineering.
1525	Volume V / Instrumentation & Control Works / Part B	Ch 2: Field & Measuring Instruments	4 of 64	2.02.00	Sensing Element and Material for Temperature gauge mentioned as 'Mercury in Steel for below 450°C'....	Bidder would like to clarify that due to safety concerns Mercury in steel is not supplied by manufacturers, Kindly accept 'Inert gas type Temperature gauge' for temperatures below 450°C also	Noted
Steam Generator & Associate Auxiliaries							
1526	Volume-II / General & Schedules	Chapter-8	54 of 57	8.0	8.0 LIQUIDATED DAMAGES FOR SHORT FALL IN EQUIPMENT PERFORMANCE If the guarantees specified at clause 6.2 are not achieved by the Bidder in the performance guarantee test or within 90 days or a reasonable period thereof allowed by the Owner after notification by the Owner, 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 listed herein above against the Bidder and such amounts calculated at the rates specified in Cl.3.2 above for shortfall in performance shall be deducted from the contract price (provided the shortfall is less than or up to 25% of Contract Price) :	Customer is requested to note that this clause is contradicting with the total liquidated damage for shortfall in performance guarantee provided in cl. No. 20.2.2, Page 34 of 80, Volume-I (GCC). Also, we would like to highlight that the total liquidated damage for shortfall in performance guarantee limit is very high. Hence, we request Customer to kindly restrict the aggregate liability to pay liquidated damages for shortfall in performance guarantee to Fifteen percent (15%) of the Contract Price. Kindly confirm acceptance to our request.	Bid specifications to be followed.
1527	Volume-I / Conditions of Contract: Commercial & General / Section – II ITB	Annexure-1	57 of 75	-	(C) Thermal Sector Minimum Local Content defined for various auxiliaries for boiler, ESP, Turbine, Generator, CHP, C&I, AHP, Raw Water Intake & supply system, CW & ACW system, Air Condition & Ventilation System, FGD. (E) Minimum Local Content Percentages in Engineering, Procurement & Construction (EPC) / Turnkey Project In case the Contract is awarded through the EPC route, the contractor should comply with the requirement of MLC for individual items as listed in Annexure-I and should purchase these items only from Class-I Local supplier. In addition, MLC for complete EPC project may also be prescribed as below: 1) Package based work (Boiler) - Minimum local content 60% 2) TG System (Water Cooled Condenser) - Minimum local content 60%--------- j) All equipment/materials/parts/items required in this package which are domestically manufactured with sufficient domestic capacity as identified in Annexure-I of MOP order dated 16/11/2021 including its subsequent revisions (copy attached as Appendix-II) shall necessarily be sourced from the class-I local suppliers only as per the extant provisions of the Public Procurement (Preference to Make in India) Orders issued by DPIIT and MoP. Any violation w.r.t Make in India and minimum local content (MLC) requirements as specified shall be sole responsibility of the Bidder.	Customer is requested to note that HPGCL Yamunanagar Tender Specification is issued on EPC turnkey package basis. Bidder can confirm the Minimum Local Content percentage for EPC turnkey package basis only as mentioned in clause no. (E) of Annexure-1 and not as per clause no. (C) for individual items/auxiliaries as mentioned in Clause no. (C) (Thermal Sector). Therefore, Bidder understands that the Minimum Local Content will be applicable on EPC package basis only as defined in Clause no. E (Minimum Local Content percentages in EPC/Turnkey package), Page 60 of 75, Annexure-I to Conditions of Contract: Commercial & General. Kindly confirm the acceptance of our understanding.	Bid specifications to be followed.
1528	Volume-II / General & Schedules	Chapter-5	30 of 86	29.3	Four (4) man month and two (2) man month training for OWNER Engineering Personnel on the offered CFD modelling code for SG & ESP including alternative geometry modeling technique shall be provided.	Such requirement is not applicable for Steam Generator & associated auxiliaries. Customer is requested to kindly delete this requirement.	Noted, however, 60 man months remains not changed.
SG & Associated Auxiliaries - Mechanial							
1529	Volume II General & Schedules	Ch 1 : Intent of specification	1 of 10	1.1	Scope of the proposal The scope of the proposal comprises----------including s**upply of special tools & tackles, mandatory spares for three (3) years operation and maintenance & recommended spares for** "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" Haryana, India	Bidder will provide spare items as per as applicable to the bidder/OEM standard practice. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1530	Volume II General & Schedules	Ch 1 : Intent of specification	4 of 10	1.5	Scope of the proposal This enquiry concerns one (1) power generating unit having a rated output of 800 MW, including but not limited to: ☐ Steam Generator and Auxiliaries including SCR system along with ammonia unloading, storage & handling system, cyclone separators etc.,	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1531	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	19 of 186	1.16	5) Flue gas duct from economizer outlet to each cyclone separator inlet, from each cyclone separator outlet to each SCR reactor inlet,	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1532	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	28 of 186	1.29.1	**Selective Catalytic Reduction System (SCR)** The scope of supply include design, engineering, manufacture, supply, erection, commissioning and testing of complete mechanical, electrical, ..., Cyclone Separators complete in all respects with all components and accessories etc., for one (1) steam generator as detailed in this specification	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1533	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	28 of 186	1.29.2	**Selective Catalytic Reduction System (SCR)** The scope of supply identified for SCR System along with ammonia unloading, storage and handling system, **Cyclone Separators** here are minimum requirements and unless excluded from the contractor's scope as per Terminal points and Exclusions, ... also be included in the scope of the contractor.	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1534	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	28 of 186	1.29.3	**Selective Catalytic Reduction System (SCR)** The scope of contractor for SCR System along with ammonia unloading, storage and handling system, Cyclone Separators shall include all items.	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1535	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	29 of 186	1.29.4	**Selective Catalytic Reduction System (SCR)** The scope of supply and services for SCR System along with ammonia unloading, storage and handling system, Cyclone Separators for each unit shall include all items indicated below but will not be limited to that.	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1536	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	29 of 186	1.29.5	1)Flue gas from downstream of economizer shall be taken through two (02) independent streams. Each stream shall have one (01) number of cyclone separator and one (01) number of SCR Reactor. Cyclone Separator shall be used to reduce inlet dust concentration at the inlet of SCR reactor.	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1537	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	31 of 186	1.29.6.1, vi)	c) Isolation gates at inlet of cyclone separator,	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1538	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	31 of 186	1.29.7	**Cyclone Separators** i) Two (02) independently operated Cyclone Separators housed in independent casings shall be provided including outside shell, structural steel supports and frame work, stiffeners, bracings, access ladders, platforms, safety rails, stairways, walk ways, access doors, insulation etc. One (01) cyclone separator shall be provided in each stream of flue gas duct from economizer outlet to SCR reactor inlet	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1539	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	31 of 186	1.29.7	**Cyclone Separators** iii) Sampling ports for off-line measurement of ash concentration in flue gas at the inlet and outlet of Cyclone separators.	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1540	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	92 of 186	12.1	**Fan Sizing Criteria** **ID Fans** **60% BMCR LOAD(one stream operation)** f) Pressure drop through Cyclone Separator - 50 mmWC or actual whichever is higher	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1541	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	93 of 186	12.2	**Fan Sizing Criteria** **ID Fans** **50% BMCR flow** 8) Pressure drop through Cyclone Separator - 50 mmWC or actual whichever is higher	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1542	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	123 of 186	23.1.1,1)	1)Cyclone Separator shall be provided in the flue gas duct between economizer and SCR reactor to reduce the dust burden.	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1543	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	125 of 186	23.1.1,9)	**Integration with other systems** a) The ash from **cyclone separator** b) The service air, instrument air, auxiliary steam, various types of water required for the SCR system and **cyclone separator** shall be integrated as ..... Exclusion	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1544	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	134 of 186	23.1.4,1)	**DUCTING SYSTEM** The ducting system for the SCR system shall connect the steam generator outlet (gas side economizer outlet) to the reactor through the cyclone separator	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1545	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	136 of 186	23.1.4,13)	**Cyclone Separator**	Customer is requested to note that cyclone separator is not applicable for SCR system as per Customer design. Hence, the same shall not be provided. Customer is requested to kindly confirm acceptance to our request.	Noted.
1546	Volume II General & Schedules	Ch 2 : Project Information	3 of 10	3.00	Plant Rating, Capacity, Availability, PLF The VWO capacity of the steam turbine 800 MW will be 105% or 840 MW and the Boiler maximum Continuous Rating (MCR) will be established to match the steam requirement at VWO conditions.	BMCR steam flow parameter requirement is different between the referred clauses. Bidder proposes to consider the BMCR parameter for steam generator as follows inline with the practice followed by most of the centre & state electricity boards including NTPC. Steam flow at superheater outlet : 102% of the turbine VWO steam flow requirement, actual condenser pressure, 0% make up, optimized feedwater temperature, rounded to next integer divisible by 5. Please confirm acceptance. Refer Annexure-M6 for the same	Clause 1.3 of Section-II at Sheet 37 of 186 of Vol-III be read as under:- "Steam flow at superheater outlet at BMCR shall be 1.02 times the steam flow at turbine VWO condition plus continuous auxilary steam requirement of unit at TMCR, rounded to next integer divisible by 5".
1547	Volume III Mechanical works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	37 of 186	1.3	BMCR Parameters 1. Steam flow at superheater outlet at BMCR is atleast 102% of the turbine VWO steam flow requirement at worst condenser pressure and 1% make up, rounded to next integer divisible by 5		
1548	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	1 of 57	1.2	General The term "BMCR" (Boiler Maximum Continuous Rating) appearing in the Technical Specification shall mean the maximum continuous steam output of Steam Generator ("As guaranteed") at super heater outlet at rated parameters.		

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1549	Volume II General & Schedules	Ch 3: Operating Capability of Plant	2 of 4	3.3	The major operating capabilities for the unit(s)/plant shall be as follows: (p) Plant shall be designed to give life of not less than 25 years. Further, expected numbers of Steam Turbine Generator startups during design life are as follows: Type of starts Number of starts Hot Start 4000 Warm start 1000 Cold start 250	Discrepancy has been observed in the technical specification regarding number of start for Hot, Warm and cold start up Hence Bidder's proposal for number of start-up is as follows, which shall be as per CEA guidelines. i. Hot start (after shut down period less than 10 hours) - 4000 ii. Warm start (after shut down period between 10 hours and 72 hours) - 1000 iii. Cold start (after shut down period exceeding 72 hours) - 150 Customer is requested to kindly confirm acceptance to our request.	In Clauses 1.1.7.1 of Chapter-2 at Sheet 14 of 87 in Vol-III and Clause 3.3 (p) of Chapter-3 at Sheet 2 of 4 in Vol-II, Number of Start ups be read as: Cold : 150, Warm : 1000, Hot : 4000.
1550	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 41 of 186	1.10	i. Hot start (after shut down period less than 10 hours) - 4500 ii. Warm start (after shut down period between 10 hours and 72 hours) - 1000 iii. Cold start (after shut down period exceeding 72 hours) - 455	Discrepancy has been observed in the technical specification regarding number of start for Hot, Warm and cold start up Hence Bidder's proposal for number of start-up is as follows, which shall be as per CEA guidelines. i. Hot start (after shut down period less than 10 hours) - 4000 ii. Warm start (after shut down period between 10 hours and 72 hours) - 1000 iii. Cold start (after shut down period exceeding 72 hours) - 150 Customer is requested to kindly confirm acceptance to our request.	In Clauses 1.1.7.1 of Chapter-2 at Sheet 14 of 87 in Vol-III and Clause 3.3 (p) of Chapter-3 at Sheet 2 of 4 in Vol-II, Number of Start ups be read as: Cold : 150, Warm : 1000, Hot : 4000.
1551	Volume II General & Schedules	Ch 3: Operating Capability of Plant	4 of 4	3.8	Analysis of designs shall include CFD and FEM investigations. The bid proposal may be developed by the bidder based on earlier studies/ investigations. CFD studies and FEM investigation shall be specifically carried out for the equipment/component selected/designed for the subject project/package. Necessary reports for the analysis (CFD and FEM) shall be furnished to the employer. The performance data required for the analysis shall be developed using dynamic modelling for the steam generator. Visual/NDE protocols additionalities for critical components/equipment, analysis of fatigue damage and load cycling consideration as per the BS-EN 12952-3 or other equivalent code or other equivalent code etc. Results of design analysis which are required to be submitted	As per bidder standard design CFD analysis studies/ investigations is not envisaged for equipment/component. Customer is requested to kindly confirm acceptance to our request.	CFD analysis to be carried out as per specifications in Vol-III.
1552	Volume II General & Schedules	Ch 3: Operating Capability of Plant	4 of 4	3.9	Provision for life consumption/Equivalent Operating Hours (EOH) of critical components due to Creep & Fatigue shall be made available online (display in CCR) for Operating personnel. Also program/measures shall be made available online (display in CCR) to guide the operating personnel for maintenance planning.	As per bidder standard design, Provision for life consumption/Equivalent Operating Hours (EOH) evaluation is not envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1553	Volume II General & Schedules	Ch 5 : General Technical Requirement	5 of 86	8.6.1	Basic Engineering Documentation Prior to commencement of the detailed engineering work, the Bidder shall furnish a Plant Definition Manual within 4-6 weeks from the date of the LOI. This manual shall contain the following as a minimum.	The document submission will be as per mutual agreed and approved master document list (MDL). Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, hpwever the issue may be discussed during detailed engineering.
1554	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	2 of 57	2.1	Performance Guarantees/Performance Tests General Requirements 9. Tools and tackles, thermowells (both screwed and welded) instruments/devices including flow devices, matching flanges, impulse piping & valves etc. and any special equipment, required for the successful completion of the tests, shall be provided by the Bidder free of cost.	The special instrument used for performance guarantee test will be taken by bidder after completion of test. Customer is requested to kindly confirm acceptance to our request.	Noted for clause 2.1 (9) of Chapter-8 at Sheet 2 of 57, Vol-II only.
1555	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	4 of 57	3.1	Guarantees Under Category-I i. Turbine Cycle Heat Rate a) Turbine Cycle heat rate in kcal/kWhr under rated steam conditions at guaranteed condenser pressure with zero make up at 440 MW unit load (i.e. 55% of rated load). b) Turbine Cycle heat rate in kcal/kWhr under rated steam conditions at guaranteed condenser pressure with zero make up at 800 MW unit load (i.e. 100% of rated load).		
1556	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	4 of 57	3.1	Guarantees Under Category-I ii. Steam Generator Efficiency a) Efficiency of the steam generator at 105% TMCR (840 MW unit load) with zero make up while firing the design coal at rated steam parameters, rated coal fineness and rated excess air at economizer outlet. b) Efficiency of the steam generator at 100% TMCR (800 MW unit load) with zero make up while firing the design coal at rated steam parameters, rated coal fineness and rated excess air at economizer outlet.		1) In following clauses of Chapter-8, Vol-II, the figure "105%" & "840 MW" be read as "55%" & "440 MW", whereever appearing:-

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1557	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	4 of 57	3.1	Guarantees Under Category-I PG test for Turbine cycle Heat Rate & Steam Generator Efficiency shall be conducted simultaneously.	As per referred clauses, performance guarantee load condition for turbine and boiler are different as follows: a. Turbine 100% TMCR and 55% TMCR b. Boiler 105% TMCR and 100% TMCR HPGCL/DESEIN to kindly check and confirm	i) Clause 3.1 (II) (a) at Sheet 4 of 57 ii) Second coulmn of Table against S.No. ii)(a) at Sheet 9 of 57 iii) Second coulmn of Table against Clause 3.6 (ii) at sheet 17 of 57. 2) In second coulmn of Table against S.No. (c) at Sheet 50 of 60 of Section-III/BDS in Vol-I, the figure "105%" & "840 MW" be read as "55%" & "440 MW" 3) The figure & words "INR 31,100,000/- (INR Thirty one Million one Hundred Thousand only)" be read as "INR 209,419,388/- (INR Two Hundred Nine Million Four Hundred Nineteen Thousand and Three Hundred Eighty Eight Only) at following places:- i) Third coulmn of Table against S.No. ii)(a) at Sheet 9 of 57 ii) Third coulmn of Table against S.No. (c) at Sheet 50 of 60 of Section-III/BDS in Vol-I.
1558	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	14 of 57	3.3	Unit Heat Rate $\text{Unit Heat Rate (55\%)} = \frac{\text{THR (55\%)}}{\text{SG\_EFF (55\%)}}$ SG_EFF(55%) : Efficiency of the Steam Generator at 440 MW unit load (i.e. 55% of rated load) with 270 C ambient temperature and 60% RH, while firing the design coal, at rated steam parameters, rated coal fineness and rated excess air. (To be calculated as per clause 3.7 of this sub-section). The efficiency shall be based on Heat Input GCV of coal.		
1559	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	9 of 57	3.2 ii (a)	Unit Heat Rate $\text{Unit Heat Rate (100\%)} = \frac{\text{THR (100\%)}}{\text{SG\_EFF (100\%)}}$ SG_EFF(100%): Efficiency of the Steam Generator at 800 MW unit load (i.e. 100% of rated load) with 270 C ambient temperature and 60% RH, while firing the design coal, at rated steam parameters, rated coal fineness and rated excess air. (To be calculated as per clause 3.7). The efficiency shall be based on Heat Input GCV of coal.		
1560	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	14 of 57	3.3	Unit Heat Rate SG_EFF(55%) : Efficiency of the Steam Generator at 440 MW unit load (i.e. 55% of rated load) with 270 C ambient temperature and 60% RH, while firing the design coal, at rated steam parameters, rated coal fineness and rated excess air. (To be calculated as per clause 3.7 of this sub-section). The efficiency shall be based on Heat Input GCV of coal.	Bidder understands that the ambient temperature specified as "270 C" is a typographical error and the same needs to be updated as "27 Deg C". Customer is requested to kindly confirm acceptance to our request.	In clause 3.3 of Chapter -8 at Sheet-14 of 57, Vol-II, the word / figure in fifth line from the bottom i.e. "270 C" be read as "27 Deg C"
1561	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	15 of 57	3.3	Unit Heat Rate SG_EFF(100%): Efficiency of the Steam Generator at 800 MW unit load (i.e. 100% of rated load) with 27^0 C ambient temperature and 60% RH, while firing the design coal, at rated steam parameters, rated coal fineness and rated excess air. (To be calculated as per clause 3.7). The efficiency shall be based on Heat Input GCV of coal.	Bidder understands that the ambient temperature specified as "270 C" is a typographical error and the same needs to be updated as "27 Deg C". Customer is requested to kindly confirm acceptance to our request.	Ambient temperature shall be 27 deg C
1562	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	17 of 57	3.6	Specific and Limiting Requirements for Steam Generator Efficiency The guaranteed efficiency quoted by the Bidder shall comply with following limiting parameters with design coal firing: Corrected flue gas temperature at air preheater outlet (at 55% & 100% TMCR) -> 115 C or as predicted by the Bidder whichever is higher	As per specification SCR will be installed in the proposed project. Minimum flue gas temperature is required for SCR activation / operation. Hence the required flue gas temperature (115 deg C) as specified in the specification is not possible with SCR installation. Bidder requests Customer to revise the flue gas temperature(corrected) to 125 deg C at AH outlet for boiler efficiency guarantee purpose.	Flue gas temperature at air preheater outlet at 55% TMCR shall be 115° C or as predicted by the Bidder whichever is higher. The same at 100% TMCR & 105% TMCR shall be 125 deg. C (min).
1563	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 65 of 186	9.1	Regenerative Air Pre-Heaters II. Regenerative Air Pre-Heaters (Trisector type RAPH) 3. Minimum AH flue gas exit temperature (corrected) at 100% TMCR (800 MW unit load) with range of specified coal - 125°C		

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1564	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	17 of 57	3.6	Specific and Limiting Requirements for Steam Generator Efficiency **For the purposes of guarantees the ambient air temperature and relative humidity shall be taken as 270 C and 60% respectively.**	Bidder understands that the ambient temperature specified as "270 C" is a typographical error and the same needs to be updated as "27 Deg C". Customer is requested to amend the same.	In clause 3.6 (iv) of Chapter -8 at Sheet-17 of 57, Vol-II, the word / figure "270 C" be read as "27 Deg C"
1565	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	18 of 57	3.7	MAJOR REQUIREMNTS/ METHOD OF STEAM GENERATOR EFFICIENCY TESTS	Bidder shall consider Heat losses as specified in ASME PTC 4 for boiler efficiency calculation. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1566	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	18 of 57	3.7	MAJOR REQUIREMNTS/ METHOD OF STEAM GENERATOR EFFICIENCY TESTS **The guaranteed steam generator efficiency shall be without any heat credit.**	Please note that the boiler efficiency will be calculated based on the procedure given in ASME PTC 4, considering credit(if any). Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1567	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	18 of 57	3.7	MAJOR REQUIREMNTS/ METHOD OF STEAM GENERATOR EFFICIENCY TESTS **Correction to tested efficiency shall be applicable for variation in following parameter only:** **(a) Ambient air temperature.** **(b) Relative humidity of ambient air.** **(c) Hydrogen in coal.** **(d) Moisture in coal.** **(e) GCV of coal.** **(f) Percentage of ash in coal.**	Please note that correction if any will be estimated as per procedure specified in the PTC 4 Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1568	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	19 of 57	3.7	MAJOR REQUIREMNTS/ METHOD OF STEAM GENERATOR EFFICIENCY TESTS k) **The Bidder shall furnish the correction curves**, for Owner's approval covering the expected ranges of variations for all these parameters for the range of coal specified.		Bid specifications to be followed.
1569	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	19 of 57	3.7	MAJOR REQUIREMNTS/ METHOD OF STEAM GENERATOR EFFICIENCY TESTS For all other aspects, not spelt out above, or in the specifications, where code stipulates the agreement between the parties concerned before commencement of the test, 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**	Corrections to SG efficency shall be inline with Volume II,Chapter No.8, (FG & LD), Cl. No. 3.7 (i). Corrections to Turbine cycle heat rate shall be inline with Volume II,Chapter No.8, (FG & LD), Cl. No. 3.5 (i). Please confirm acceptance.	Bid specifications to be followed.
1570	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	28 of 57	4.1.1	GUARANTEES UNDER CATEGORY-II NOx emission Bidder shall guarantee that maximum total NOx emission from the unit shall not be more than 100 grams of NOx (from thermal as well as fuel) per giga joule of heat input (at 6% O2 level and as per equivalent NO2) to the boiler during the entire operating range of steam generator for the range of coals specified.	As per MOEF guide line NOx emission from the SCR outlet shall 100mg/Nm3 (at 6% O2 dry) instead of 100 grams per giga joule of heat input. Customer is requested to kindly confirm acceptance to our request.	In clause 4.1.1 at sheet 28 of 57, Chapter-8, Volume-II, "100 grams of NOx (from themal as well as fuel) per giga joule of heat input (at 6% O2 level and as per equivalent NO2) to the boiler" shall be read as "80 mg/Nm^3 (at 6% O_2 level and as per equivalent NO_2)".

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1571	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	29 of 57	5.4	GUARANTEES UNDER CATEGORY-III Steam temperature imbalance 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 10^0 C under all load conditions.	Bidder request HPGCL/DESEIN to correct the clause as follows "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 Deg.C under all load conditions."	There is no discrepancy.
1572	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	29 of 57	5.5	GUARANTEES UNDER CATEGORY-III SH and RH tube metal temperature It shall be demonstrated that superheater and reheater tube metal temperature at critical locations remain within maximum tube metal temperature limits as per design of the OEM under various load conditions (i.e. 100%, 80%, 60% & 50%).	As per bidder standard practice and general industry practice Superheater and Reheater tube metal temperature will be measured and will not be guaranteed. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1573	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	30 of 57	5.6	GUARANTEES UNDER CATEGORY-III Super heater and reheater attemperation system It shall be demonstrate that the spray water flow of SH attemperation system does not exceed 8% of main steam flow, at super heater outlet, while firing any coal from within the range specified with HP heaters in service while maintaining the rated SH outlet steam temperature at all loads up to and including BMCR. It shall also be demonstrate that the RH temperature is maintained at the rated value without any spray water requirement under normal operating conditions.	Please note that referred guarantee item is not required separately, considering EPC package. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1574	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	31 of 57	5.12	Ammonia slippage in De-NOx system It shall be demonstrated that the Ammonia slippage in De-NOx system (after last layer of catalyst) **for entire range of operation from 40% BMCR to 100% BMCR shall be less than 2.5 ppm (at 6% O2 on dry basis)** for the range of coal specified for an operation period of minimum 16,000 hrs without further catalyst addition or replacement.	There is a contradiction in ammonia slippage value among different clauses in the tender document. Hence bidder has considered ammonia slip not exceeding <3ppm in all the respective tender clauses. Customer is requested to kindly confirm acceptance to our request.	Ammonia slip after last catalyst layer (ppm at 6% O_2 on dry basis): - Guarantee Point < 3 - Design point < 2.5
1575	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	31 of 57	5.14	Catalyst Life The Bidder shall demonstrate NOx emission outlet at SCR **shall not exceed 80 mg/Nm3** @ 6% O2 dry basis (with ammonia slip less than 2.5 ppm at 6% O2 dry basis) at the end of 16000 operation hours for range of coal(s) specified from 40% BMCR to 100% BMCR.	Please note that SCR outlet NOx of 100mg/Nm3(as per MOEF guideline) shall be demonstrated at the end of 16000 hours of operation for range of coal(s) specified from 40% BMCR to 100% BMCR. Bidder request Customer to amend the SCR outlet NOx level specified for catalyst life demonstration.	Clause 5.14 (Catalyst life guarantee under Category - III) at Sheet 31 of 57, Chapter-8, Vol-II stands deleted. However, in clause 3.1 (x) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%".
1576	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	31 of 57	5.15	Pressure drop across the SCR Reactor Bidder shall specify guarantee value and demonstrate the pressure drop across the SCR Reactor with operating catalyst rows (except spare row considered) at 100% TMCR load condition with design Coal and shall not exceed the guaranteed value.	Please note that separate guarantee for "Pressure drop across SCR reactor" is not required as the auxiliary power consumption has been guaranteed. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1577	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	31 of 57	5.16	Air Preheater air in leakage Bidder shall demonstrate that the air-heater air-in-leakage and maximum drift in air leakage do not exceed the guaranteed or the value specified in technical specification (whichever is lower), as specified at 100% TMCR load condition with design coal.	In case, air preheater air in leakage test is not conducted as per agreed schedule(3000 hrs) due to any reason, then air in leakage will be demonstrated considering the 1% drift per year. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.

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1578	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	36 of 57	5.24	(iii) Air Preheater Air in Leakage Bidder shall demonstrate that the air-heater air-in-leakage and maximum drift in air leakage do not exceed the guaranteed or specified value (whichever is lower) as per indicated in the Technical specifications. Above requirement needs to be complied with		
1579	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	33 of 57	5.24	Steam Generator and Auxiliaries (i) Coal Pulveriser capacity at rated fineness (b) Further, Bidder shall also demonstrate capacity output on four coal pulverisers (of Owner's choice) of Steam Generator, **not less than the 85% of guaranteed value of (a) above, at 100% mill loading with t**he originally installed grinding elements in nearly worn-out condition or at the end of guaranteed wear life of grinding elements, whichever is earlier.	Mill type/model shall be selected considering mill loading of 90%, as per general industry guideline and as per CEA specification maximum permissible mill load. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1580	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	73 of 186	10.5.II, 3)	**Sizing of Coal Pulverisers** a) Maximum permissible mill loading for deciding mill capacity (selection of mill type/model) complying with requirement at clause 10.5 above - 85% or the mill loading achievable corresponding to the near worn out conditions of mill grinding rolls/balls/tyres etc. whichever is less. This condition shall be complied for the range of specified coals including the adequacy range of coals.		Demonstration test shall be carried in line with Volume II.
1581	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	54 of 57	8.0	LIQUIDATED DAMAGES FOR SHORT FALL IN EQUIPMENT PERFORMANCE If the guarantees specified at clause 6.2 are not achieved by the Bidder in the **performance guarantee test or within 90 days or a reasonable period thereof allowed by the Owner after notification by the Owner,** 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 listed herein above against the Bidder and such amounts calculated at the rates specified in Cl.3.2 above for shortfall in performance shall be deducted from the contract price (provided the shortfall is less than or up to 25% of Contract Price)-----	We request Owner to modify the clause as below : If the guarantees specified at clause 6.2 are not achieved by the Bidder in the performance guarantee test or within 90 days or a reasonable period thereof allowed by the Owner after notification by the Owner, 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 listed herein above against the Bidder and such amounts calculated at the rates specified in Cl.3.2 above for shortfall in performance shall be deducted from the contract price (provided the shortfall is less than or up to ~~25%~~ **15%** of Contract Price)-----	Bid specifications to be followed.
1582	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 2 of 186	1.0	Biomass Co-firing The steam generator should should be able to accommodate future stringent biomass co-firing norms. Stream Generator should be designed for minimum 10% co-firing with Biomass Torrefied Pellets. Performance Guarantees will be on the basis of design coal.	The boiler will be designed as per the specification requirement (10% Biomass co-firing with torrefied pellets) since the future requirement is not not known Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed.
1583	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 3 of 186	1.3	Super heater(s) Superheater(s) including safety valves, main steam stop valves **at superheater outlet with integral bypass valves,** drains, **start up vents,** air release valves, nitrogen connections, sampling connections, MTM thermocouples etc.	For once through supercritical units, boiler will be started with HP bypass valve in operation. Hence, start up vent valve is not necessary and not envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1584	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 3 of 186	1.4	Reheater(s) Reheater(s) including safety valves, drains**, start up vents,** air release valves, sampling connection, reheater inlet and outlet isolators, MTM thermocouples, hydraulic test arrangement of reheater tubes etc.		
1585	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 8 of 186	1.8	Valves i) Start-up drain and vent isolating valves with motor drives with control from C&I system.		
1586	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 3 of 186	1.5	Economizer In line, bare tube economizer, including vents, **re-circulation system,** drains and sampling connections, inlet NRV, motorized valve with integral by pass, Boiler preservation line through Economizer. etc.	Please note that re-circulation system is not applicable for Economiser. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1587	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 4 of 186	1.7	Superheater and Reheater Desuperheating Spray Systems Desuperheating spray type attemperators with headers shall be provided for the spray for Superheaters and Reheaters. **The superheater spray water shall be tapped off from a suitable location downstream side of HP heaters**. However, for Reheater desuperheating, the spray water shall be tapped off from the intermediate stage of Boiler Feed Pumps. **The super-heater spray water shall be tapped off from downstream side of HP heaters only.**	Desuperheating spray type attemperators with headers shall be provided for the spray for Superheaters and Reheaters. The superheater spray water shall be tapped off from a **suitable location downstream side of HP heaters or intermediate banks of economiser or economizer outlet**. However, for Reheater desuperheating, the spray water shall be tapped off from the intermediate stage of Boiler Feed Pumps. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.

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1588	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 8 of 186	1.8	VALVES j) All start-up vents, first lowest & second lowest set pressure spring loaded safety valve and electromatic relief valves at superheater & reheater outlet and lowest set pressure spring loaded safety valves on Separator shall be provided with silencers for each safety valve. **The silencers shall enable meeting specified noise levels and the safety/ relief valve floats.**	Please note that only lowest set pressure spring loaded safety valve shall be provided with silencer instead of first lowest and second lowest set pressure spring loaded safety valve, as per bidder's earlier project practice. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1589	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 108 of 186	14.2.V	b) Silencers on all start up vents and lowest set & second lowest set pressure safety valves.		
1590	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 9 of 186	1.9	Soot Blowing System Soot blower piping including supply piping to all soot blowers through pressure reducing station, drain piping, vent piping**, relief valves and escape piping with silencer**, support & hangers etc.	As per bidder design standard, no silencer will be installed for section 8 safety valve. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1591	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 9 of 186	1.9	Soot Blowing System Valves for soot blower operation shall include pneumatically operated pressure reducing control valves, **(one control valve of 0-40% capacity for wall blowers, one control valve of 0-100% capacity for all types of blowers taken in service in any combinations, one standby 0-100% capacity motorised inching valve with position feedback, drain valves)**, isolating valves with motor drives up stream of each of pressure control valves, all other valves and steam supply lines as required for soot-blower operation, coupling, air purge, vent and relief valves etc.	Bidder proposes that "Valves for soot blower operation shall include pneumatically operated pressure reducing control valves, (**one control valve of 0-100% capacity for all types of blowers taken in service in any combinations, one standby 0-100% capacity motorised inching valve with position feedback, drain valves**), isolating valves with motor drives up stream of each of pressure control valves, all other valves and steam supply lines as required for soot-blower operation, coupling, air purge, vent and relief valves etc." Customer is requested to kindly confirm acceptance to our request.	Noted.
1592	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 9 of 186	1.9	Soot Blowing System Soot blowing steam shall also be taken from main steam line before main steam stop valve for APH soot blowing during light-up.	No Separate connection is required for air heater soot blowing form MS line. The auxiliary steam from Aux header is sufficient for RAPH soot blowing purpose. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1593	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 9 of 186	1.10	Auxiliary Steam Pressure Reducing and Desuperheating Station (Aux. PRDS) A high temperature unit header with **parameters 16 Kg/cm² (a) and 310°C** and a low temperature unit header with parameters 16 Kg/cm² (a) and 210°C shall be provided.	Aux steam parameters 16kg/cm2 and 310 Deg C specified in technical specification for high temperature aux steam header is noted. However, bidder shall select suitable higher steam parameters based on process requirements considering the EPC project. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1594	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 10 of 186	1.10.11	Package type (start-up) Boiler shall be arranged by the bidder based on the steam requirement and can be taken back after commissioning.	Bidder understand that No Auxiliary Boiler has been envisaged for the New Unit. The initial steam requirement for new unit shall be fed from the existing Operating Unit of 300 MW and the same will be connected to High Temperature Auxiliary Steam Header of New Unit (800 MW) instead of Low Temperature Auxiliary Steam Header. Minimum steam parameter required shall be pressure = 16 kg/cm2(a), Temp = 310 deg C and Mass flow rate of 92 TPH for new 800 MW unit. Bidder understand that there is only one Unit of 1x800 MW, Therefore only One High Temperature Aux. Steam Header and One Low Temperature Aux. Steam Header is envisaged. Please confirm Bidder's understanding.	Auxiliary boiler is not in the scope of tender. Auxiliary steam required for commissioning shall be tapped from the existing 2 x 300 MW auxiliary steam header and connect the same to new plant. Bidder may also make arrangements for auxiliary steam, if required, from a portable auxiliary boiler on returnable basis which can be taken away after use.
1595	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 11 of 186	1.11	Steam Generator Integral piping 18. Interconnecting auxiliary steam pipi**ng from pakage boiler to auxi**liary steam station headers(s). The complete engineering, routing, hanger, support and auxiliary structure shall be in the Bidder's scope.		
1596	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 12 of 186	1.13	a) Forced Draft Fans **Two (2) FD fans (2X60% BMCR)** (Axial type, constant speed variable pitch controlled FD fans each with drive motor, base plates, foundation bolts & nuts, inlet bird and trash screen, suitable arrangement to prevent rain water entry to fan motor, coupling and coupling guard and acoustic silencer.	Bidder proposes to consider 60% TMCR load for FD fan design instead of 60% BMCR. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1597	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 12 of 186	1.13	b) Induced Draft Fans Two (2) ID fans **(2 x 60% BMCR)** (Axial type, constant speed, **variable pitch controlled, with variable frequency drive)** each with drive motor, base plates, foundation bolts and nuts, inlet box, discharge case, coupling, coupling guard and suitable arrangement to prevent rain water entry to fan motor.	Bidder proposes to consider 60% TMCR load for ID fan design instead of 60% BMCR. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1598	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 12 of 186	1.13	b) Induced Draft Fans Two (2) ID fans **(2 x 60% BMCR)** (Axial type, constant speed, **variable pitch controlled, with variable frequency drive)** each with drive motor, base plates, foundation bolts and nuts, inlet box, discharge case, coupling, coupling guard and suitable arrangement to prevent rain water entry to fan motor.	Please note that for the offered ID fan with constant speed variable hydraulic blade pitch control, variable frequency drive is not applicable. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1599	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 13 of 186	1.13	ID fans shall be suitable for the type of foundation being provided. ID fans shall be suitable for installation on spring supported RCC foundation. The spring supported RCC foundation comprising of steel helical spring units with viscous damper units	Conventional foundation will be provided for ID fan without any spring as per bidder's practice. Customer is requested to kindly confirm acceptance to our request.	Noted.

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1600	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 13 of 186	1.14	a) Regenerative Air Pre-heater (RAPH) 1. Two (2x100%) **peripheral AC drive connected** to drive Air heater along with automatic clutching/declutching arrangement for each APH. **Alternatively, centrally mounted APH AC drive system having sufficient space for mounting emergency** drive and having handling	Discrepancy observed in the technical specification regarding airheater drive - peripheral and centrally mounted. Bidder requests to include central mounted APH AC drive in the clause no. Vol.III, Ch.1, 9.1. Customer is requested to kindly confirm acceptance to our request.	Confirmed.
1601	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 67 of 186	9.1	Regenerative Air Pre-Heaters V. Air preheater Construction shall conform to following: 5. Air Heater drive i. 2x100% peripheral AC drive, with gear box and automatic clutching/declutching facility		
1602	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 13 of 186	1.14	a) Regenerative Air Pre-heater (RAPH) 1. Two (2x100%) **peripheral AC drive connected** to drive Air heater along with automatic clutching/declutching arrangement for each APH. **Alternatively, centrally mounted APH AC drive system having sufficient space for mounting emergency** drive and having handling	Bidder shall provide 1no. Centrally mounted AC VFD Drive, 1 No. air motor drive, mounted on common gear box with automatic clutching/declutching arrangement, inline with earlier project experience. Customer is requested to kindly confirm acceptance to our request.	Noted.
1603	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 67 of 186	9.1	Regenerative Air Pre-Heaters V. Air preheater Construction shall conform to following: 5. Air Heater drive i. 2x100% peripheral AC drive, with gear box and automatic clutching/declutching facility		
1604	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 15 of 186	1.15.1	Raw Coal Chutes and Bunker shut off valves, including following: xii. Coal bunker shall be in the scope of bidder. Storage capacity of the bunkers shall correspond t**o 12 hours requirement of the unit under BMCR condition with design coal firing.**	Please note that Coal bunker shall be sized with 10 hrs storage requirement with BMCR load and design coal firing. Customer is requested to kindly confirm acceptance to our request.	Noted.
1605	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 16 of 186	1.15.3	Coal Pulveriser a) The coal pulveriser shall be vertical spindle type (pressurised type bowl mills). The number of coal pulverisers to be provided shall conform to sizing /standby requirement stipulated elsewhere in the specification. **Minimum Eight (8) coal pulverisers shall be provided for steam generator.**	Bidder has in-house facility for manufacturing bigger size coal pulverizers for the specified coal. And Bidder can meet all technical specification requirements for 800 MW with 7 number of mills. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1606	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 48 of 186	3.0	Minimum number of coal pulverisers to be provided for steam generator shall not be less than Eight (8).		
1607	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 73 of 186	10.5	II. Sizing of Coal Pulverisers Selection, sizing and total number of Coal pulverisers to be provided for Steam Generator shall confirm to following stipulations: Number of mills for Steam Generator ---- Adequate to achieve 100% TMCR for all specified coal(s) and all operating conditions but not less than eight (8) mills.		
1608	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 17 of 186	1.15.4	Primary Air Fans a) Two (2) numbers of two stage axial PA fans for steam generator, with hydraulic blade pitch control / Radial type with variable speed, **with VFD control system each with motor, base plates, foundation bolts, inlet box, inlet bird** and trash screen, inlet rain water canopy, inlet cone, diffuser, coupling, coupling guard and silencer.	Please note that for the offered PA fan with constant speed variable hydraulic blade pitch control, variable frequency drive is not applicable. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1609	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 17 of 186	1.15.4	Primary Air Fans PA fans shall be suitable for installation on the Spring supported RCC foundation. The spring supported RCC foundation comprising of steel helical spring units with viscous damper units. The springs shall be provided above the ground level.	Conventional foundation will be provided for PA fan without any spring as per bidder's practice. Customer is requested to kindly confirm acceptance to our request.	Noted.
1610	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 18 of 186	1.15.6	Coal Burners **Second generation Lo**w NOx type Coal Burners with burners tilt mechanism, tilt drives, linkages and complete actuator assemblies, burner tilt position transmitters etc.	The requirement of Second generation is not clear but bidder will supply the low NOx burner of their design to fulfil the specification requirement. Customer is requested to kindly confirm acceptance to our request.	Combustion system along with wind box, air ducting and other associated parts shall be designed for guaranteed maximum NOx emission of 325 mg/Nm^3 at 6% O_2 on dry gas basis at Selective Catalytic Reduction (SCR) inlet. The value of NOx shall include both fuel and thermal NOx and shall not be exceeded during 40% TMCR to 100% BMCR load condition for the range of specified coals.

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1611	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 21 of 186	1.18	Dampers 5.Fully gas tight, motor operated, gates before and after each ESP stream, before and after each ID fan, at inlet to each of RAPH on flue gas side, before and after of RAPH on air side, at discharge of each PA fans, FD fans and at economiser bypass duct (if applicable), S**CR inlet, SCR outlet & SCR Bypass.** Fully gas tight pneumatic operated gates at each hot air & cold air duct to the mills. Vertical Mounted fully gas tight, motor operated, gates before and after	SCR bypass duct and cyclone separator is not envisaged by the bidder, Hence guillotine Gate at SCR inlet, SCR outlet & SCR bypass outlet shall not be considered. Bidder proposes one no. double louver damper at RAPH inlet on flue gas side for each stream due to layout constraints. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1612	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	31 of 186	1.29.6.1, vi)	c) Isolation gates at inlet of cyclone separator, SCR outlet and SCR bypass duct of SCR reactor and isolation gate & control damper in economizer bypass duct to SCR inlet duct.		
1613	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	103 of 186	13.2	Power operated gas tight isolation dampers along with their drives shall be provided at all locations required for carrying out internal repair and maintenance of pulverizers, electrostatic precipitators and induced draft fans when the Steam Generator is on load. As a minimum following locations shall be provided with power operated gas tight dampers/gates: d) At inlet to each of the Regenerative Air Pre-Heaters on flue gas side. h) At .....Each SCR inlet duct, each SCR outlet duct (only incase of Bi-sector APH) & each SCR bypass duct.		
1614	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	136 of 186	23.1.4.12	**Dampers and Gates** i)Motor operated gas tight gates along with their drives shall be provided at inlet, outlet and bypass duct of the SCR system for carrying out internal repair and maintenance of complete SCR system when the Steam Generator is on load.		
1615	Volume VII-Tender Drawings	Mechanical	17 of 120	Dwg no. 111-11-1200	Bidder to consider 2 no. of dampers at inlet of RAPH (Flue gas side). One is Biplane multi louver with 2x100% seal air fan arrangement, and one more guillotine damper for isolation purpose.		
1616	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	30 of 186	1.29.6.1, iv)	**Catalyst De-dusting System** a) Adequate number of Rake retractable type steam operated Soot blowers shall be provided for each catalyst layer (including future layer) complete with structural supporting frame, access platform, motors, piping, control & instrumentation, insulation etc. b) In addition to steam type soot blowers, bidder to provide additional Sonic horns & Air Cannons for each catalyst layer (including future layer) complete with structural supporting frame, access platform, compressed air storage vessel, piping, control & instrumentation, insulation, acoustic enclosures etc.	Technical specification calls for Rake type steam operated Soot blowers, Sonic horns & Air Cannons for Catalyst De-dusting. However, as per general OEM practice rake type steam soot blower are only envisaged for Catalyst De-dusting. Customer is requested to kindly confirm acceptance to our request.	Noted as per OEM practice.
1617	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	131 of 186	23.1.3, 4)	**Catalyst De-dusting System** The catalyst de-dusting system shall use rake type steam soot blower. In addition to steam type soot blowing, sonic horn and air cannon for blowing/dislodging accumulated/sticking ash and fouling on catalyst surface shall be provided.		
1618	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	132 of 186	23.1.3, 4)	**i) Rake type steam soot blowers** a) Soot blowers shall be provided for cleaning all catalyst layers, including the future layer. Adequate number of soot blowers shall be provided so that it should cover complete catalyst surface area.		
1619	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	132 of 186	23.1.3, 4)	**ii) Sonic Horn** a) Sonic horn shall be provided for cleaning all catalyst layers, including the future layer. Adequate number of sonic horn shall be provided so that it should cover complete catalyst surface area.		
1620	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	133 of 186	23.1.3, 4)	**iii) Air Cannons** a) Air cannons shall be provided for cleaning all catalyst layers, including the future layer. Number of air cannons shall be provided so that it should cover complete catalyst surface area.		
1621	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	30 of 186	1.29.6.1, iii)	**SCR Reactor and Auxiliary System** j) Gas sampling system including online gas analysers at inlet and outlet of SCR reactor for measurement of NOx, SOx, O2, CO2 etc.	Online gas analyser for SOx & CO2 is not required to measure at SCR inlet & outlet and hence the same is not envisaged at SCR inlet and outlet. Customer is requested to kindly confirm acceptance to our request.	Noted
1622	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	31 of 186	1.29.6.1	**vii) CFD and Physical modeling** a) Bidder's scope shall include Computation Fluid Dynamics (CFD) and Physical modelling for SCR reactor,	Based on bidder experience and proven practice the requirement for physical model test is not envisaged. Therefore, bidder request confirmation to carry out CFD analysis only. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1623	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	31 of 186	1.29.6.1	b) Bidder's scope shall also include conductance of laboratory/shop test to establish and demonstrate the activity of the catalyst selected for Indian coal/ash. Further, such test shall be conducted and report shall be provided to customer before supply of catalyst to site.	Bidder shall select the SCR catalyst suitably based on previous project experience(high ash). Hence, conductance of lab/shop test and submission of test report is not envisaged under bidder's scope. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.

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1624	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 32 of 186	1.29.9	Ammonia Unloading, Storage and Handling System (Common for all units) One (1) ammonia storage tank including all supports and other accessories with all fittings, monitoring and safety devices. T**he storage tank capacity shall be of 14 days ammonia** requirement of SCR system.	Ammonia storage tank shall be sized for 7 days requirement of SCR system considering the tank volume and technical specification requirement for transporting storage tank as one piece to site. Customer is requested to kindly confirm acceptance to our request.	No. of Ammonia tanks shall be as per Clause 23.1.23 D) of Ch-1 at Sheet 157 of 186, Vol-III. Total capacity of Ammonia storage shall be for 7 days requirement.
1625	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	157 of 186	23.1.23, D), i)	**Ammonia Storage Tank** 2) Storage capacity of each tank - Catering the requirement of two (02) reactor SCR System for steam generator under design condition meeting 14 day requirement		
1626	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	32 of 186	1.29.9	d) Two (2) (1W+1S) Ammonia vaporizer and associated systems. Each ammonia vaporizer shall be capable of vaporizing the ammonia to meet the requirements of SCR system	Discrepancy observed in the no. of vaporisers requirement between referred technical specification clauses. No. of vaporisers shall be considered as 2 nos.(1W+1S) inline with clause no. 1.29.9 d) and 23.1.8,5),a), for proposed one unit Customer is requested to kindly confirm acceptance to our request.	Vaporisers shall be 2 nos. (1W+1S)
1627	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	145 of 186	23.1.8, 5), a)	**Ammonia Vaporizer** Two (2) (1W +1S) ammonia Vaporizer shall be provided for the steam generator. Vaporizer shall be designed to supply ammonia vapour to SCR reactor under all operating conditions.		
1628	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	157 of 186	23.1.23, D), iii)	**Ammonia vaporizer system** 1) Total No. of vaporizer - Three (03)		
1629	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	32 of 186	1.29.9	f) 2x100% Glycol-water recirculation pumps with common water/ glycol heater for each ammonia vaporizer and common overhead make up water/glycol tank. Make up shall be tapped from suction header interconnecting the Condensate storage tanks (CST)	Bidder proposes Water bath type natural circulation system for heating of ammonia based on proven practice, instead of forced circulation system. Hence, the water will be directly heated through auxiliary steam and heat in water will be transferred to ammonia. Customer is requested to kindly confirm acceptance to our request.	Noted if it is as per standard proven OEM design.
1630	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	158 pf 186	23.1.23, D), 4)	**Water/Glycol heater**		
1631	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	145 of 186	23.1.8, 5), a)	**Ammonia Vaporizer** Glycol/water cycle which in turn would supply heat to ammonia. Glycol/water mixture as intermediate heat transfer medium shall be circulated in closed cycle.		
1632	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	145 of 186	23.1.8, 5), c)	**Ammonia Vaporizer** 2X100% capacity Glycol/water pump with 1X100% capacity glycol/water heater shall be provided for recirculation and heating of Glycol/water mixture for each ammonia vaporizer. Glycol/water will be heated through Auxiliary steam.		
1633	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	145 of 186	23.1.8, 5), e)	**Ammonia Vaporizer** Changeover to standby glycol/water recirculation pump and standby vaporizer without interruption to service.		
1634	Volume III Mechanical Works	Section 1 : Scope/Ch 1: SG & Auxiliaries	33 of 186	1.29.10	iii) Sheathing work for roof/ canopy/ side cladding of SCR system.	As per OEM practice, No side cladding/Roof sheeting is envisaged for SCR system. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1635	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 41 of 186	1.11	Operation without High Pressure (HP) Heaters in service Steam generator shall be capable of operation with HP heaters out of operation. The steam generator heat output under HP heaters out condition shall be at least 100% BMCR heat duty.	Please note that the operation with all HP heater out condition, the heat output may be limited to 100%TMCR heat duty instead of 100% BMCR heat duty. Customer is requested to kindly confirm acceptance to our request.	Noted.
1636	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 42 of 186	1.12.3	1.12.3 Irrespective of the fact that HP-LP bypass system is provided for smooth start-up, fast loading & house load operation of unit, the steam generator shall also be capable of start-up without HP-LP by-pass system in service.	This operation requirement is practically not possible. Accordingly request Owner to delete this requirement. Please confirm acceptance.	Noted.
1637	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 43 of 186	1.13	The Steam Generators shall be designed for minimum rate of loading/unloading mentioned below without compromising on design life of pressure parts: a) Step load change - Minimum ± 10% per minute b) Ramp Rate Minimum ± 3% per minute (30% to 50% load) Minimum ± 5% per minute (50% to 100% load)	Following ramp rate shall be considered for the steam generator, a) Step Load Change : Minimum ± 10% b) Ramp Rate : Minimum ± 1% per minute (in the load range 40% to 55%) Minimum ± 2% per minute (in the load range 56% to 70%) Minimum ± 3% per minute (in the load range 71% to 100%). Customer is requested to kindly confirm acceptance to our request.	Follow ramp rates as per CEA Gazetted notification (CG-DL-E-31012023-243299 dated 25.01.2023)
1638	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 44 of 186	1.19	ii) Maximum allowable -stress values for ASME SA-335: P-92/T-92 or approved equivalent material as per code shall be reduced by 10% for calculating the thickness of pressure parts.	Bidder proposes to use ASME SA-335/213:P-92/T-92 material using maximum allowable stress values as per code. Customer is requested to kindly confirm acceptance to our request.	Noted.
1639	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 45 of 186	1.23	Noise level The equivalent weighted average of sound level measured at a distance of 1.5 M above floor level in each elevation and 1 M horizontally from the base of any equipment furnished and installed under these specifications, expressed in decibel to a reference of 0.0002 microbar, **shall not exceed 85 dB (A).** Noise level for motors shall be specified in motor specification.	Noise level for safety valve and mill shall be as follows: a. The sound level for safety valve with silencer shall be 105dBA. The sound level may exceed 105dBA for the safety valve without silencer. b. Mill noise shall be limited to 90 db(A) Customer is requested to kindly confirm acceptance to our request.	Noted.

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1640	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 46 of 186	1.25	1.25 Design Of Pressure Parts Design pressure of the Steam Generator pressure parts shall be atleast 1.05 times the maximum operating pressure, or as required by IBR/other international codes, whichever is higher. Further, design pressure of the steam generator pressure parts upstream of separators shall be atleast 1.05 times the maximum operating pressure, or as required by IBR / ASME, **or pressure arrived based on lowest set pressure of spring loaded safety valve on the separators plus the pressure drop from separator to the respective pressure part; whichever is higher.**	Design pressure of the Steam Generator pressure parts will be atleast 1.05 times the maximum operating pressure, or as required by IBR/ASME, whichever is higher. Customer is requested to kindly confirm acceptance to our request.	Noted.
1641	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 53 of 186	5.0	Steam Seperator(s) c) Design Pressure 1.05 times the max. operation pressure or highest set pressure of the spring loaded safety valve for full discharge whichever is higher		
1642	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 46 of 186	1.25	d. The working fluid temperature to be considered for design of boiler tubes, headers, separators and other pressure parts upto first stage of attemperation shall be arrived by **adding an additional margin of minimum 40°C to the maximum predicted/expected fluid temperature in these pressure parts.** The margins as per IBR and other codes shall be taken over and above the working fluid temperatures so arrived.	Bidder shall consider Design temperature for pressure parts as per IBR. Customer is requested to kindly confirm acceptance to our request.	Noted.
1643	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	53 of 186	5.0	**STEAM SEPERATOR(S)** b) Design Temperature - Maximum fluid temperature plus 40°C (Min.)		
1644	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 47 of 186	2.0	Steam Generator Enclosure The Steam Generator enclosure shall be provided with: a) Compressed air cooled observation ports for each oil/coal burner and at various platform levels on all the walls.	Bidder proposes to provide observation ports at various locations(as required) without cooling air as per earlier practice. Customer is requested to kindly confirm acceptance to our request.	Shall be provided as per OEM.
1645	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 47 of 186	2.0,7)	In the Steam Generator enclosure, minimum 1.5 M cavity height shall be provided in between the horizontal banks/sections of economizer, superheater and reheaters for maintenance purpose.	The Horizontal & Vertical cavity height in between the banks/ sections of economizer, superheater and reheaters shall be provided as per bidder standard only (1.2m approx.). Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1646	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 48 of 186	3.0	1. Furnace / Evaporator shall be designed for variable pressure operation **over 30% to** 100% BMCR load range. Furnace shall be water/steam cooled on all four sides and the bottom by means of closely spaced tubes with welded ligament membrane wall construction. Furnace roof tube may be either steam or water cooled.	There is contradiction in these clauses related to definition of sliding pressure mode of operation. Bidder proposes following to be considered as modified Sliding Pressure definition: • 0% to 40% TMCR : Constant Pressure Operation • 40% to 100% TMCR: Sliding Pressure Operation • 100% TMCR to VWO : Constant Pressure Operation Please confirm acceptance.	Noted
1647	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 53 of 186	5.0	Steam Separator construction shall have: (b) Fusion welded construction with welded hemispherical dished ends.	Bidder proposes to consider steam Separator and Drain collection vessel with forged construction inline with Bidder's earlier experience. Customer is requested to kindly confirm acceptance to our request.	Noted as per OEM practice.
1648	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 56 of 186	6.0	The recirculation pumps/motors shall be provided with necessary handling arrangement including runway beams, trolleys etc. Construction of start-up drain recirculation pump shall meet following requirements: v. Pump casing shall be one piece casting with end suction **& dual side discharges.**	The pump casing shall be Single Forged Casing with Discharge nozzle welded at one end . Single discharge Nozzle. This is as per OEM standard practice and inline to previous executed projects. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1649	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 57 of 186	7.1	SUPER HEATERS & REHEATERS 2. Maximum average flue gas velocity in section/tube banks with transverse tube pitching 600 mm or less and with **25%** excess air at economizer outlet 10 M/sec. (The maximum localized velocities across the cross- section shall not exceed 12m/ sec.)	Bidder proposes to consider **20%** excess air at Economizer outlet for fulfilling the flue gas velocity requirement specified in the technical specification. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed. However 20% excess air at economiser outlet be considered.
1650	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 58 of 186	7.2	Construction of Superheaters(s) & Reheater(s) shall have following features: c) Ensure even temperature distribution at gas and steam side by criss-crossing the steam paths between LHS and RHS	As per Bidder's standard boiler design, twin fire vortex is provided for uniform heat absorption across the furnace. In this furnace, steam temperature control can be achieved by individual right/left spray control system for the superheater and with the help of gas biasing damper control for Reheater temperature balancing. Hence criss-cross arrangement in SH and RH line are not necessary for twin fire vortex furnace design and not envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1651	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 58 of 186	7.2	Construction of Superheaters(s) & Reheater(s) shall have following features: 3. Maximum depth of tube banks/sections in the direction of gas flow: a) 2 Meters or maximum soot blowing radius, whichever is lower.	More heating surface area is required for the Steam Generator having 603 deg C SH & RH outlet steam temperature. To accommodate the more heating surface the horizontal SH & RH bank height shall be extended to 2.5 m instead of 2 m. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.

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1652	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 59 of 186	7.2	Construction of Superheaters(s) & Reheater(s) shall have following features: 8. Tube/Header Material b) Bidder to minimize/limit use of different grades of tube materials in one SH/RH bank to three.	Higher volume of heating surface area is required for the Steam Generator having 603 deg C SH & RH outlet steam temperature and accordingly wide range of material need to be provided. Hence the number of material need to be used in the bank shall be decided by the bidder suitably. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1653	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 59 of 186	7.2	Construction of Superheaters(s) & Reheater(s) shall have following features: 9. Max no. of material grades in flue gas path inside the boiler can be used in one bank:- Three (3)		
1654	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	59 of 186	7.2, 10)	**Construction of Superheaters (s) & Reheater(s) shall have following features:** **Space Provision** a) Keep provision of space for atleast 20% addition of additional economizer surfaces in future. Structure/hanger design shall be suitable for loads due to these additional surfaces (filled with water) also.	Bidder and their technology partner having vast experience in selecting the required heating surface for design of USC boilers. Hence space for installation of additional heating surface of Economiser in future is not required. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1655	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	63 of 186	8.0,iv	On gas inlet side of the Economizer, provision of space shall be kept for future addition of minimum 20% economizer surfaces. Structure/hangers design to be suitable for loads due to this additional water filled surfaces also.		
1656	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	61 of 186	8.0, 3)	Maximum average flue gas velocity through the Economizer tube banks, with 25% excess air at Economizer outlet. - 10 m/sec. (The maximum localized velocities across the cross-section shall not exceed 12 m/sec) With any coal from specified range	Bidder proposes to consider 20% excess air at Economizer outlet for satisfying the flue gas velocity requirement specified in the technical specification. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed. However 20% excess air at economiser outlet be considered.
1657	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	61 of 186	7.4	**Construction of Superheaters (s) & Reheater(s) shall have following features:** For maintenance/inspection of SH/RH, provide: i) 1.5 m clear cavity height between two sections/banks of horizontal heat transfer surfaces for personnel access from both the sides of the boiler.	The Horizontal & Vertical cavity height in between the banks/ sections of economizer, superheater and reheaters shall be provided as per bidder standard only (1.2m approx.). Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1658	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	63 of 186	8.0, iii)	Economizers shall be provided with:- a) Minimum 1.5 m clear cavity height between two sections/banks of the economizer for maintenance access from both the sides of the boiler.		
1659	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	62 of 186	8.0	Economisers 6. Maximum depth of tube banks / sections in the direction of gas flow - 2 M or maximum soot blowing radius, whichever is lower.	Please note that maximum depth of Economiser tube banks shall be considered as 2.5 m as per bidder's practice. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1660	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	65 of 186	9.1	Regenerative Air Pre-Heaters II. Regenerative Air Pre-Heaters (Trisector type RAPH) Air preheater shall be sized / designed to cater to following requirements	Trisector RAPH sizing/design criteria is specified in two different clause i.e. in clause 9.1.II(page of 65 of 186) and in clause 9.1.VI(page 67 of 186) Customer is requested to kindly confirm sizing criteria to be considered by bidder	Refer clause 9.1 (II) at Sheet 65 of 186 and clause 9.1 (VI) at Sheet 67 of 186 of Chapter-I, Vol-III for RAPH sizing criterion but with following corrections:- i) Design ambient air temperature and humidity shall be 27 deg C and 65% RH. ii) Air leakage (at 100% TMCR i.e. 800 MW Unit load for complete range of coals) shall be less than 10% of the flue gas weight entering air heaters.
1661	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	67 of 186	9.1	Regenerative Air Pre-Heaters VI. Regenerative Air Pre-Heaters (Trisector type RAPH) Air preheater shall be sized / designed to cater to following requirements		
1662	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	65 of 186	9.1	Regenerative Air Pre-Heaters II. Regenerative Air Pre-Heaters (Trisector type RAPH) 2. Sizing shall be based on following criteria, all conditions considered to be occurring together: a) Design ambient air temperature & humidity - 30 °C & 75% RH	Bidder proposes to consider design ambient air temperature and relative humidity as 27 Deg C and 60% RH for RAPH design. Customer is requested to kindly confirm acceptance to our request.	RAPH shall be designed for design ambient of 27 deg C & 65% RH
1663	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	65 of 186	9.1	Regenerative Air Pre-Heaters II. Regenerative Air Pre-Heaters (Trisector type RAPH) b)Type of coal firing - Worst coal, with **mix**. Moisture	Bidder understands that 'Worst coal, with Mix moisture" mentioned in the technical specification is the typographical error and the same needs to be corrected as 'Worst coal, with Max. moisture" Customer is requested to kindly confirm acceptance to our request.	'mix.' shall be read as 'max.'
1664	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	65 of 186	9.1	Regenerative Air Pre-Heaters II. Regenerative Air Pre-Heaters (Trisector type RAPH) d) Load Range a) 60% **BMCR** with worst coal and maximum moisture with one set of RAPH in service. b) 100% **BMCR** with worst coal and maximum moisture with both sets of RAPH in service	Bidder proposes to consider following loads in the RAPH sizing/design. d) Load Range a) 60% **TMCR** with worst coal and maximum moisture with one set of RAPH in service. b) 100% **TMCR** with worst coal and maximum moisture with both sets of RAPH in service Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1665	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	65 of 186	9.1	Regenerative Air Pre-Heaters II. Regenerative Air Pre-Heaters (Trisector type RAPH) 5. Air Leakage (at 100% TMCR i.e. 800 MW unit load for complete range of coals) - Less than 7% of the Flue gas weight entering air heater	HPGCL/DESEIN to note that air side leakage shall be limited to 10%, considering the 800 MW boiler and larger RAPH. Customer is requested to kindly confirm acceptance to our request.	Against S.No.-5 in 3rd coulmn of Table against Clause-II at Sheet 65 of 186, figure "7%" be read as "10%''. Against S.No.-10 in 3rd coulmn of Table against Clause-VI at Sheet 67 of 186, figure "7.5%" be read as "10%''.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1666	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 66 of 186	9.1	Regenerative Air Pre-Heaters V. Air preheater Construction shall conform to following: 4. Air heater seals ii. The maximum air-in leakage to flue gas after 3000 hours continuous operation of the boiler with coal shall be guaranteed and demonstrated. The Bidder shall also demonstrate that the drift in air heater leakage (percentage change in air-in-leakage) does not exceed 1%, one year after demonstration of above guaranteed air-in-leakage.	In case Air in leakage is not conducted as per agreed schedule (3000 hrs) due to any reason then air in leakage will be demonstrated considering the 1% drift per year. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1667	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 68 of 186	9.1	XII. Provide: a) Sufficient space provision for future installation of minimum additional **15% of APH heating surface are shall be made in the design so that, the same can be installed**, if required.	As per bidder's experience provision for future installation of minimum additional 15% of APH heating surface is not required, hence same is not envisaged. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however it will be reviewed and finalised during detailed engineering.
1668	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 69 of 186	9.1	Steam Coil Air Preheaters (SCAPH) I. Design SCAPH and connected air ducts to handle flows corresponding to 60% BMCR loads with one of the two streams working without any undue noise/vibration.	Bidder proposes to consider 60% TMCR load instead of 60% BMCR load for SCAPH design and connected air ducts. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1669	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 74 of 186	10.5.II	Side Ways arrangement for pulverizer shall be considered.	Bidder has supplied 15 Units (700 MW & 660 MW) with front mill arrangement and in which 11 units are in operation. Hence, bidder requests to consider front mill arrangement for the proposed project. Customer is requested to kindly confirm acceptance to our request.	Front Mill arrangement is acceptable.
1670	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	76 of 186	10.5.XVII	Ensure minimum mill turn-down ratio(s) of 3.5:1.	As per bidder's standard mill turn down ratio shall be 3:1. Customer is requested to kindly confirm acceptance to our request.	Noted as per OEM Standard proven design.
1671	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 77 of 186	10. 5, XXIII	Mill Rejects System: Mill reject system shall automatically …..... to a dense phase pneumatic conveying system .	Bidder proposes the following regarding mill reject system. Kindly accept.Mill reject system shall automatically …..... to a dense phase pneumatic conveying system **or Mechanical conveying system through Mechanical Conveyors and Bucket Elevator to a storage Silo.** Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1672	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	81 of 186	10.8.II.a)	(4) Air-heater air-in-leakage of 15% of flue gas flow entering in case of a Bi-sector APH (OR) 10% of flue gas flow entering in case of a Tri-sector APH (OR) guaranteed whichever is higher.	Customer is requested to note that actual guaranteed value of airheater leakage will be considered for fan sizing. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed but in Clause 10.8.II (b) (4) at Sheet 82 of 186 of Ch-1, Vol-III, the Figure "12%" be read as "10%".
1673	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	82 of 186	10.8.II.b)	(4) Air-heater air-in-leakage of 15% of flue gas flow entering PAPH & 10% of the flue gas flow entering SAPH in case of Bisector or 12% of the flue gas flow entering Trisector APH or actual guaranteed value, whichever is higher		
1674	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 91 of 186	12.1	Fan Sizing Criteria FD Fans - Each fan to be sized for 60% BMCR load (one stream in operation) calculated taking into account following factors	Bidder proposes to consider 60% TMCR load (one stream in operation) in FD fan sizing, instead of 60% BMCR load Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1675	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 91 of 186	12.1	Fan Sizing Criteria ID Fans - Each fan to be sized for 60% BMCR load (one stream in operation) calculated taking into account following factors	Bidder proposes to consider 60% TMCR load (one stream in operation) in ID fan sizing, instead of 60% BMCR load Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1676	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 92 of 186	12.1	Fan sizing criteria FD fan e) Air-heater air-in-leakage - Min. 7.5% of flue gas flow entering Bisector APH or Trisector APH or actual guaranteed whichever is higher	Bidder proposes to consider actual guaranteed value of airheater leakage in FD fan sizing. Customer is requested to kindly confirm acceptance to our request.	3rd coulmn against S.No. (e) of Table at Sheet 92 of 186, be read as under:- "Minimum 10% of flue gas flow entering bisector APH or minimum 10% of flue gas flow entering trisector APH or actual guaranteed whichever is higher." In 3rd coulmn against S.No. (6.) of Table at Sheet 93 of 186, the figure "8%" be read as "10%".
1677	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 93 of 186	12.2	Fan sizing criteria FD fan e) Air-heater air-in-leakage - Min. 10% of flue gas flow entering Bisector APH or minimum 8% of flue gas flow entering Trisector APH or actual guaranteed whichever is higherr		
1678	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 92 of 186	12.1	Fan sizing criteria ID fan e) Air-heater air-in-leakage - Based on min. 15% of flue gas flow entering PAPH & 10% of the flue gas flow entering SAPH in case of Bisector or 12% of the flue gas flow entering Trisector APH or actual guaranteed value, whichever is higher	Bidder proposes to consider actual guaranteed value of airheater leakage in ID fan sizing. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1679	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 93 of 186	12.2	Fan sizing criteria ID fan e) Air-heater air-in-leakage - Based on min. 15% of flue gas flow entering PAPH & 10% of the flue gas flow entering SAPH in case of Bisector or 12% of the flue gas flow entering Trisector APH or actual guaranteed value, whichever is higher	Customer is requested to kindly confirm acceptance to our request.	
1680	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	92 of 186	12.1,	**Fan Sizing Criteria** **ID Fans** **60% BMCR LOAD (one stream operation)** g) Pressure drop through SCR System - 150 mmWC or actual whichever is higher	Pressure drop through SCR System specified in the tender document seems to be higher side, this results in bigger ID fan and efficiency at operating point will be less. Hence bidder shall consider the pressure drop across SCR as predicted for ID fan sizing. Customer is requested to kindly confirm acceptance to our request.	In clause 12.1 (g) at Sheet 92 of 186 of Ch-1, Vol-III, the figure "150 mmwc" be read as "100 mmwc"
1681	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	92 of 186	12.1,	**Fan Sizing Criteria** **ID Fans** **60% BMCR LOAD (one stream operation)** i) Pressure drop through FGD - 200 mm WC	Minimum pressure drop across FGD shall be 150mm WC instead of 200 mm WC as stated. Kindly modify the clause accordingly.	In clause 12.1 (i) at Sheet 92 of 186 of Ch-1, Vol-III, the figure "200 mmwc" be read as "150 mmwc"
1682	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	92 of 186	12.1,	**Fan Sizing Criteria** **ID Fans** **60% BMCR LOAD(one stream operation)** k) Pressure required at chimney inlet - + 40 mmWC	In case separate booster fan is provided for FGD system, ID fan shall be sized considering +10mmWC at chimney inlet. Customer is requested to kindly confirm acceptance to our request.	Booster fan is not envisaged.
1683	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 92 of 186	12.2	Fan Sizing Criteria The fans shall also fulfill following sizing criteria in addition to those mentioned at S.No. 10.1 above. Each fan to be sized for **50% BMCR** flow calculated taking into following conditions occurring together.	Bidder proposes to consider 50% TMCR load flow and pressure in FD fan and ID fan sizing, instead of 50% BMCR load Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1684	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 92 of 186	12.2	FD fan and ID fan: Margin over 100% BMCR flow - 20% Margin over 100% BMCR pressure requirement - 44%		
1685	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	93 of 186	12.2	**Fan Sizing Criteria** **ID Fans** **50% BMCR flow** **9**) Pressure drop through SCR System - 150 mmWC or actual whichever is higher	Pressure drop through SCR System specified in the tender document seems to be higher side, this results in bigger ID fan and efficiency at operating point will be less. Hence, bidder shall consider the pressure drop across SCR as guaranteed by SCR supplier for ID fan sizing. Customer is requested to kindly confirm acceptance to our request.	In clause 12.2 (9) at Sheet 93 of 186 of Ch-1, Vol-III, the figure "150 mmwc" be read as "100 mmwc"
1686	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	93 of 186	12.2	**Fan Sizing Criteria** **ID Fans** **50% BMCR flow** 11) Pressure drop through FGD - 200 mm WC	Minimum pressure drop across FGD shall be 150mm WC instead of 200 mm WC as stated. Kindly modify the clause accordingly.	In clause 12.2 (11) at Sheet 93 of 186 of Ch-1, Vol-III, the figure "200 mmwc" be read as "150 mmwc"
1687	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	93 of 186	12.2	**Fan Sizing Criteria** **ID Fans** **50% BMCR LOAD** k) Pressure required at chimney inlet - + 40 mmWC	In case separate booster fan is provided for FGD system, ID fan shall be sized considering +10mmWC at chimney inlet.	Booster fan is not envisaged.
1688	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 97 of 186	13.1	Duct Work I. Sizing Criteria: a) Allowable velocities in the duct work. ii. Maximum gas velocity shall be 13 m/sec except flue gas duct **from ID fan outlet to chimney inlet.** iii. Maximum Flue gas velocity from **ID fan outlet to chimney** inlet shall be 16m/sec.	Bidder proposes the following in duct sizing criteria. Customer is requested to kindly confirm acceptance to our request. ii) Maximum gas velocity shall be 13m/sec except flue gas duct **from ESP outlet to chimney inlet.** iii) Maximum Flue gas velocity **from ESP out-let to chimney inle**t shall be 16 m/sec.	Bid specifications to be followed. However 20% excess air at economiser outlet be considered.
1689	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 97 of 186	13.1	Duct Work I. Sizing Criteria: b) The velocities in the ducts shall not exceed the above limits under the following conditions, all occurring together: i. Design/best/Worst coal firing at **100% BMCR** load whichever gives maximum flow. ii. **25% excess air** over and above the stoichiometric air at economizer inlet.	Bidder proposes the following in duct sizing criteria. Customer is requested to kindly confirm acceptance to our request. i) Design/best/Worst coal firing at **100% TMCR** load whichever gives maximum flow. ii. **20% excess air** over and above the stoichiometric air at economizer inlet.	Bid specifications to be followed. However 20% excess air at economiser outlet be considered.
1690	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	97 of 186	13.1.I	**Duct Work** **Sizing Criteria** b) The velocities in the ducts shall not exceed the above limits under the following conditions, all occurring together: (ii) 25% excess air over and above the stoichiometric air at economizer inlet.	As per technical specification, fan to be sized considering 20% excess air. And so, duct will also be sized considering 20% excess air. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed. However 20% excess air at economiser outlet be considered.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1691	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 97 of 186	13.1	Duct Work I. Sizing Criteria: iv. For Bisector air preheater, air in leakage 10% of flue gas flow at inlet of secondary air preheater and 15% of flue gas flow at inlet of primary air preheater or actual guaranteed whichever is higher. In case of Trisector air preheater, air heater air in leakage 12% of flue gas flow at inlet of air preheater or actual guaranteed whichever is higher..	Bidder proposes to consider actual guaranteed value of airheater leakage in duct sizing. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1692	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	Sheet 97 of 186	13.1	Duct Work I. Sizing Criteria: c)The above velocities shall not be exceeded even in case of operation with one stream of ID, FD, PA fans and air heater operation at 60% o**f BMCR load.**	Bidder proposes to consider 60% TMCR load in duct sizing velocity criteria(in one stream operation), instead of 60% BMCR load Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1693	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	101 of 186	13.1/XI.a	Metallic type expansion joints suitable for the service conditions shall be provided. The expansion joint design shall conform to the requirements of the EJMA Standards.	All Fan Inlet & Outlet Expansion Joint shall be non-metallic type suitable for the application . This is as per OEM standard practice and inline to previous executed projects. HPGCL/DESEIN to kindly accept	Bid specification to be followed, however the issue may be discussed during detailed engineering.
1694	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	118 of 186	18	Elevators Load carrying capacity : 3000 Kgs. for each passenger cum goods elevator . Rated speed : 1.0 M/sec	Please note that Rated Speed of High Load carrying passenger cum goods elevator shall be limited to 0.55 M/s, inline with previous executed project. Customer is requested to kindly confirm acceptance to our request.	Bid specification to be followed, however the issue may be discussed during detailed engineering.
1695	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	127 of 186	23.1.3, 2), i)	**Reactor Housing Design** a) The SCR reactor shall be weatherproof and water tight construction for protection from monsoon rains/winds and have drainage arrangement like gutters, drain pipes etc., as applicable, connected to plant drainage system at ground level.	Bidder will provide suitable insulation and cladding for SCR similar to RAPH for weather protection of SCR system. However, separate drainage arrangement like gutters, drain pipes etc. are not required as the SCR is kept in open area. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed, however the issue may be discussed during detailed engineering.
1696	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	129 of 186	23.1.3, 3)	**Catalyst modules** ii) The upper edge of the catalyst shall be hardened to minimize ash erosion.	Hardening of upper edge is applicable for honeycomb type catalyst only. However, technical specification calls for plate type catalyst. Hence, hardening requirement is not applicable / feasible. Customer is requested to kindly confirm acceptance to our request.	Noted.
1697	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	136 of 186	23.1.5	**CFD and Physical Flow Modeling** **1)**CFD modelling as well as physical modelling for SCR reactor, upstream duct work from economizer outlet (including economizer bypass) along with cyclone separator and downstream ductwork from SCR reactor outlet upto Air preheater inlet shall be carried out to examine and finalize the design options for the duct system, flow modification devices, Ammonia Injection Grid (AIG), etc. Modeling shall be carried out with the following objectives:	Based on bidder experience and proven practice the requirement for physical model test is not envisaged. Therefore, bidder request confirmation to carry out CFD analysis only for SCR system. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1698	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	137 of 186	23.1.5	2)The model shall predict dependencies of NH3/NO ratio, temperature, residence time and flue gas composition. The Bidder shall provide the result of computer simulation for fluid dynamics of the SCR De-NOx system at 100% BMCR, 80% BMCR, 60% BMCR and turn down load for the SCR system. Bidder shall load the final CFD model alongwith all necessary files on Owner's Computer	Flue gas composition will not be simulated by both CFD and model test. However the velocity distribution, ammonia distribution, temperature distribution study at the inlet of first SCR catalyst layer shall be conducted with CFD simulation. Customer is requested to kindly confirm acceptance to our request.	Bid specifications to be followed.
1699	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	154 of 186	23.1.23	A) SCR System Sizing shall comply the following: 2) Each Reactor shall be sized - 25% excess air	Customer is requested to note that SCR reactor shall be sized considering 20% excess air, instead of 25% excess air. Customer is requested to kindly confirm acceptance to our request.	Noted.
1700	Volume II General & Schedules	Ch 8 : Functional Guarantee & Liquidated Damages for Shortfall in Performance and Performance Guarantee Tests	7 of 57	3.1, ix)	**SCR Efficiency for Control of NOx emission** Contractor shall guarantee and demonstrate that at the end of 16000 hrs of operation and with the originally installed catalyst (i.e. without the use of future layer of catalyst) the SCR efficiency for control of NOx emission (from thermal as well as fuel) shall not be less than 80% at 6% oxygen (O2) content in flue gas on dry gas basis and ammonia slip not exceeding 3ppm at 100% TMCR load condition, when firing any coal from the range of coal(s) specified.	Discrepancy observed in the technical specification requirement about SCR efficiency for control	SCR efficiency for control of NOx Emission (%) (keeping ammonia slip within the maximum limit): - Guarantee Point: 84 - Design Point: 84 (after 16000 operational hours) NOx emission shall not exceed 80 mg/Nm^3 (with Ammonia Slip less than 3 ppm at 6% O2 dry basis) at the end of 16000 operation hours for range of coal(s) specified from 40% TMCR to 100% BMCR. *** Note: Following changes have also been incorporated in the Tender specifications: Functional Guarantees under category-I 1) In clause 3.1 (ix) at sheet 7 of 57, Chapter-8, Volume-II,

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1701	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	155 of 186	23.1.23, B), 5)	**SCR efficiency for control of Nox Emission (%) (keeping ammonia slip within the maximum limit) Guarantee Point & Design point - 85%**	of NOx emission - 80% in Vol.II, Ch.8, 3.1,vii and 85% in Vol.III, section-2, 23.1.23.B),5) As per MOEF guideline, SCR outlet NOx of 100mg/Nm3 shall be considered instead of SCR efficiency (80% or 85%) for catalyst design. Hence bidder request Customer to remove the NOx efficiency requirement	figure "80%" shall be read as "84%". 2) In clause 3.1 (ix) (4th and last line of second stanza) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%". 3) In clause 3.1 (x) at sheet 7 of 57, Chapter-8, Volume-II, figure "70%" shall be read as "75%". Functional Guarantees under category-II In clause 4.1.1 at sheet 28 of 57, Chapter-8, Volume-II, "100 grams of NOx (from themal as well as fuel) per giga joule of heat input (at 6% O2 level and as per equivalent NO2) to the boiler" shall be read as "80 mg/Nm3 (at 6% O2 level and as per equivalent NO2)". Functional Guarantees under category-III 1) In clause 5.12 at sheet 31 of 57, Chapter-8, Volume-II, "2.5 ppm" shall be read as "3 ppm". 2) Clause 5.14 at Sheet 31 of 57, Chapter-8, Vol-II stands deleted.
1702	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	155 of 186	23.1.23, B), 6)	**Inlet Dust Burden (g/Nm3) Guarantee Point & Design point - 35 OR** Ash remaining after cyclone separator collection as per Cl. no. 23.1.23, C, iii-3, whichever is higher.	Bidder request HPGCL/DESEIN to remove the inlet dust burden requirement since cyclone separator is not envisaged. Customer is requested to kindly confirm acceptance to our request.	Noted
1703	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	156 of 186	23.1.23, C), ii)	**Flue Gas Duct inlet and outlet** 1) Flue gas velocity at BMCR with **25%** excess air at economizer outlet - Max 13 m/sec with Design/Worst/Best coal whichever gives maximum flue gas flow and operating temperature corresponding to 47 deg.C ambient temperature and 60% RH	HPGCL/DESEIN to note that SCR inlet and outlet flue gas ducting shall be sized considering 20% excess air, instead of 25% excess air. Customer is requested to kindly confirm acceptance to our request.	Noted
1704	Volume III Mechanical Works	Section 2 : Design Basis Ch 1: SG & Auxiliaries	157 of 186	23.1.23, D), iii)	2) Capacity of each compressor - Min 1100 LPM, Reciprocating, oil free type	As part of safety feature for any tank truck (ammonia supply truck) design, the installation of IEFCV (Internal Excess flow check valve) on the liquid line is mandated by CCOE (Chief Controller of Explosives) to shuts off if the flow exceeds the set limit. Tanker outlet nozzle size is 2" and the rated flow for the 2" IEFCV is 150 GPM (i.e. about 560 LPM). And hence, Ammonia compressor capacity shall be selected as 560 LPM considering IEFCV. Customer is requested to kindly confirm acceptance to our request.	The capacity constraints, if any, on account of statutory requirement shall be considered.
Pulveriser Engg Points							
1705	Volume II	Ch 2 : Project Information	Sheet | 5 of 10	APPENDIX – II	Coal Properties	Bidder has reviewed the coal properties.YGP index is not given in the Coal analysis given in the tender specification. Bidder would request to specify the same for guarantee of mill wear parts.	50-70 mg/kg
1706	Volume III	Ch 1: Steam Generator & Auxiliaries	Sheet | 75 of 186	Clause No. 10.5 / XIV	b) Grinding elements (Rolls and Rings/Race) : 15000 [See note (a) below]	Bidder has reviewed the coal properties.YGP index is not given in the Coal analysis given in the tender specification. Bidder would request to specify the same for guarantee of mill wear parts.	50-70mg/kg
1707	Volume III	Ch 1: Steam Generator & Auxiliaries	Sheet | 2 of 186	Clause No. 1.0	Stream Generator should be designed for minimum 10% co-firing with Biomass Torrefied Pellets. Performance Guarantees will be on the basis of design coal.	Bidder would also request to kindly clarify the Maximum Biomass % for co-firing.	Bid specifications to be followed.
1708	Volume III	Ch 1: Steam Generator & Auxiliaries	Sheet | 74 of 186	Clause No. 10.5 / III (d)	Aerodynamic shape for vanes will be provided for effective classification. The classifier vanes and cones shall be lined with approved wear resistant material to ensure the guaranteed wear life. If required, wear lining may be provided at wear prone areas of the classifier.	M/s HPGCL to kindly note that Wear resistant Material for Classifier Vanes shall be as per Bidder's Design.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1709	Volume III				b) The YGP index for the specified coal is indicated in subsequent section when measured as per BS Standard BS-1016 Part-111. The Bidder shall furnish a curve alongwith his offer indicating the variation in guaranteed wear life with variation in YGP index of coal fired. Separate curves for different wear elements of mill shall be furnished e.g. for grinding rolls, grinding rings, clearly indicating its relationship with YGP index of coal. The curve shall be subject to Owner's approval.	Separate curve for wear element (i.e Roller & Table liner only) indicating its relationship with YGP index of coal shall be provided.	Curve is not available. Range of YGB index 50-70 mg/kg is to be considered.
Pulveriser QA Points							
1710	SECTION-M1,VOL II	Chapter 11	10 of 103	M1-2.5 (i)	Raw material for shaft, coupling, gears and pinions, top and bottom races and other rotating components shall be subjected to UT. MPI/LPI shall be carried out to check surface soundness	Forged shafts used in Roller Journal Assembly / Tensioning Parts Assembly shall be subjected to UT & MPI, as applicable, during stages of production. However, Shaft, Coupling, Gears & Pinions, Top & Bottom races and other rotating components are the part of bought-outs viz., Gear Box with Lubrication units, Hydraulic Tilting Device, Roller Loading Device etc. These are compliant to supplier internal quality norms & no reports for UT/MPI/LPI will be produced.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1711	SECTION-M1,VOL II	Chapter 11	10 of 103	M1-2.5 (ii)	Wear-resistant parts shall be UT/ RT tested to check soundness after suitable heat treatment. Check for chemical composition, hardness and microstructure shall be carried out. For ceramic materials check for various properties including hardness, density, wear rate and composition shall be carried out	Wear resistant parts viz. Roller Liners (Roller Journal Assembly) & Table Liners are composites comprising of SG Iron & Hi chrome material. For such composite material, UT/RT/MPI is technically not feasible. However, LPI shall be conducted to ensure surface integrity. (LPI acceptance norms will be as specified by the supplier specification & approved by LMB Engg).	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1712	SECTION-M1,VOL II	Chapter 11	10 of 103	M1-2.5 (iii)	Butt welds in the tube/ separator /body casing of the mill shall be tested by RT and MPI. All other welds in main tube/separator shall be tested by MPI/LPI for acceptance. The tube shall be statically balanced.	The separator & body casing of the mill are non pressure part components and hence butt welds shall be subjected to UT and LPI after PWHT, as applicable.The same inspection methodology was followed in NTPC projects like Tanda, Khargone & Buxar etc.,	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1713	SECTION-M1,VOL II	Chapter 11	10 of 103	M1-2.5 (iv)	All gearboxes shall be run tested for adequate duration to check rise in oil temperature, noise level and vibration. Check for leak tightness of gear case also shall be performed.	Trial run duration shall be as per manufacturer specification (approved by LMB-Engg). Oil leakage shall be checked during no load trial run test at supplier's works.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1714	SECTION-M1,VOL II	Chapter 11	10 of 103	M1-2.5 (v)	Fabricated pipe welds should be examined by MPI.	In case of Pulveriser mill, pipe welds are applicable only for Lower housing –seal air piping arrangement. This is a low pressure piping & hence LPI is proposed.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1715	SECTION-M1,VOL II	Chapter 11	10 of 103	M1-2.5 (viii)	Trial assembly (stacking) of atleast two Mill complete with all major components needs to be carried out at shop	At shop, only one mill will be trial assembled with 01 no. Grinding Table Assembly, 01 no. Roller Journal Assembly, 01 no. Lower Housing Assembly and 01 no. Middle Housing Assembly.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
Fan & RAPH							
1716	Volume III	Chapter 1 : Steam Generator & Auxilaries	12 of 186	1.13	Two (2) FD fans (2X60% BMCR) (Axial type, constant speed variable pitch controlled FD fans each with drive motor, base plates, foundation bolts & nuts, inlet bird and trash screen, suitable arrangement to prevent rain water entry to fan motor,	"HPGCL/DESEIN to note that fan shall be directly placed on the foundation as per the previous executed Projects. And so, base Plate is not applicable as per OEM design. Kindly accept".	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1717	Volume III	Chapter 1 : Steam Generator & Auxilaries	12 of 186	1.13	2x100% filters, differential pressure switches etc.	"Bidder shall provide DPT(differential pressure transmitter) instead of differential pressure switch inline with earlier executed project".	Bid specifications to be followed.
1718	Volume III	Chapter 1 : Steam Generator & Auxilaries	12 of 186	1.13	Two (2) ID fans (2 x 60% BMCR) (Axial type, constant speed, variable pitch controlled, with variable frequency drive) each with drive motor, base plates, foundation bolts and nuts, inlet box, discharge case, coupling, coupling guard and suitable arrangement to prevent rain water entry to fan motor,	"HPGCL/DESEIN to note that fan shall be directly placed on the foundation as per the previous executed Projects. And so, base Plate is not applicable as per OEM design. Kindly accept".	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1719	Volume III	Chapter 1 : Steam Generator & Auxilaries	17 of 186	1.15.4	Two (2) numbers of two stage axial PA fans for steam generator, with hydraulic blade pitch control / Radial type with variable speed, with VFD control system each with motor, base plates, foundation bolts, inlet box, inlet bird and trash screen, inlet rain water canopy, inlet cone, diffuser, coupling, coupling guard and silencer,	"HPGCL/DESEIN to note that fan shall be directly placed on the foundation as per the previous executed Projects. And so, base Plate is not applicable as per OEM design. Kindly accept".	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1720	Volume III	Chapter 1 : Steam Generator & Auxilaries	18 of 186	1.15.4	2x100% oil filters along with differential pressure switches etc.	Bidder shall provide DPT(differential pressure transmitter) instead of differential pressure switch inline with earlier executed project.	Bid specifications to be followed.
1721	Volume III	Chapter 1 : Steam Generator & Auxilaries	83 of 186	10.8	Base plate - cast iron or welded steel.	HPGCL/DESEIN to note that fan shall be directly placed on the foundation as per the previous executed Projects. And so, base Plate is not applicable as per OEM design. Kindly accept	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1722	Volume III	Chapter 1 : Steam Generator & Auxilaries	84 of 186	10.8	Each bearing shall be provided with an oil level indicator and screwed drain plug.	Bidder will use oil circulation system wherein oil level indicator is placed in oil reservoir. Separate oil level indicator and drain plug at the bearing housing is not required and not feasible either.	Bid specifications to be followed.
1723	Volume III	Chapter 1 : Steam Generator & Auxilaries	95 of 186	12.6	Size oil reservoir in bearings housing for maintaining lubrication for extended periods in case of oil circulation system is out of service.	Bidder offers antifriction bearings for Fan with oil circulation system as per OEM design. The oil bath available in these bearing housings will be sufficient while the fan is coasting down (during loss of plant auxiliary power). However, we do not recommend running the Fans when the oil circulation system is out of service for any "extended period". In case of lube oil system being "out of service", the fan need to coast down immediately.	Bid specifications to be followed.
1724	Volume III	Chapter 1 : Steam Generator & Auxilaries	95 of 186	12.6	Cooling air circulation to be provided across main bearing if applicable	Please note that Cooling of main bearing housing is not applicable in the design by bidder's OEM, cooling of bearing are carried out by the circulating lubrication system. Kindly accept the same.	Bid specifications to be followed.
1725	Volume III	Chapter 1 : Steam Generator & Auxilaries	95 of 186	12.7	The fans shall be statically and dynamically balanced before shipment.	Blades will be balanced statically and hubs will be balanced dynamically at its workshop. The combination of. these will therfore be a balanced rotor.	Bid specifications to be followed.
1726	Volume III	Chapter 1 : Steam Generator & Auxilaries	95 of 186	12.7	Balancing of each fan shall be checked and adjusted at site, if necessary.	Blades and Hub will be balanced separately at the workshop itself and in view of this site balancing is not required.	Bid specifications to be followed.
1727	Volume III	Chapter 1 : Steam Generator & Auxilaries	95 of 186	12.7	Natural frequency of all fan components shall be established by vibration testing to ensure that no part of the wheel is adversely excited by any force generated at operating speeds.	Bidder's OEM will carry out natural frequency test for one set of blades for one Hub for the first set of fans as per OEM's practices. Natural frequency test is not required for other rotating parts.	Bid specifications to be followed.
1728	Volume III	Chapter 1 : Steam Generator & Auxilaries	96 of 186	12.11	The fan casing shall be split to provide easy removal of the fan hub/impeller for replacement and repairs.	Bidder's OEM design consists of rolling diffuser / inlet box for onsite maintenance,diffuser (in case of single stage and two stage fans) and inlet box (in case of two stage fans only) are mounted on rails for easy maintenance of hubs and blades.However Fan components like inlet box and diffuser will be supplied in split for ease of transportation and handling at site.	Bid specifications to be followed, however, the issue may be discussed during detailed engineering.
1729	Volume III	Chapter 1 : Steam Generator & Auxilaries	14 of 186	1.14	Forced lubrication system for bearing of each air heater shall be provided and shall include two (2) x 100% capacity oil pumps with motor, two (2) x 100% oil coolers, two (2) x 100% oil filters, one (1) oil tank etc	HPGCL/DESEIN to note that Oil unit system shall be provided which is without oil tank. The scope of instruments shall be furnished separately after detailed review of specifications	Bid specifications to be followed.
1730	Volume III	Chapter 1 : Steam Generator & Auxilaries	14 of 186	1.14	15. Temperature switches on bearings for interlock purpose.	Please note that temperature transmitters in the bearing shall be provided instead of temperature swithces linline with previous executed projects.	Bid specifications to be followed.
1731	Volume III	Chapter 1 : Steam Generator & Auxilaries	66 of 186	9.1	Heating Elements a) Cold end Made of corten steel, minimum 1.2 mm thick b) Hot / Intermediate end- Made of carbon steel minimum 0.8 mm thick.	Bidder propose the following heating element thicknesses 1. Hot End - 0.6 mm / MS 2. Hot Intermediate - 0.6 mm / MS 3. Cold End - 0.8 mm / LACR HPGCL/DESEIN to kindly confirm	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
1732	Volume III	Chapter 1 : Steam Generator & Auxilaries	67 of 186	9.1	The maximum air-in leakage to flue gas after 3000 hours continuous operation of the boiler with coal shall be guaranteed and demonstrated. The Bidder shall also demonstrate that the drift in air heater leakage (percentage change in air-in-leakage) does not exceed 1%, one year after demonstration of above guaranteed air-inleakage. Within this period of operation till all air heater leakage demonstrations are completed only external adjustments of seals, without needing any shut down for replacements and without internal adjustments, shall be allowed. The seal design/construction shall be such that the above requirements are satisfied.	The air heater sealing system, and thus leakage will be adversely impacted by operating conditions beyond the control of bidder. For example, operating the air heater with gas flow and little to no air flow (bottle-up) will result in extensive wear and damage to the hot end radial seals, hot end sector plates, hot end circ seal (and possibly its holding bar) and cold end axial and circ seals. Similarly, operation at elevated gas temperature may result in larger than expected rotor capping/turndown, resulting in seal wear and possible damage to the seals and cold end sector plates. Demonstration of guaranteed leakage values is contingent upon the air heater sealing system being in the as-designed condition as called for in the ASME PTC 4.3 test code. The code recommends that the sealing system be inspected, and all necessary repairs carried out, just prior to guarantee testing to ensure that the equipment is suitable for testing. Based on various testing experience in last few scenarios it was noticed that the RAPH is being operated within initial 3000 hours including bottling-up and elevated temperature scenarios as indicated above, which in turn impact the part and thereyby the performance as informed above. Hence, Bidder does not recommend the leakage guarantee demonstration after 3000 hours of operation and demonstration of 1% drift one year after the initial demonstration/ operation. Instead, we recommend as below: 1. The APH Leakage demonstration test shall be undertaken along with Boiler PG Test or within 3000 hours of Steam Generator Unit Operation whichever comes earlier. 2. Post the above period, the Air heater leakage value shall be compensated with drift applicable (1% drift per year) prorated to the amount of hours exceeded from the above said period. 3. Prior to Air Preheater PG test, internal inspection / adjustment of Air Preheater Seals & Sealing surfaces are required as per Air preheater test code ASME PTC 4.3.	Bid specification to be followed.
1733	Volume III Mechanical Works _____ Volume III Mechanical Works	Ch 1: Steam Generator & Auxiliaries Ch 1: Steam Generator & Auxiliaries	28 of 186 122 of 186	1.29 23	Selective Catalytic Reduction System (SCR) 1.29.1 The scope of supply include design, engineering, manufacture, supply, erection, commissioning and testing of complete mechanical, electrical, C&I and associated civil foundation and structural work for Selective Catalytic Reduction (SCR) System along with ammonia unloading, storage and handling system, Cyclone Separators complete in all respects with all components and accessories etc., for one (1) steam generator as detailed in this specification. SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM AND AUXILIARIES	Bidder request Owner to consider Steam Generator "SCR Ready" in present scope of work instead of SCR system, wherein necessary provisions made in the boiler such that SCR can be integrated at later stage if need arises. This is in-line with the provision specified in recent NTPC tenders.	Bid Specification to be followed

Lot-1 (Commercial)

S. No.	Section / Part / Chapter / Volume	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of Pre-bid Query & Clarification	HPGCL Response
1	Sec-II, ITB	-	22 of 75	11.1	The plant and equipment including type test charges and mandatory spares to be supplied from abroad (Schedule-1) may be quoted in either one (1) of the three (3) foreign currencies i.e. (US $ or Euro or Yen).	Owner may kindly note that our associates/collaborators are located in Japan and there are many other equipment and components which are required to be imported from foreign countries other than Japan. Therefore, we request Owner to modify the clause as below: The plant and equipment including type test charges and mandatory spares to be supplied from abroad (Schedule-1) may be quoted in **combination** ~~either one (1)~~ of ~~the~~ three (3) foreign currencies i.e. (US $ **and/**or Euro **and**/or Yen). This is in line with all ICB tenders published by Central & State Utilities.T Kindly confirm.	In addition to INR, two foreign currencies i.e. USD & YEN will be allowed.
2	Sec-II, ITB	-	31 of 75	27.2 (iv)	The Owner's evaluation of a bid will take into account the following: i. The bid prices indicated in Price Schedules Nos. 1 to 4 ii. Price Schedule No. 7 & 7A iii. The corrections pursuant to ITB sub-clause 26.2 iv. Adjustment for the functional guarantees of the facilities offered in attachment-6(P) to price bid. v. Bid Price for Optional Item/works quoted in Schedule 12	We request Owner to remove functional Guarantee from Price bid evaluation. Instead, we request Owner to specify limiting values for critical Performance Guarantee Parameters like Heat Rate, Aux Power etc. in line with practice followed by Central Utilities and accordingly introduce a provision that any bids quoting higher values from the limiting values shall be rejected. No credit will be given for lower values quoted from the limiting values.	Bid specifications to be followed.
3	Sec-II, ITB	-	19 of 75	10.4 (C)	In case Installation Price (Excluding Civil/Site Fabricated Structural works price) is less than 12.5% of the cumulative total of CIF & Ex-works Price of Main Equipment, the amount by which it is lower shall be retained proportionately from the CIF & Ex-works component of Contract Price while releasing supply payments and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on Final Taking Over of the plant.	Keeping such restriction in pricing will impact the bidder's cashflow and the bidder will be forced to change the price breakup w.r.t. actual expenses. Therefore, we request Owner to kindly remove such restriction and allow bidders to specify the breakup based on Bidder's experience/estimate.	Bid specifications to be followed.
4	Sec-II, ITB	-	19 of 75	10.4 (f)	In case Civil/Site Fabricated Structural works price (excluding Installation price) is less than 15% of the cumulative total of CIF & Ex-works Price of Main Equipment, the amount by which it is lower shall be retained proportionately from the CIF & Ex-works component of Contract Price while releasing supply payments and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on Final Taking Over of the plant.		
5	Sec-II, ITB	-	19 of 75	10.4 (g)	In case the Civil/Site Fabricated Structural works price (excluding Installation price) is above 25% of the cumulative total of CIF & Ex-works Price of Main Equipment, the amount by which it is higher shall be retained proportionately while releasing progressive payments, and no interest shall be payable on the retained amount. The aforesaid retained amount shall be paid on Final Taking Over.		

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
6.	Sec-II, ITB	-	38 of 75	34.1	**Contract Performance Security:** Within thirty (30) days after the date of LOI, the successful Bidder shall furnish contract performance securities for ten percent (10%) of Contract Price for all the contracts and in the form provided in the Annexure-A to GCC.	The after-effects of Covid-19 pandemic are still continuing which caused severe damage to global economy and India is not exception to it. All business houses are struggling and are yet to get over the impact of pandemic. Considering the same Ministry of Finance had extended the validity of its OM No. F.9/4/2020-PPD dated 12th Nov'2020, regarding reduction of Performance Security to 3% of Contract Price for tenders issued till 31st March 2023 vide an OM dated 30th Dec'2021. We therefore request Owner to reduce the value of performance Security from 10% to 3% of Contract Price. Accordingly, all Performance Security related clauses stipulated elsewhere in the bidding documents may please also be modified.	Bid specifications to be followed.
7.	Sec-II, ITB	-	41 of 75	43.0	**Royalty** The bid price shall be inclusive of any Royalties or Seigniorage fee or cess or other charges payable on the quarried or mined metal, minerals or minor minerals as the case may be, at the rate(s) prevailing as on seven (7) days prior to the date of bid opening.	We understand statutory variation, if any, for Royalties beyond Techno- Commercial bid (Part-I) opening date shall be reimbursed by Owner. Kindly confirm our understanding. The request is in line with all Central & State Utilities tenders.	In Clause 43.0 at Sheet 41 of 75 of ITB / Section-II / Vol-I, the words "date of bid opening " be read as "date of opening of Part-I (Techno- Commercial) bid".
8.	Sec-IV, GCC	-	4 of 80	3.25	"Effective Date of contract" shall mean the date of issuance of Letter of Intent (LOI)	We understand, "Effective Date of contract" shall mean the date of issuance of Letter of Intent (LOI) subject to availability of all statutory clearances under Owner's responsibility mentioned in Annexure-G. Kindly confirm our understanding.	Bid specifications to be followed.
9.	Sec-IV, GCC	-	19 of 80	9.13.4 (b)	…… At any given point in the project if the deviation is beyond 60 days from the schedule, HPGCL shall have the right to take alternate corrective measure to bring back the activity(s) to the schedule at Contractor's risk and cost.	The project schedule is subject to extension for various reasons, if required. Further, Contractor can anytime catch-up the schedule with additional mobilization. Hence, such generic clause may invite dispute during execution. Therefore, we kindly request Owner to delete this provision.	In last para of Clause 9.13.4(b) at Sheet 19 of 80 of GCC / Section-IV/Vol-I, the word "60 days" be read as "90 days".
10.	Sec-IV, GCC	-	22 of 80	12.4	**Assignment and subletting of part of Contract:** Contractor shall have to obtain specific approval from the Owner to sublet civil works as well as unloading, storage and erection works of this project.	EPC Contractor is responsible for timely delivery of the Project complying all the Technical Specification. Further, such large EPC Contract will have numbers of sub-contracts. Hence, prior approval for each and every sub- contract from Owner for Civil Work, Storage and Installation work will only delay the process. Hence, we request Owner to delete the referred provision.	Bid specifications to be followed.
11.	Sec-IV, GCC	-	22 of 80	12.5	The contractor shall provide to the Owner unpriced copies of all contracts between sub-contractors and themselves. The contractor shall ensure that all such sub-contracts are made in writing.	EPC Contractor is responsible for timely delivery of the Project complying all the Technical Specification. Hence, request Owner to delete the referred provision.	Bid specifications to be followed.
12.	Sec-IV, GCC	-	22 of 80	12.6	The sub-contractor shall cause all warranties provided to the contractor under any sub-contract to be assignable to the Owner or its designee and shall assign to the Owner the benefit of all unexpired sub-contract warranties (excluding performance or schedule guarantees for which liquidated damages are provided as a remedy) upon the expiration of the warranty period, or earlier, at the Owner request, provided the contractor shall continue to be responsible for all contractual obligations under the contract.	Contractor shall be responsible for a Warranty Period as specified in Clause 35.2 of GCC including all applicable amendments, if any. EPC Contractor generally carries risk of short warranties from sub-contractors, if any. Hence, we do not envisage any additional warranty period assignable to Owner. Kindly confirm.	Bid specifications to be followed.
13.	Sec-IV, GCC	-	23 of 80	14.0	**Contract Price:** The indigenous portion of the contract price as indicated in Schedule 2 & 4 [Schedule of Prices] excluding price of mandatory and recommended spares shall be subject to adjustment in accordance with the provision of Annexure-K to the GCC.	In view of fluctuating oil prices and present market volatility, we request Owner to kindly allow Price Adjustment for Mandatory spares, recommended spares and Transportation under referred provision. The request is in line with all Central Utility tenders.	Price adjustment for mandatory spares is allowed if the spares are supplied alongwith the main equipment. Accordingly in Clause 14.0 of GCC at Sheet 23 of 80 in Vol-I, the word "mandatory and" is deleted. In Clause (i) (a) of Annexure-K of Section-IV (GCC) at page 63 of 97 in Vol-I, the words "Mandatory Spares manufactrured within the Owner's Country and" stands deleted. In Clause (vi) of Annexure-K of Section-IV (GCC) at Page 63 of 97 in Vol-I, the word "Mandatory Spares and" stands deleted. Similary, the price adjustment clauses at other places shall be read accordingly.
14.	Sec-IV, GCC	-		Annexure K	**Price Adjustment:** The price adjustment provisions shall be applicable separately for price components relating to Supply of Equipment from Owner's country only, Installation, Civil and Structural Works, as per price break-up furnished by the Contractor in Schedule-2 and Schedule-4. The price adjustment considering variation of all factors shall have ceiling of + 20% for the contract price for equipment/ system, installation, civil works and site fabrication structures as mentioned in S. No. (i) above. The ceiling of + 20% shall be separately applicable for each of the above component	Considering recent past commodity price movement, we request Owner to keep the Price adjustment provision without any ceiling. This is in line with all Central & State Utility A19:G25tenders. Kindly confirm.	The last line "The ceiling of + 20% shall be separately applicable for each of the above component" of clause (ii) of Anexure-K at Sheet 63 of 97 of GCC Annexures, Sec. IV, Vol.I shall be read as "The PVC ceiling of ± 20% shall be linked with overall cost of all items of schedule-2 & schedule-4 (Except training charges)"

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
15.	Sec-IV, GCC	-	26 of 80	14.3.2 (v)	In case the Owner refuses to admit that any variation directed by him involved extra work or extra materials entitling the contractor to claim extra payment, the contractor shall, nevertheless if so required by the Owner, carry out the same and the matter in difference shall be decided by Arbitration as provided in the contract.	We request Owner to modify the clause as below: "In case the Owner refuses to admit that any variation directed by him involved extra work or extra materials entitling the contractor to claim extra payment and extension of time, ~~the contractor shall, nevertheless if so required by the Owner, carry out the same an d~~ the matter in difference shall be decided by Arbitration as provided in the contract." Contractor will carry out all the work except the disputed one.	Bid specifications to be followed.
16.	Sec-IV, GCC	-	33 of 80	20.1.1	**Liquidated Damages (LD) for Delay in Completion:** Stage LD will be leviable on the following intermediatory stages: 1. Boiler light-up: 0.75% of Unit Contract Price 2. Putting the Turbine on Barring Gear: 0.75% of Unit Contract Price	Contractor shall be responsible for timely completion of the Project i.e. completion of trial operation in 48th months and Final Taking Over by 52 months, as specified in Tender. Accordingly, we request Owner to remove the Intermediate milestone LD provision.	Bid specifications to be followed.
17.	Sec-IV, GCC	-	34 of 80	20.1.2	If the Contractor fails to achieve final taking over of the unit/s within stipulated period indicated vide Clause no 1.0 of SCC, the Contractor shall pay to the Owner Liquidated damages for the delayed period at the rate of ¼% total contract price per week of delay or part thereof for a period of four (4) weeks delay. Subsequently LD shall be levied @ ½% of total contract price per week of delay or part thereof. The total amount of liquidated damages for delay shall be subject to a maximum of ten percent (10%) of the Total Contract price plus GST	1) 10% delay LD ceiling is very high. We request owner to reduce the delay LD cap to 5%. This is in line with other state and central utilities. 2) As per circular of Ministry of Finance, Deptt of Revenue No. 178/10/2022/GST dated 3- Aug'2022 GST is not applicable in cases of Liquidated Damages. Hence, we request Owner to delete the Note regarding applicability of GST on LD. Kindly confirm.	1) Bid specifications to be followed. 2) Govt. of India notifications in respect of GST will be followed.
18.	Sec-IV, GCC	-	34 of 80	20.2.2	**Liquidated Damage for Shortfall in Guaranteed Performance Parameters**: If the total liquidated damage for short fall in guaranteed performance is less than or up to twenty percent (20%) of Contract Price, the plant/system will be accepted after levying the liquidated damage as specified. If the total liquidated damage for shortfall in performance guarantee exceeds twenty percent (20%) of the Contract Price, the Contractor shall carry out necessary modification to make the system comply with guaranteed requirement. However, if the Contractor is not able to demonstrate guaranteed performance even after the modification within 90 days of notification by the Owner, the Owner may at his discretion reject the plant and recover the payment already made for the entire Contract or accept the equipment after levying the liquidated damage at actuals.	☐ We request Owner to reduce the liquidated damage for performance guarantee to 15% instead of present 20%. . We also request to Owner to provide 180 days (instead of present 90 days) window for modification and demonstration of performance guarantee parameters.	Bid specifications to be followed.
19.	Sec-IV, GCC	-	35 of 80	20.3	Contractor's aggregate liability to pay liquidated damages for delay in completion of project and for shortfall in guaranteed performance parameters, cumulatively shall not exceed twenty five percent (25%) of the Contract Price, which is a genuine pre-estimate of damages and not by way of penalty.	We request Owner to modify the clause as below: Contractor's aggregate liability to pay liquidated damages for delay in completion of project and for shortfall in guaranteed performance parameters, cumulatively shall not exceed twenty five percent (~~25%~~) 20% of the Contract Price, which is a genuine pre-estimate of damages and not by way of penalty	Bid specifications to be followed.
20.	Sec-IV, GCC	-	37 of 80	22.2	Notwithstanding the foregoing, none of the following shall constitute an event of Force Majeure hereunder: (A) the failure of any Sub-contractor, supplier or vendor to perform its obligations to Contractor, which failure is not itself caused by Force Majeure with respect to such Sub-contractor, supplier or vendor; (B) financial difficulty suffered by Contractor or any supplier, Sub- contractor, supplier or vendor in performing its obligations; (C) failure of any equipment, system or component related to the Project, which failure is not itself caused by Force Majeure; or (D) strikes or labour disturbances at site or at the Contractor's / Sub- Contractor's works; (E) unforeseen sub-surface conditions as per Clause 1.1.1 of ITB	We understand that Sl. No. (D) strikes or labour disturbances at site or at the Contractor's / Sub-Contractor's works shall not be considered as Force Majeure, if the reasons are solely attributable to the Contractor. If strikes or labour disturbances take place which are beyond control of the Contractor then aforesaid clause shall not be applicable. Kindly confirm our understanding.	In Clause 22.2 at Sheet 37 of 80 of GCC / Sec. IV / Vol-I, S.No. (D) be read as"strikes or labour disturbances at site (except attributable due to Owner) or at the Contractor's / Sub-Contractor's works;"
21.	Sec-IV, GCC	-	39 of 80	22.5	**Consequences of Force Majeure:** Any time period specified for the performance of any obligations hereunder by the Affected Party shall be extended by a period equal to the duration of the Force Majeure Events, provided that the Affected Party shall not be entitled to any extension to the extent that such delay or failure to perform would have occurred irrespective of the Force Majeure event or circumstance.	We request Owner to add the following clause at the end of 22.5. This is in line with other Central Utility tenders: **If the performance of the Contract is substantially prevented, hindered or delayed for a single period of more than sixty (60) days or an aggregate period of more than one hundred and twenty (120) days on account of one or more events of Force Majeure during the currency of the Contract, the parties will attempt to develop a mutually satisfactory solution for time and cost compensation, failing which the dispute shall be resolved in accordance with GCC Clause 26 Settlement of Disputes/Conciliation/Arbitration.**	Bid specifications to be followed.
22.	Sec-IV, GCC	- -	40 of 80	-	New Clause **"Termination by Contractor"**	We request Owner to kindly include a new clause as below:	Not acceptable.
23.	Sec-IV, GCC	- - -	50 of 80	-	New Clause "**Suspension by Contractor**"	We request Owner to kindly include a new clause as below: Suspension by Contractor: If	Not acceptable
24.	Sec-IV, GCC	-	42 of 80	26.5	If amicable settlement cannot be arrived at, the dispute shall be settled by the arbitration of a Sole Arbitrator to be appointed with mutual consent of both the parties from the panel of Arbitrators to be suggested by HPGCL.	Bidder's Request to modify clause as below: If amicable settlement cannot be arrived at, the dispute shall be settled by the arbitration ~~of a Sole Arbitrator to be appointed with mutual consent of both the parties from the panel o f Arbitrators to be suggested by HPGCL.~~ **There shall be three (3) arbitrators of whom each Party shall appoint one. Third Arbitrator shall be selected by other two appointed Arbitrators within 30 days of selection of 2 Arbitrators to form Arbitration Committee.**	Bid specifications to be followed.
25.	Sec-IV, GCC	-	49 of 80	33	**Suspension of Work:** At any time after suspension under sub-clause 33.2, the Owner may instruct the Contractor to proceed with the delivery of plant and/or work the subject of suspension under sub-clause 33.2. Upon receipt of such instructions, the Contractor shall examine the plant and work affected by the suspension and shall remedy any deterioration or defect in or loss of such plant or work that may have occurred during the suspension.	If any repair/remedy work to be carried out by Contractor due to deterioration or defect occurred during suspension, for which Contractor is not responsible, suitable cost & time compensation shall be made by Owner to Contractor. Kindly confirm.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
26.	Sec-IV, GCC	-	52 of 80	35.2	**Warranty:** The Contractor shall warrant the equipment to be new and in accordance with the Contract documents and free from defects in design, material and workmanship for a period of twelve (12) calendar months commencing immediately upon final taking over of Unit and balance of plant system equipment.	Final taking over will occur after completion of both Trial Operation and PG test whereas plant will start operating after successful completion of Trial Operation. Therefore, in line with standard industry practice, the Defect Liability Period should commence from Trial Operation. Therefore, we request Owner to modify the clause as below: The Contractor shall warrant the equipment to be new and in accordance with the Contract documents and free from defects in design, material and workmanship for a period of twelve (12) calendar months commencing immediately **from Commercial Operation** ~~upon final taking over of Unit and balance of plant system equipment.~~	Bid specifications to be followed.
27.	Sec-IV, GCC	-	53 of 80	35.2	Notes: 1) The contractor shall be liable irrespective of the operation/ generation of power subsequent to the commercial operation declaration of the Unit by the Owner.	We understand, the Contractor shall not be responsible for the repair, replacement or making good of any defect or of any damage to the Facilities arising out of or resulting from any of the following causes: (a) If the Owner has not operated the equipment according to the generally approved industrial practices and in accordance with the conditions of operation specified and in accordance with operating manuals, if any. (b) failures resulting from unauthorized repair or adjustments (c) normal wear and tear (d) improper repair outside of good engineering practice. Kindly confirm our understanding.	Bid specifications to be followed.
28.	Sec-IV, GCC	- - -	52 of 80	35.2	In the event of an emergency, where in the judgement of the Owner, delay would cause serious loss or damage, repairs or adjustments may be made by the Owner or a third party chosen by the Owner with notice to the Contractor and the cost of such work shall be paid by the Contractor.	We request Owner to REPLACE the following clause in place of referred clause: ~~In the event of an emergency, where in the judgement of the Owner, delay would cause serious loss or damage, repairs or adjustments may be made by the Owner or a third party chosen by the Owner with notice to the Contractor and the cost of such work shall be paid by the Contractor.~~ **If the Contractor is unable or unwilling to do such work immediately, the Owner may do or cause such work to be done as the Owner may determine is necessary in order to prevent damage to the Facilities. In such event the Owner shall, as soon as practicable after the occurrence of any such emergency, notify the Contractor in writing of such emergency, the work done and the reasons therefor. If the work done or caused to be done by the Owner is work that the Contractor was liable to do at its own expense under the Contract, the reasonable costs incurred by the Owner in connection therewith shall be paid by the Contractor to the Owner. Otherwise, the cost of such remedial work shall be borne by the Owner.**	Bid specifications to be followed.
29.	Sec-IV, GCC	-	54 of 80	35.16	If the Contractor fails to commence the work necessary and proceed diligently to remedy such defect or any damage to the Facility caused by such defect within a reasonable time (which shall in no event be considered to be not more than two (2) days), the Owner may, following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by the Owner in connection therewith shall be paid to the Owner by the Contractor or may be deducted by the Owner from any monies due to the Contractor or claimed under the Performance security.	Two days' time period to commence the work is very short and unreasonable in some cases, depending upon nature of defects. Thus, we request Owner to increase the reasonable commencement time period to 30 days, instead of 2 days.	In Clause 35.16 at Sheet 54 of 80 of GCC / Section-IV / Vol-I, the word ''two (2) days'' be read as "seven (7) days"
30.	Sec-IV, GCC	-	58 of 80	35.9	At the end of the Warranty Period, the Contractor's liability ceases except for latent defects. In respect of goods supplied by Sub-contractors to the Contractor where a longer warrantee (more than 12 months) is provided by such Sub Contractors, the Owner shall be entitled to benefit of such longer guarantees.	Contractor shall be responsible for a Warranty Period as specified in Clause 35.2 of GCC including all applicable amendments, if any. EPC Contractor generally carries risk of short warranties from sub-contractors, if any. Hence, we do not envisage any additional warranty period assignable to Owner. Kindly confirm.	Bid specifications to be followed.
31.	Sec-IV, GCC	-	58 of 80	43.4	The Contractor shall provide the Owner with manufacturing drawings, material specifications, catalogues, assembly drawings and any other document required by the Owner so as to enable the Owner to identify the spares. Such details shall be furnished to the Owner as soon as they are prepared but in any case not later than six (6) months after the date of LOI.	We request Owner to modify the clause as follows: The Contractor shall provide the Owner with **non-proprietary type of** manufacturing drawings, material specifications, catalogues, assembly drawings and any other document required by the Owner so as to enable the Owner to identify the spares. Such details shall be furnished to the Owner as soon as they are prepared but in any case not later than six (6) months ~~after the date of LOI. Prior~~ **to commencement of manufacture of the corresponding main equipment**	In Clause 43.4 of Section-IV (GCC) at Sheet 58 of 80, Vol-I, the last words "after the date of LOI" be read as "to commencement of manufacture of the corresponding main equipment."
32.	Sec-IV, GCC	-	59 of 80	43.7	The Contractor shall guarantee the long-term availability of spares to the Owner for the full life the equipment covered under the Contract. The Contractor shall guarantee that before "going out of production" of spare parts of the equipment covered under the Contract, he shall give the Owner at least (36) thirty six months advance notice so that the latter may order his bulk requirement of spares, if he so desires.	It is not possible for Contractor to provide guarantee for long term availability of spares for full life of equipment as same is beyond our control. Moreover, Contractor cannot guarantee for advance intimation to Owner, as any vendors are not intimating in 36 months advance for any materials/parts going out of production. Hence, request Owner to modify the clause as follows: The Contractor shall guarantee the long-term availability of spares to the Owner for the full life the equipment covered under the Contract. The Contractor shall guarantee that before "going out of production" of spare parts of the equipment covered under the Contract, he shall give the Owner at least ~~(36) thirty six~~ **(12) Twelve** months advance notice so that the latter may order his bulk requirement of spares, if he so desires.	In clause no. 43.7 at Sheet no. 59 of 80 of GCC/Section. IV/Vol.I the words "atleast (36) thirty six months" shall be read as "atleast (18) Eighteen months"
33.	Sec-IV, GCC	-	59 of 80	43.8	Further in case of discontinuance of supply of spares by the Contractor or his Sub Contractors, the Contractor shall provide the Owner with full information for replacement of such spares with other equivalent makes, if so required by the Owner.	Vendors being OEM for any equivalent make of spares, request Owner to get such details directly from vendors.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
34.	Sec-IV, GCC Sec-IV, GCC	-	61 of 80 62 of 80	44.3 44.5.1	Payment Schedule/Cash Flow Schedule: The format for the payment/cash flow schedule is as given in Annexure- E (GCC). **Mode of Payment:** Unless otherwise modified as per the Terms of Financing, the Owner will make payment in Indian Rupees/Foreign Currency as quoted / mention in the contract through financial institution with whom the finance is tied up for payments due under the Contract as per the cash flow schedule for each quarter and valid for the quarter. It will be the responsibility of the Contractor to utilize the available fund to the fullest extent. In case, the available fund is not fully utilized, the commitment charges to the financial institution shall be to the Contractor's account.	Contractor's Cashflow during award of Contract is subject to changes in Project Schedule. Further such commitment charges are Developer's risk. Contractor shall put his best effort to meet the projected cashflow, however, in case of over/under utilization of fund, corresponding commitment charges, if any shall be Owner's account. Accordingly, we request Owner to delete this provision.	Bid specifications to be followed.
35.	Sec-IV, GCC	-	63 of 80	44.5.1 (ii)	The payment of the advance amount, Type Test Charges if any, price adjustment amounts, all supply payments, taxes and duties (wherever admissible) inland transportation (including port handling if any) insurance and the Installation Portion of the Facilities including Civil, Structural and Allied Works (if any), shall be made direct to the Contractor by the Owner and no L/C shall be established by the Owner for such payments.	We request Owner to establish an irrevocable Letter of Credit (L/C) in favour of the Contractor through the Owner's Bank in Owner's country for payments due, as per Terms of Payment, on despatch of equipment including Mandatory Spares i.e. Ex- Works / CIF despatch of equipment including Mandatory Spares (including due payments towards Ocean Freight and Marine Insurance). The value of L/C will be as per payment schedule for each quarter and valid for a quarter. This is in line with tender conditions of Central & State Utilities.	Bid specifications to be followed.
36.	Sec-IV, GCC	-	63 of 80	44.6.3.1	**I. A** Five percent (5%) of the Total Ex- Works Supply Price Component of Contract Price as Interest free initial advance payment shall be paid on fulfilment of the following: (i)…. (ii)…. (iii)… (iv)…. (v)…. (vi) Submission of a detailed PERT Network based on the Work Schedule and its approval by the Owner.	Improved payment terms are the fundamental requirement for such mega project. Hence, adequate advance payment is not only critical for improved cash flow but also in turn will help in project completion on time. Considering the same Other Central Utilities have already increased advance payment percentage. Accordingly, we request Owner to modify the clause as below: ~~Five~~ **Ten** percent (~~5%~~ **10%**) of the Total Ex Works Supply Price Component of Contract Price as Interest free initial advance paymen t shall be paid on fulfilment of the following: (i)…. (ii)…. (iii)… (iv)…. (v)…. (vi) Submission of detailed PERT Network based on the Work Schedule ~~and its approval by the Owner.~~ Accordingly, we also request Owner to adjust the receipt payment as follows: ~~**Twenty Percent (20%)**~~ **Fifteen Percent (15%)** of Total CIF/Ex- Works Supply Price Component of the Contract Price for each identified equipme nt **on receipt of equipment at site to and on physical verification** and acceptance by the Owner for the spares received in good condition and stored at site and Despatch Instructions issued by the Owner. We also understand, first instalment of advance shall be released within 1 month of LOI.	Bid specifications to be followed.
37.	Sec-IV, GCC	-	65 of 80	44.6.3.1	**I. B** Further Five percent (5%) of the Total Ex-Works / CIF Supply Price component of Contract Price as Interest Free advance payment shall be paid after six (6) months of release of 1st Advance on fulfilment of following: (i)… (ii)… (iii) Supply and installation of DMS System as per Chapter 20, Vol.VI. However, in case the installation of DMS System is delayed (1% advance value out of advance of 5% shall be released after installation of DMS System).	DMS system readiness will take place at later stage of the Project, accordingly we request Owner to delink the 2nd instalment of advance payment from DMS system readiness and modify the clause as below: Further Five percent (5%) of the Total Ex-Works / CIF Supply Price component of Contract Price as Interest Free advance payment shall be paid ~~after~~ **within** ~~six (6)~~ **three (3)** months of release of 1st Advance on fulfilment of following: (i)…. (ii)… ~~(iii) Supply and installation of DMS System as per Chapter 20, Vol.VI. However, in case the installation of~~ ~~DMS System is delayed (1% advance value out of advance of 5% shall be released after installation of DMS System).~~	Clause 44.6.3.1- I.B(iii) at Page-65 of 80 of Section-IV/GCC/ Vol-I stands deleted.
38.	Sec-IV, GCC	-	65/69/71/73 of 80	44.6.3.1.IV 44.6.3.3.III 44.6.3.4. III 44.6.3.5.VI	Ten Percent (10%) of CIF/ Ex-works Supply Price Component of the contract price on Successful Final Taking Over of the plant. Ten Percent (10%) of total Installation Services Component of Contract Price (excluding Civil and Site Fabricated Structural Works) on Final Taking Over. Ten Percent (10%) of total Civil Works Price component of Contract price shall be paid on Final Taking Over. Ten Percent (10%) of total Structural Works Price Component of Contract Price on Final Taking Over.	10% retention amount for Supply & Service is very high. Such high retentions till 52 months will result into substantial blockage of funds leading to a negative cash flows and requirement of huge working capital to be arranged by the EPC Contractor. Accordingly, we request Owner to modify the last retention payment as follows: (i) 5% on Completion of Trial Operation/ Commercial Operation whichever is earlier (ii) 5% on completion of PG Test	Bid specifications to be followed.
39.	Sec-IV, GCC	-	69/71 of 80	44.6.3.3. IA & IB 44.6.3.4. IA & IB 44.6.3.5. IA & IB	☐ 1st Instalment of 5% (Interest bearing advance) ☐ 2nd Instalment of 5% (Interest bearing advance)	Improved payment terms are the fundamental requirement for such mega project. Hence, interest free advance for Civil works and Installation services will facilitate improved cash flow and in turn will help in project completion on time. Hence, we request Owner to provide **"Interest free"** advance against Installation and Civil work.	Bid specifications to be followed.
40.	Sec-IV, GCC	-	67 of 80	44.6.3.1.1	Hundred Percent **(100%) of CIF/Ex-** works price component of the **spares** to be paid on pro-rata basis **on receipt and storage at site and on physical** verification and acceptance by the Owner for the spares received in good condition and stored at site and Despatch Instructions issued by the Owner.	We request Owner to modify the clause as below: **Seventy five percent (75%)** of CIF/Ex- works price component of the spares to be paid on pro-rata basis: **upon despatch to site** and against invoices and shipping documents along with Material Despatch Clearance Certificate (MDCC) issued by the Owner's QA&I representative. **Twenty five percent (25%) of** CIF/Ex- works price component of the spares to be paid on pro-rata basis: **on receipt and storage at site** and on physical verification & certification by the Project Manager for the spares received and stored at site.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
41.	Sec-IV, GCC	-	75 of 80	46.0	Any increase in rate of tax or enactments of new tax, etc beyond the scheduled delivery period shall be to the Contractor's Account. However, if the rate of Tax or enactments of new tax, etc are decreased or the existing tax abolished beyond contractual delivery period, the benefit of the same shall be passed on to the Owner.	We understand, "scheduled delivery period" includes extension of time, if any. Accordingly, within scheduled delivery period including extension of time, if any, in case of increase, Owner shall reimburse to Contractor. Similarly, in case of decrease, Contractor shall pass the benefits to Owner. Kindly confirm.	Confirmed.
42.	Sec-IV, GCC	-	65 of 80	44.6.3.1.III	**Twenty Percent (20%)** of Total CIF/Ex-Works Supply Price Component of the Contract Price for each identified equipment **on receipt of equipment at site** on pro-rata basis and physical verification and certification/ acceptance by the Owner for the equipment received in good condition **and stored at site.**	In case Contractor opts for Laydown area outside plant boundary due to non-availability of sufficient land within plant area, we understand that the supply payment linked with "receipt of equipment at site" as stipulated under Terms of Payment (Clause 44.6 of GCC) shall be released to the Contractor after receipt and physical verification of equipment/material at laydown area identified by the Contractor outside the plant boundary, Kindly confirm.	Confirmed
43.	Sec-IV, GCC	-	79 of 80	48.	In the event of the Owner failing to avail of the training facilities in full or part, the Owner will be entitled to adjust the Contract price by an equivalent amount.	We understand, Owner shall be entitled to adjust, only if such part utilisation of training facilities by Owner is due to reasons attributable to Contractor. Kindly confirm.	Confirmed
44.	Sec-IV, GCC	-		Article 2.0 Contract Document	The following documents shall constitute the Contract between the Owner and the Contractor, and each shall be read and construed as an integral part of the Contract: a) This Contract Agreement and the Appendices hereto b) LOI including MOM Pre-Bid/ Post Bid Discussions c) Special Conditions of Contract d) General Conditions of Contract e) Bidding document including IFB, ITB, and ECC. f) The Bid and Price Schedules submitted by the Contractor g) Procedures	We request Owner to modify the clause as below: The following documents shall constitute the Contract between the Owner and the Contractor, and each shall be read and construed as an integral part of the Contract: a) This Contract Agreement and the Appendices hereto b) LOI including MOM Pre-Bid/ Post Bid Discussions **c) Amendments, clarifications, corrigenda and correspondences issued between issuance of IFB and NOA** d) Special Conditions of Contract e) General Conditions of Contract f) Bidding document including IFB, ITB, and ECC. g) The Bid and Price Schedules submitted by the Contractor h) Procedures	Bid specifications to be followed.
45.	Sec-VI, SCC	-	1 of 12	2.2	**Divergences from Statutory Requirements:** If the Contractor or the Owner finds any divergence between any Indian law or Directive and the technical specification, it shall immediately give to the other written notice specifying the divergence. The Contractor shall promptly upon becoming aware of the same, inform the Owner in writing of its proposed amendment for removing the divergence, and with the Owner's consent the Contractor shall entirely at its own cost and expense complete the works in accordance with the amendment.	We understand, If Contractor incurs additional cost and time for such compliance, then it shall be compensated, and appropriate time extension shall be provided by Owner. Kindly confirm.	Bid specifications to be followed.
46.	Sec-VI, SCC	-	6 of 12	5.8	New Clause	We request Owner to introduce a new clause as follows: **In case the unit is ready for Initial/Trial Operation and the Owner is unable to permit the Contractor to proceed for the period of three (3) months from such readiness owing to statutory, environmental, fuel, utilities or any other reason beyond Contractor's control, then unit shall be deemed to have achieved the Initial/trial Operation. In such event, all liabilities of Contractor in respect of Contract shall be deemed to have been discharged. Defect Liability Period for the unit shall commence on such date of deemed Initial/ Trial Operation. All Bank Guarantees and linked payments due on Initial/Trial Operation and PG Test shall be released.**	Not Acceptable
47.	Sec-VI, SCC	-	7 of 12	7.1	If the **performance shortfall** is such that the performance shortfall exceeds three **(3) percent** of the guaranteed value then the Owner will be entitled (at the Owner's sole discretion) to reject the works, terminate the Contract, and recover from the Contractor any loss the Owner has suffered up to the contract price. The Owner will give credit for any part of the works which he retains. In case, the plant is rejected by the Owner, the price recovery from the Contractor **will be done up to the whole contract price.**	The referred clauses are contradictory to Liquidated damage for Guaranteed Performance Parameters (clause 20.2 of GCC) and clause no. 2.0 of Chapter 8 of Vol-II (Technical Specification). Hence, we request Owner to delete these clauses.	In clause no. 7.1 at Sheet 7 of 12 in SCC/Section VI/Vol.I, the words ""three (3) percent of" stands deleted.
48.	Sec-VI, SCC	-	7 of 12	7.2	Failure to prove the performance of the plant/equipment as per guaranteed figures, which will lead to rejection as per clause 7.0 above, shall be treated as non-performance of the contract and in addition to the liquidated damages (plus GST as and if applicable) leviable for shortfall in the performance, the Owner will be entitled to revoke/invoke the contract performance security and realize the proceeds from the Bank without any demur, protest and/or objection by the Contractor.		
49.	Sec-VI, SCC	-	10 of 12	9.6	Owner reserves the right to take possession of and use for any intended purpose, any portion or all of any handed over but as yet unaccepted Unit. The taking of possession at any time or use of any of such portion of Unit shall not be deemed to be an acknowledgement of Owner acceptance of Unit and shall not relieve Contractor from his obligations under the Contract in this respect, until Owner's acceptance of the Unit, has occurred on Final Taking Over.	We request Owner to add the following paragraph at the end of the aforesaid clause: **If the Owner makes use of the Facilities or part thereof, then the Facilities or that part thereof shall be deemed to have reached Completion as of the date of the Contractor's notice or repeated notice, or as of the Owner's use of the Facilities, as the case may be. Accordingly, all related payment, BGs shall be released and Warranty period will start from the date of Completion.**	Bid specifications to be followed.
50.	Vol-II, Ch- 8	-	1 of 57	2.1	The Performance Guarantee Tests shall commence within 45 days after the successful completion of Trial Operation. The PG test shall conclude within 50 months from date of LOI Any extension of time beyond the above time shall be mutually agreed upon.	However, if for reasons attributable to the Owner, the performance Guarantee (PG) Test of the Facilities or the relevant part thereof cannot be successfully completed within the period of 60 days from the date of Completion of Trial Operation, then amount due on "Completion of PG Test" shall be released to the contractor without submission of any BG	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
51.	Sec-VI, SCC	-	8 of 12	9.1	Basis of Extension: (a) ..... (b) ..... (c) ..... (d) events or circumstances of Force Majeure, provided however that such events or circumstances shall continue for a period of seven (7) days or more in respect of anyone occurrence or shall continue for a cumulative period of twelve (12) days or more in respect of more than one occurrence. However, this provision shall not apply in relation to events or circumstances of Force Majeure which occur after the unit is fired.	We request Owner to modify the clause as follows: Basis of Extension: (a) ..... (b) ..... (c) ..... (d) events or circumstances of Force Majeure, ~~provided however that such events or circumstances shall continue for a period of seven (7) days or more in respect of anyone occurrence or shall continue for a cumulative period of twelve (12) days or more in respect of more than one occurrence. However, this provision shall not apply in relation to events or circumstances of Force Majeure which occur after the unit is fired.~~ (e) Any other circumstance of any kind whatsoever which may occur, making the Contractor entitled to an extension of time which, however, shall be mutually discussed and agreed.	Bid specifications to be followed.
52.	Sec-VI, SCC	-	9 of 12	9.3	Grant of Extension	We understand, on Grant of extension by Owner, Contractor shall be eligible for overstay compensation including extended BG charges, extended Insurance coverages. The same shall be mutually discussed and agreed. Kindly confirm.	Bid specifications to be followed.
53.	Sec-IV, GCC	-	75 of 80	44.6.3.6	The Advance BG shall be in the form of an unconditional bank guarantee as per the proforma provided. The advance payment BG shall be reduced prorata every six (6) months after First Running Account Bill/Stage Payment under the Contract based on the value of the respective equipment/ plant/ facilities received. The cumulative amount of reduction at any point of time shall not exceed seventy five percent (75%) of the advance corresponding to cumulative value of the respective equipment/plant/facilities supplied and received as per certificate issued by the Chief Engineer. The balance of 25% shall be released on Completion of Final Taking Over.	The basic purpose of obtaining Advance Bank Guarantee (ABG) from the contractor is to have security in lieu of advance payment being released. Therefore, such ABG should get fully reduced on adjustment of advance amount. In view of the above, we request Owner to allow 100% reduction of ABG on full adjustment of advance.	Bid specifications to be followed.
Lot-2 (Commercial)							
1	Section-II ITB	-	8 of 75	8	Single Stage (Two Parts) Bidding procedure shall be followed as under: Part-I: Techno-Commercial Bid Part-II: Price Bid Both Parts of the bid (Part-I & Part-II) shall be submitted simultaneously by the Bid Submission date as per IFB.	In line with practice followed by many Central & State utilities, we request Owner to adopt the Two Stage (Stage-I: Techno-commercial and Stage-II: Price Bid) bidding process for the subject package. Accordingly, the bidders should be given the opportunity to take deviations on the tender and discuss the same during post-bid meeting after submission of Stage-I bid. This will allow Owner to bring all the bidders techno-commercially at par before inviting Stage-II: Price Bid.	Bid specifications to be followed.
2	Section-II ITB	-	22 of 75	12.2	**Bid Security** Bid security shall remain valid for a period of o**ne year from the date of opening of Part-I** (Techno-Commercial) Bid and beyond any extension of Bid validity subsequently requested under ITB sub-clause 13.3.	Bid security validity for one year from the date of opening of Part-I bid is too long, which will result in additional cost burden to capex. Thus, as followed by other central & state utilities, we request Owner to reduce the Bid security validity equivalent to bid validity, i.e. 180 days plus additional 45 days (all together Bid security validity shall be 225 days from the date of opening of Part-I bid). Request Owner to modify the clause suitably.	In clause no. 12.2 at Sheet 22 of 75 of ITB/SectionII/Vol.I the words " one year from the date of opening of Part-I (Techno-commercial) bid " may be read as " forty five (45) days after bid validity period".
3	Section-I IFB	-	43 of 76	Note 9	The bids submitted by the bidders shall remain valid for acceptance for a period of one hundred eighty (180) days from the date of opening of price bid.	We request Owner to modify the clause as follows: The bids submitted by the bidders shall remain valid for acceptance for a period of one hundred eighty (180) days from the date of opening of ~~price~~ **Part-I Techno-Commercial** bid.	In Clause 9.0 at Sheet 43 of 76 of IFB / Section-I / Vol-I, the word "one hundred eighty (180) days from the date of opening of Price Bid" be read as, "two hundred twenty five (225) days from the date of opening of Part I (Techno-commercial) Bid"
4	Section-II ITB	-	24 of 75	13.3	In exceptional circumstances, the Owner may solicit the Bidder's consent to an extension of the bid validity period. The request and responses there to shall be made in writing by post or by telefax/email followed by post confirmation. If a Bidder accepts to extend the period of bid validity, the validity of bid security shall also be suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required nor permitted to modify its bid.	We request owner to modify the clause as follows: In exceptional circumstances, the Owner may solicit the Bidder's consent to an extension of the bid validity period. The request and responses there to shall be made in writing by post or by telefax/email followed by post confirmation. If a Bidder accepts to extend the period of bid validity, the validity of bid security shall also be suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will ~~not~~ be ~~required nor~~ permitted to modify its bid.	Bid specifications to be followed
5	PROFORMA OF CONTRACT AGREEMENT FOR SUPPLY	-	25 of 97	Article 6 6.2	**Governing Laws:** The Contract shall be governed by Indian Laws and Rules as amended from time to time. The Panchkula Courts alone shall have the exclusive jurisdiction in all matters arising under this Agreement.	We request Owner to modify the exclusive jurisdiction to New Delhi instead of Panchkula. Kindly confirm.	Bid specifications to be followed
6	Section IV GCC	-	55 of 80	38.1	Except in respect of latent defects liability, the long-term availability of spares and other specific liabilities identified in the Contract, the Contractor shall be released from his liabilities under the Contract at the completion of the contract as per clause 30.0, GCC.	We request Owner to delete the following exceptions from Limitation of Liability: •latent defects liability, •the long-term availability of spares and other specific liabilities identified in the Contract	Bid specifications to be followed
7	Section IV GCC	-	54 of 80	35.15	..... In no event, however, shall the warranty period for any section or part thereof the power plant extend, in the case of the electrical generators and all other plant manufactured by the Contractor beyond four years from the date of "Final Taking-Over" of the relevant section of the power plant and in respect of any other equipment and plant, beyond three years from the date thereof.	We request to modify the clause as below: ..... In no event, however, shall the warranty period for any section or part thereof the power plant extend, in the case of the electrical generators and all other plant manufactured by the Contractor beyond ~~four~~ **two** years from the date of "Final Taking-Over" of the relevant section of the power plant and in respect of any other equipment and plant, beyond ~~three~~ **two** years from the date thereof.	Bid specifications to be followed
8	Section-II ITB	-	41 of 75	44	"RESTRICTIONS ON PROCUREMENT FROM A BIDDER OF A COUNTRY WHICH SHARES A LAND BORDER WITH INDIA"	We understand this include original circular along with its subsequent amendments issued by respective authority of GoI in this regard. Kindly confirm our understanding.	Bid specifications to be followed

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
9	Annexure-K	-	63 of 97	(i). (a)	**Price adjustment** Only following components of the Contract Price will be subject to Price adjustment during performance of the Contract to reflect changes in the cost of labour and material components: (a) Ex-Works (India) Price of Plant and Equipment excluding Mandatory Spares manufactured within the Owner's Country and Type Tests Charges	We request Owner to follow respective IEEMA formula for Price Adjustment for supply of electrical equipment. Kindly confirm.	Bid specifications to be followed.
10	Sec-II, ITB	-	23 of 75	13.2	The bidder is required to keep the prices of recommended spares covered under Price Schedule 6 valid for a period of Eighteen (18) months from the date of issue of LOI for main equipment and mandatory spares.	We request Owner to modify the clause as follows: The bidder is required to keep the prices of recommended spares covered under Price Schedule 6 valid for a period of ~~Eighteen (18)~~ **Six (6)** months from the date of issue of LOI for main equipment and mandatory spares.	Bid specifications to be followed.
11	Sec-IV, GCC	-	3 of 80 52 of 80	3.13 34.9	Definition of Terms: Change in Law Change in Applicable Laws	We understand, Change in Applicable laws (Clause 34.9 of GCC) shall be read in conjunction with Definition of terms 'Change in Law' (Clause 3.13). Kindly confirm.	Bid specifications to be followed.
12	Sec-IV, GCC	-	12 of 80	6.2	**Regarding Site Condition:** The Contractor shall not, except as 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 the works	**Bidder's Request:** Underground facilities which cannot be foreseen by any Contractor during site visit, hence, in case of any usual encounter from sub soil which can lead to delay of Contract, shall be reason for entitlement of time extension and cost compensation to Contractor by Owner.	Bid specifications to be followed.
13	Sec-IV, GCC	-	Page 52 of 80	34.8	**Deletion from Work:** The Owner may delete from the work any item by Change Order. Any deletion of an item shall not invalidate any Contract provision or other requirement and Contractor will complete the work not so deleted under this Contract. Such deletions from the work may include Owner procurement of plant, materials and equipment which Contractor is otherwise obligated to purchase thereunder.	Request to delete such clause, as this Contract to be awarded on EPC basis and it will be not be possible for Contractor to be liable for time schedule, price rates, reliability, Functional Guarantees and warranty in case of such part deletion in certain cases.	Bid specifications to be followed.
14	Sec-IV, GCC	-	Page 59 of 80	43.8	The prices of all future requirements of item of spares beyond 5 years shall be derived from the corresponding CIF/Ex-works price at which the order for such spares have been placed by the Owner as a part of the mandatory spares or recommended spares. CIF/Ex-works order price of future spares shall be computed in accordance with the price escalation formula to be furnished by Contractor indicating base price reference variation indices for material, labour etc…… ……The above option for procuring future recommended spares by the Owner shall remain valid for the period of fifteen (15) years from the date of successful completion of Trial Operation of the Unit. In case the spare parts from the same sub-vendor are not available due to obsolescence or any other reason, the Contractor shall supply the spares for a period of fifteen (15) years from an alternative source.	**Bidder's request to delete the said clause:** (1) It is difficult to assess the future price of spares required beyond 5 years of operation. Owner may directly negotiate with vendors to get optimal price. (2) Also, price variation will not be beneficial to any of the Contractor for supplying recommended spares for 15 years after Trial Operation completion. (3) Contractor cannot supply spare parts from alternative source, if the same are not available with sub-vendor due to obsolescence or any other reason. Accordingly suggest to delete said clause.	Bid specifications to be followed.
15	General	-	-	-	General	For the purpose of availing certain exemptions in GST relating to nil rate, **we request Employer to clarify whether they fall under the definition of governmental authority or government entity.** The definitions as per CGST Act, 2017 have been given below for your reference: 1. "governmental authority" means an authority or a board or any other body, - (i)set up by an Act of Parliament or a State Legislature; or (ii)established by any Government*, with ninety per cent. or more participation by way of equity or control, to carry out any function entrusted [to a Panchayat under Article 243G or] to a municipality under article 243W of the Constitution. 2. "government entity" shall mean an authority or a board or any other body including a society, trust, corporation, which is : a)set up by an Act of Parliament or State Legislature; or b)established by any Government, with 90 per cent or more participation by way of equity or control, to carry out a function entrusted by the Central Government, State government, Union territory or a local authority.". *Government means "Central Government"	Govt. of India notifications in respect of GST will be followed.
16	Sec-III, BDS	-	Page 51 of 60	12.2 (g)	**Adjustment Factors For Bid Evaluation** For increase in limestone consumption of FGD system in 100 kg/hr./unit at 100% TMCR load - INR /- 27,000,000/- (INR Twenty Seven Million only) per 100kg/hr. increase in Limestone Consumption	It is a general practice followed by other Utilities / Owners to specify base value of Limestone Consumption (LSC) for bidders to confirm / quote in their respective bid. This refrains bidder(s) from quoting aggressive values of limestone consumption which may not be achievable later during PG test post installation of FGD and also facilitates Owner in maintaining parity amongst bidders while evaluation. We therefore request Employer to fix the base values of Limestone consumption as has been generally done in past & ongoing tenders.	Bid specifications to be followed.
17	Sec-IV, GCC	-	Page 24 of 80	14.2.4	…..However, these adjustments would be restricted to items in respect of direct transactions between the Owner and the Contractor/Assignee of Foreign Contractor (if applicable) and Bought out items (dispatched directly from sub-vendor's works to Site) only up to Schedule Completion Period.	In line with practice followed by other State and Central Utilities, we request Employer to modify the clause as follows: …..However, these adjustments would be restricted to items in respect of direct transactions between the Owner and the Contractor/Assignee of Foreign Contractor (if applicable) and Bought out items (dispatched directly from sub-vendor's works to Site) ~~only~~ up to Schedule Completion Period **including any extension granted by the Owner.**	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
18	General	-	-	-	General	We understand that the process for Environment Clearance (EC) has been initiated by the Owner, and EC is awaited from the Ministry of Environment, Forest and Climate Change (MoEF&CC). In view of the same, we request Owner to kindly issue the Limited Notice to Proceed (LNTP) to the successful bidder to carry-out engineering activities in advance on paid basis prior to award of contract, in case the EC is not granted by the time bids are opened.	Bid specifications to be followed.
Lot-3 (Commercial)							
S/N.	**Section / Part /**		**Page no.**	**Clause No.**	**Bid Specification Stipulation**	**Statement of Pre-bid Query & Clarification**	**HPGCL Response**
1.	Sec-IV, GCC	-	Page 23 of 80	14.2	**TAXES AND DUTIES**	1. Recently, the government has enacted the Social Security Code under which BOCW Cess has been submerged. The government is yet to notify the rate at which such cess shall be levied. In case the rate of cess is increased by the government, whether that will be covered under the statutory variation clause or not. 2. As per our understanding, BOCW cess is to be deducted @1% of the "cost of construction" in respect of civil & structure works portion of the contract price only in line with the standard industry practice. Accordingly, BOCW Cess will not be deducted on the supply contracts [first & second], erection including installation services portion [part of third contract] and on transportation and transit insurance (as per price schedule 3). Kindly confirm.	Bid specifications to be followed.
2.	Sec-II, ITB	-	Page 21 of 75	10.6.1	**Concessional Custom Duty for Power Projects** Bidder may ascertain the availability of Custom Duty benefits available under Customs Tariff Act for import of goods, which are required for incorporation in the facilities under the Contract…….	We have analysed notification 50/2017- Customs dated 30.06.2017 and found that the said project does not fall under the list of 'mega power' projects. Further, entry 597 is applicable for projects that are registered with customs prior to September 2022. Thus, we understand that all imports under this project will be eligible to be imported at merit rate of duty under chapter 98 of customs tariff act.	Bid specifications to be followed.
3.	Sec-II, ITB	-	Page 18 of 75	10.3	**Schedule 3** Local Transportation including Port handling, Port clearance, Port charges, Custom reconciliation, Inland transit insurance and other local costs incidental to delivery of Plant & Equipment and Mandatory Spares.	Local Transportation including Inland transit insurance and other local costs incidental to delivery of Plant & Equipment are under Price Schedule 3 of the bid documents. However, as per section 15(2)(c) of CGST Act, 2017, freight and insurance and other costs incidental to delivery are required to be added in the value of goods. In line with the stated legal position, the said elements of cost be transferred from price schedule 3 to price schedule 1 & 2 pertaining to offshore and onshore supply.	Bid specifications to be followed
4.	Sec-IV, GCC	-	Page 23 of 80	14.2.2	Notwithstanding GCC Sub-Clause 14.2.1 above, the Contractor shall bear and pay all Customs & Import duties except GST if imposed on the Plant and Equipment including Mandatory Spares supplied from abroad and specified in Price Schedule-1 (and on Recommended Spare Parts to be supplied from abroad and specified in Price Schedule-6, when awarded) and that are to be incorporated into the Facilities, by the law of the country where the Site is located.	We request Owner to either pay directly or re-imburse all Customs & Import duties including GST. Accordingly, we request Owner to suitably modify the Price Schedule No. 7A so that the bidders can quote both Customs & Import duties and GST	Bid specifications to be followed
5.	Sec-IV, GCC	-	Page 23 of 80	14.2.1	…..Any variation in Taxes and Duties against Foreign supplies shall be to the Contractors Account.	As per standard industry practice, we request HPGCL to pay the variation in Taxes and Duties against Foreign supplies.	Bid specifications to be followed
6.	SEC - VII BOOK 1 OF 3 (PART-1)	-	-	Attachment-3K	**Attachmet-3K** **PROVENNESS CRITERIA** Bidder shall submit the list of proposed sub-vendors/ sub-contractors along with their credentials as per format of Attachment-3K duly filled for each equipment and system proposed for the EPC package for consideration/approval of the Owner within 90 days from issue of Letter of Intent.	In line with Central and Other State Utility tenders, we request Owner to kindly modify the referred provision as follows: Bidder shall submit the list of proposed sub-vendors/ sub-contractors along with their credentials as per format of Attachment-3K duly filled for each equipment and system proposed for the EPC package for consideration/approval of the Owner ~~**within 90 days from issue of Letter of Intent**~~.	Bid specifications to be followed.
7.	General	-	-	-	General	The area available for laydown within site is not sufficient, which necessitates that the bidders should take land on lease outside plant boundary. In such a case, different bidders will be able to avail land at different rates which then will be added in their respective bid prices. Therefore, in order to bring parity amongst all the bidders, we request Owner to himself arrange the laydown area on lease which shall be utilized by the successful bidder.	Bid specifications to be followed.
8.	Sec-IV, GCC	-	34 of 80	20.1.2	….. However, the payment of liquidated damages shall not in any way relieve the Contractor from any of its obligations to complete the facilities or from any other obligations and liabilities of the contractor under the Contract.	We request Owner to add following paragraph at the end of this clause: Alternatively, the Contractor may submit a Bank Guarantee to Owner in lieu of levy of LD for an amount equivalent to LD amount. In such a case, the amount withheld, if any, on account of LD would be released/ would not be deducted. The Bank Guarantee shall be initially valid from the date of submission up to a period of six months and shall be kept valid till the final settlement is arrived mutually or through provisions of Settlement of Disputes stipulated under GCC Clause-26.0.	Bid specifications to be followed.
9.	Sec-II, ITB	-	57 of 75	Appendix-II to ITB	Annexure-I of Appendix-II (DPIIT Notification dated 16.11.2021)	The tender for this project is issued on EPC turnkey package basis. In view of the above, the bidders can confirm the Minimum Local Content percentage for complete EPC package only as mentioned in Clause No. (E) of Annexure-I of DPIIT Notification dated 16.11.2021 enclosed as Appendix-II to ITB, and not for individual items/auxiliaries as mentioned in Clause no. (C) (Thermal Sector). Therefore, we understand that the Minimum Local Content will be applicable on EPC package basis only as defined in Clause No. E (Minimum Local Content percentages in EPC/Turnkey package). Kindly confirm.	Bid specifications to be followed.

Sr. No.	Volume/ Section	Chapter / Drawing No.	Page no.	Clause No.	Bid Specification Stipulation	Statement of clarification sought	HPGCL Response
10.	Sec-IV, GCC	-	52 of 80	35	New Clause	We request Owner to introduce a new clause as follows: (a) Raw material for Pressure Partsand Raw Materials for the Factory Fabricated Steel Structures used under this Contract shall be new and unused (not reconditioned) and of recent manufacture which shall in no case be of a date of manufacture older than two years from the date of delivery at Bidder / Bidders' sub-supplier works (b) Reinforcement steel and Structural steel for fabrication at site, shall in no case be of a date of manufacture older than two years from the date of delivery at the yard/site. Exception from the above criteria shall in no case exceed 1% of the Total Contract Price."	Not Acceptable
11.	Sec-II, ITB	-	8 of 75	8	The bidder has to submit Techno Commercial Bid (Part-I) and Price Bid (Part-II) in online mode only on the specified e-procurement portal. In addition, the documents mentioned in clause no. 8.1.1, 8.2.1 & elsewhere have to be submitted in Original in physical mode two (2) working days before last date of bid submission.	We understand that the bidders are required to submit only those documents in Original which are mentioned in Clause No. 8.1.1 of ITB. Kindly confirm. In line with practice followed by Central and other State Utilities, we request Owner to allow bidders to submit the original documents (in physical mode) till the last date of bid submission. Similarly, Clause No. 12.3 and 14.0 of ITB may also be modified suitably.	Bid specifications to be followed.
12.	Sec-II, ITB	-	17 of 75	8.4	2. If there is any discrepancy (ies) in documents submitted physically and/or online, then documents submitted online shall prevail.	We understand that physical documents are considered as original. Therefore, we request Owner to modify the referred clause as follows: If there is any discrepancy (ies) in documents submitted physically and/or online, then documents submitted **~~online~~ physically** shall prevail.	Bid specifications to be followed.
13.	Sec-II, ITB	-	23 of 75	13.2	The bidder is required to keep the prices of recommended spares covered under Price Schedule 6 valid for a period of Eighteen (18) months from the date of issue of LOI for main equipment and mandatory spares.	In line with provisions stipulated in Central and other State Utility tenders, we request Owner to modify the clause as follows: The bidder is required to keep the prices of recommended spares covered under Price Schedule 6 valid for a period of **~~Eighteen (18)~~ Six (6)** months from the date of issue of LOI for main equipment and mandatory spares.	Bid specifications to be followed.
14.	Sec-II, ITB	-	35 of 75	30.3	Owner reserves the right to vary the quantity of any of the Spares and/or delete any item of Spares altogether at the time of Award of Contract.	We request Owner to finalize the quantity of spares during bidding stage.	Bid specifications to be followed.
15.	SEC – VII, BOOK 2 OF 3 Price Schedules	-	-	-	Schedule-8A: Break up of Type Test Charges for Equipment Priced in Schedule-1 Schedule-8B: Break up of Type Test Charges for Equipment Priced in Schedule-2	Generally, all equipment are type tested by OEMs and they submit type test certificates. Hence, repetition of type test is not required. In view of the above, we request to delete Schedule 8A and 8B from price schedules. In case any type test report is not available for specific equipment, the same shall be conducted by the Contractor.	Agreed.
16.	SEC – VII, BOOK 2 OF 3 Price Schedules	-	-	Schedule-8A: (25) ----- Schedule-8B: (25)	Any other type test not covered above, but required for the Scope of Work under the Package	In case Schedule 8A & 8B is not deleted as per our request above (under Sl. No. 15), then Owner may please specify the specific tests to be quoted by bidder instead of the general provision as mentioned in the referred clause. Bidder request to kindly delete this clause.	Not applicable.
17.	SEC – VII, BOOK 2 OF 3 Price Schedules	-	-	Schedule-8A: Break up of Type Test Charges for Equipment Priced in Schedule-1 Schedule-8B: Break up of Type Test Charges for Equipment Priced in Schedule-2	Any Type Test found applicable/ considered essential during detailed Engineering for any of the offered Equipment but not indicated above shall be deemed to be included in the above quoted price. Any Type Test found applicable/ considered essential during detailed Engineering for any of the offered Equipment but not indicated above shall be deemed to be included in the above quoted price.	In case Schedule 8A & 8B is not deleted as per our request above (under Sl. No. 15), then Bidder requests Owner to list all required type test in schedule 8A and 8B before submission of bid instead of specifying general note below schedule 8A and schedule 8B as per referred clause. Bidder requests to kindly delete this clause.	Not applicable.
18.	SEC – VII, BOOK 2 OF 3 Price Schedules	-	-	-	Price Schedule – 1 Price Schedule – 2 Price Schedule - 4	We request Owner to kindly allow bidders to quote lumpsum price for Main Equipment instead of detailed break-up (i.e., A 1-5) as sought in the Price Schedule No. 1, 2 & 4, which is not required for the purpose of Evaluation of the Price Bids. The same shall be furnished by the Contractor after award of Contract.	Bid specifications to be followed.
19.	Section – IV, GCC	-	23 of 80	14.2.1	Any variation in Taxes and Duties against Foreign supplies shall be to the Contractors Account	We request Owner to kindly adjust the impact due to foreign exchange rate variation on taxes and duties with respect to base exchange rate (i.e., SBI Bill selling rate as on 7 days prior to submission of Price bid) vis-à-vis foreign exchange rate as on date of actual billing during project execution.	Bid specifications to be followed.
20.	Sec-IV, GCC	-	-	Annexure-A, Annexure-B.1 & Annexure-J	Proforma(s) of Bank Guarantee for Contract Performance, Advance Payment and Bid Security	We request HPGCL to kindly modify the formats of Bank Guarantee for Contract Performance, Advance Payment and Bid Security as suggested under Appendix-1, 2 and 3 to these Commercial Pre-Bid Queries (Lot-3).	Bid specifications to be followed.
21.	Sec-IV, GCC	-	-	New Clause	New Clause	We request HPGCL to introduce suitable provision in the tender to retain the right to seek clarification in case of "abnormally low price" offered by a bidder and in case of any non-satisfactory response/explanation from such lowest bidder, HPGCL shall have the right to select the next lowest bidder after similar determination. An "abnormally low price" is one where the bid price appears to be so low that it raises concern as to the capability of the bidder to perform the contract for the offered bid price.	Not acceptable

Index

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5	Limestone Handling	35
6	Coal Analyzer	2
7	Ultra Filtration System	1
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9	CV Pumps	4
10	Control Room Layout	2
11	SAS Details	7
12	Bus Bar Protection Panel	21
13	Biomass Co-firing in the Steam Generator	2
14	Electrical Distribution and Monitoring system	14
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16	Drawings of existing buildings for installation of Roof top solar	2
17	Reactor Clarifier Unit	1
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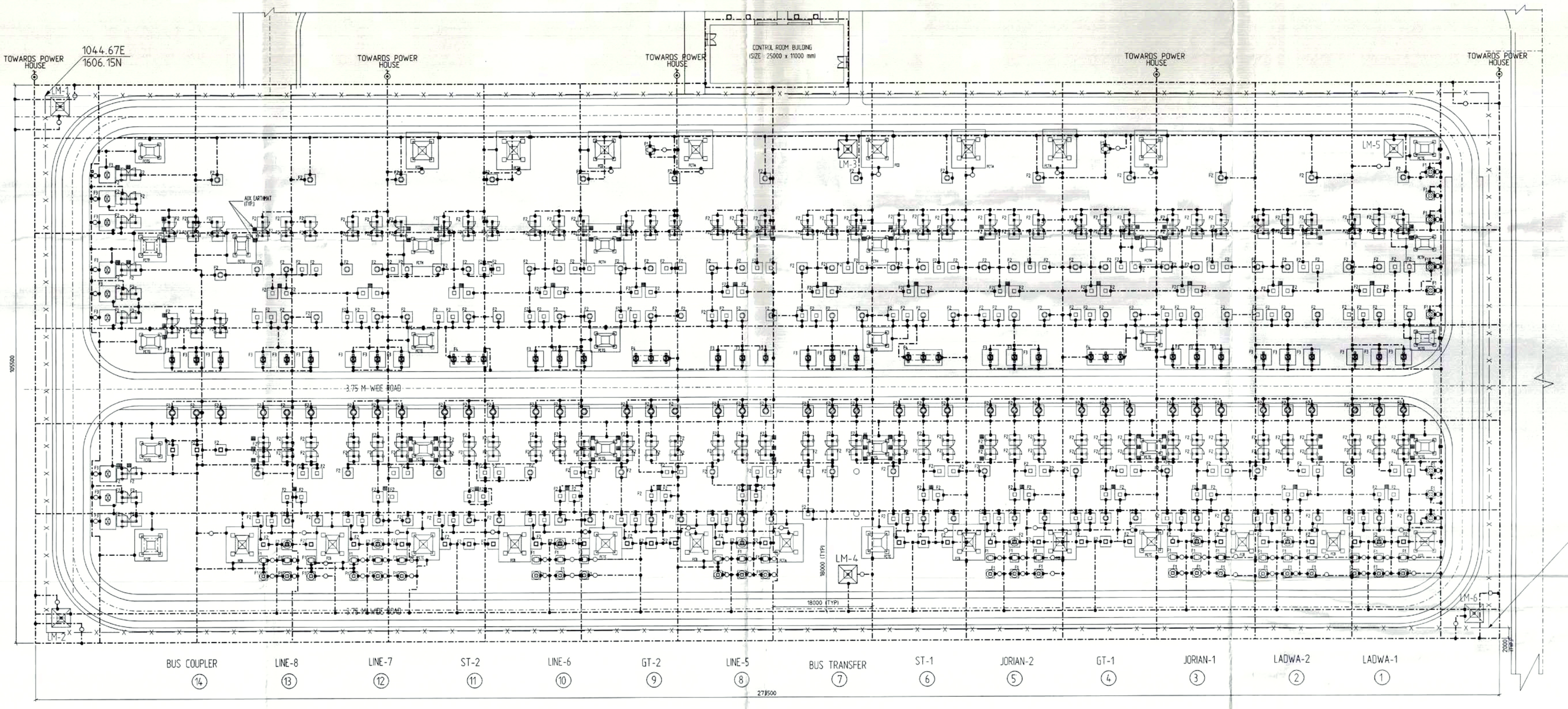
30	Environment Monitoring Systems- Amendment	1
31	Provenness of Fire Protection & Detection System	1
32	Errata	1
33	Complete Ash Analysis Report	1

Attachment 1 A



NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. MAIN EARTHMAT CONDUCTOR IS LAID 600MM BELOW FROM THE GROUND LEVEL.
3. EARTHING CONDUCTOR RUNNING BELOW CABLE TRENCHES, DRAINS, ROADS & RAIL IS LAID 300MM BELOW THEM.
4. FOR CONTROL BUILDING EARTHMAT CONDUCTOR IS ROUTED AROUND THE BUILDING AND BUILDING EARTHING WILL BE CONNECTED WITH THE MAIN EARTH MAT.
5. EARTHMAT IS LAID 2000MM BEYOND THE FENCE(EXCEPT TOWARDS CONTROL ROOM).
6. CABLE TRENCH EARTHING IS DONE WITH 50x6 GS FLAT AND RUN ALONG THE CABLE SUPPORTING STRUCTURE EARTH FLAT OF CABLE TRENCH IS CONNECTED TO THE MAIN EARTHING AFTER SHORTING OF ALL CABLE TRAYS AT 30MTS. INTERVAL.
7. FENCE IS EARTHED AT ALTERNATE POST.
8. ALL EARTHING IS DONE IN ACCORDANCE WITH IS:3043
9. AUXILARY EARTHMAT 1500X1500 WITH GRID SPACING 300MM IS PLACED BELOW ISOLATOR MOM & EOM AT 300MM DEPTH FROM FGL.
10. EARTHING OF CONTROL ROOM BUILDING IS SUBMITTED SEPERATELY.
11. EARTH PIT DETAILS:
    - FOR LA : 45 NOS.
    - FOR CVT : 26 NOS.
    - FOR EMVT : 09 NOS.
    - FOR TOWER : 24 NOS.
    - FOR LM : 06 NOS.
    - FOR GRID CORNER : 04 NOS.
12. GRAVEL FILLING IS 100MM FROM THE FGL (NOMINAL SIZE OF GRAVEL -40mm DIA.).
13. SOIL RESISTIVITY IS CONSIDERED 75.36 OHM. MTR.

LEGEND:-

- MAIN EARTHING GRID-40mm MS ROD
- RISER INTER CONNECTIONS-40mm DIA.MS ROD BELOW GROUND LEVEL
- ROD EARTH ELECTRODE.
- TAPPING/CONNECTIONS
- TEST PIT WITH DISCONNECTING LINKS
- TREATED TYPE EARTH PIT FOR DRY TYPE T/R NEUTRAL
- AUXILIARY EARTHMAT FOR ISOLATOR AND E/SWITCH

REFERENCE DRAWINGS:-

1. REL-DCRTP-NVE-201-F-2001	220kV SWITCHYARD LAYOUT PLAN
2. REL-DCRTP-NVS-201-C-2101	SWITCHYARD FOUNDATION PLAN FOR 220kV YARD
3. REL-DCRTP-NVE-201-D-2015	EQUIPMENT GROUNDING NOTES & DETAILS

BILL OF QUANTITIES :-

40MM DIA MS ROD	= 12800 MTS
75X12 GI FLAT	= 4140 MTS
50X6 GI FLAT	= 2550 MTS
ROD ELECTRODE	= 103 NOS.

AS BUILT

PACKAGE TITLE :- 220kV SWITCHYARD
DISCIPLINE :- ELECTRICAL

REVISED	APPROV.	MECH	INST.	ELEC.	STRL.	ARCH.	NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE
							AS BUILT	M.DAS	M.DAS	2	2007-06-20
							REVISED AS PER REL COMMENTS	S.GHOSH	PANKAJ	1	2006-04-21
							FIRST ISSUE	S.GHOSH	CHANDAN	0	2006-03-02

RELEASE STATUS	DATE	SIGNATURE
PRELIMINARY		
FOR TENDER ONLY		
FOR CONSTRUCTION		
ARCHITECTURAL		
CIVIL & STRUCTURAL		
ELECTRICAL		
INSTRUMENTATION		
MECHANICAL		
ENGG. MANAGER		

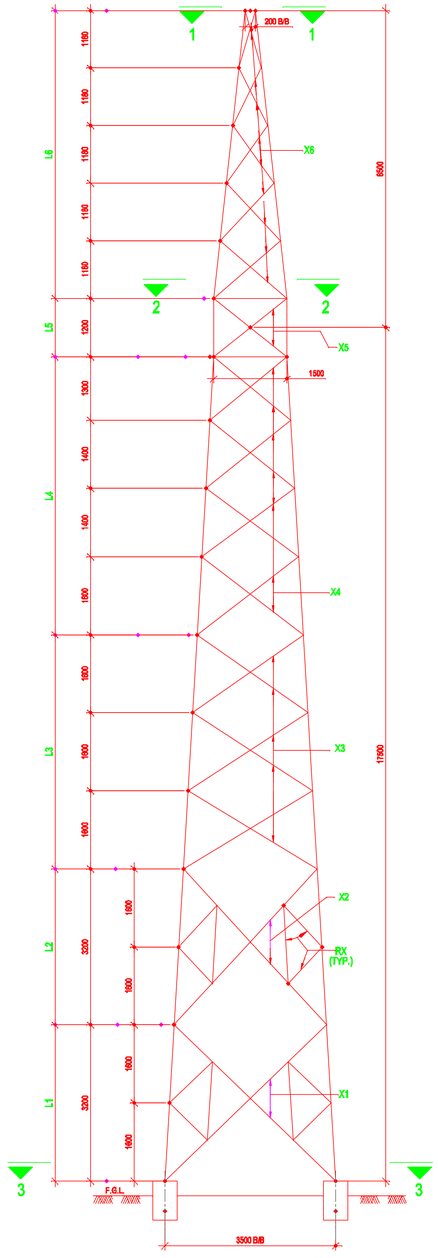
220KV SWITCHYARD - EARTHING LAYOUT PLAN

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

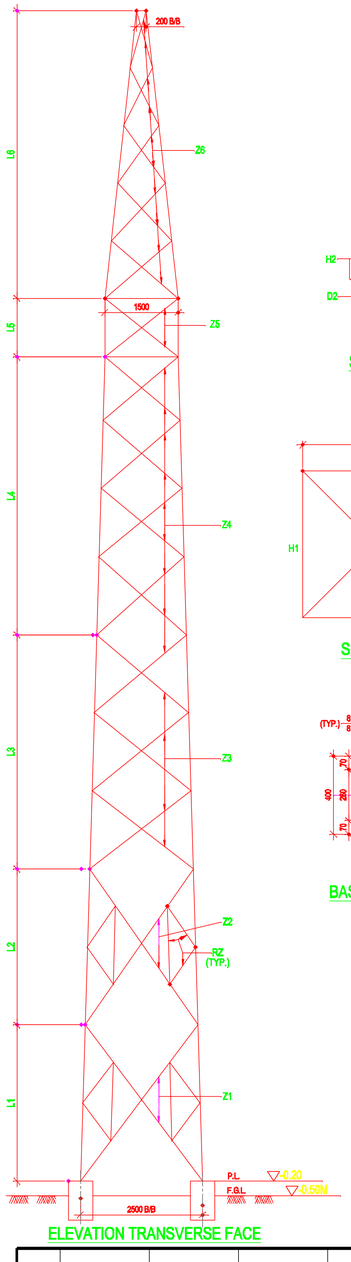
OWNER:	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
OWNER CONSULTANT: DESEIN	DESEIN PVT. LTD. CONSULTING ENGINEERS NEW DELHI - INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN R K PURAM NEW DELHI
EPC Contractor: Reliance Energy	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
EPC Contractor's Consultant	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
Switchyard Contractor: SIEMENS	SIEMENS LTD. 6-A SECTOR-18 MARUTI INDUSTRIAL AREA, GURGAON-122015, HARYANA

DRAWN : CHANDAN	CHECKED : S.GHOSH	SCALE : 1:300	
REVIEWED : S.GHOSH		DATE : 2006-03-02	
APPROVED : V.ADAVAN		DCPL JOB NO. : -	
JOB NO. XXX/XX/XX/XXX	DRAWING NO. REL-DCRTP-NVE-2011-J-2012	REV. 2	

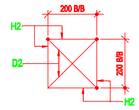
REL NO. REL-2011-J-2012



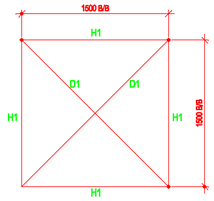
LONGITUDINAL FACE
SIDE VIEW



ELEVATION TRANSVERSE FACE



SECTION 1-1
(SCALE 1:10)



SECTION 2-2
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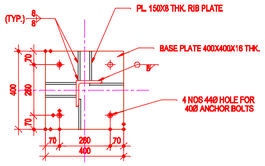
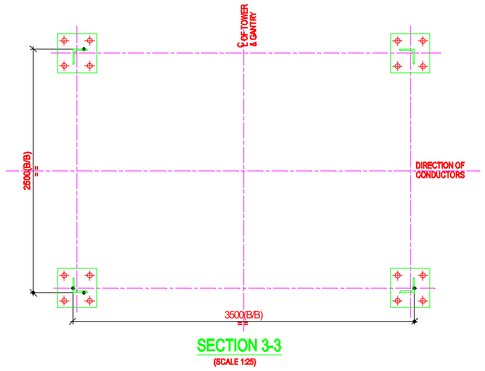


BASE PLATE DETAIL
(SCALE 1:10)

MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	130x130x12	M16	DS	08
L2	130x130x12	M16	DS	07
L3	110x110x12	M16	DS	06
L4	100x100x8	M16	DS	02
L5	65x65x6	M16	DS	02
L6	65x65x6	M16	DS	02
X1	65x65x6	M16	SS	03
X2	65x65x6	M16	SS	03
X3	65x65x6	M16	SS	02
X4	75x75x6	M16	SS	03
X5	50x50x6	M16	SS	02
X6	45x45x5	M16	SS	01
Z1	50x50x6	M16	SS	03
Z2	50x50x6	M16	SS	03
Z3	50x50x6	M16	SS	02
Z4	50x50x6	M16	SS	02
Z5	50x50x6	M16	SS	02
Z6	45x45x5	M16	SS	01
H1	65x65x6	M16	SS	02
D1	45x45x5	M16	SS	02
RZ	45x45x5	M16	SS	01
RX	45x45x5	M16	SS	01
H2	45x45x5	M16	SS	01
D2	45x45x5	M16	SS	01



SECTION 3-3
(SCALE 1:25)

AS BUILT

BUILDING LEGEND

220kV SWITCHYARD

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5Ø FOR 16Ø BOLTS OF PROPERTY CLASS 4.8 CONFORMING TO IS: 1367-1991.
3. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART-II)-1965.
4. STEP BOLTS OF 16MM AND 175MM LONG WITH 450MM SPACING SHALL PROVIDED UPTO THE TOP OF TOWER. STEP BOLTS SHALL CONFORM TO IS: 10238

LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL.	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR

REVIEWED							
		MJ	RNS	AS BUILT	AS BUILT	-	12-07-2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

220KV SWITCHYARD
TOWER MARKED CTA
DETAIL OF STEEL WORK

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION, PANCHKULA, HARYANA

OWNER'S CONSULTANT: DESEIN, CONSULTING ENGINEERS, NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY, SEWA BHAWAN, R.K.PURAM, NEW DELHI

RELIANCE ENERGY LIMITED, EPC BUSINESS GROUP, RELIANCE ENERGY TOWER, A-2, SECTOR-24, NOIDA-201301 (U.P.)

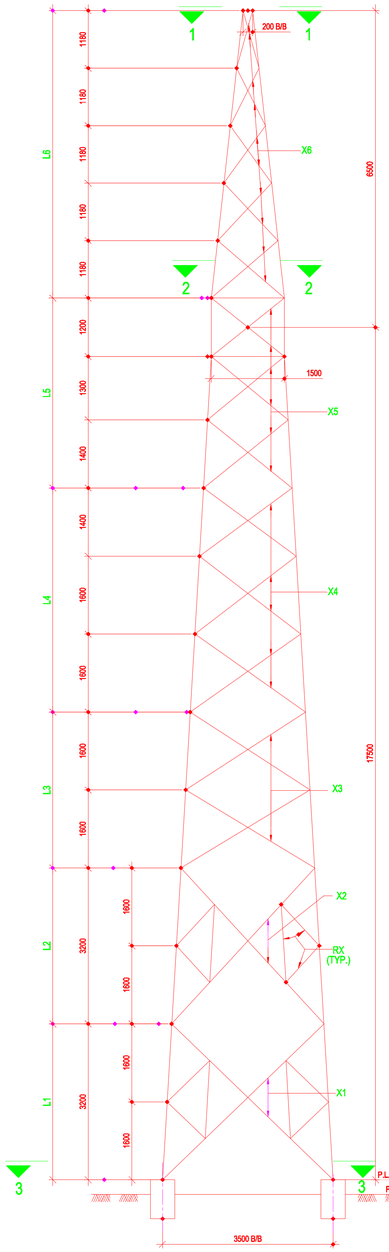
DEVELOPMENT CONSULTANTS PRIVATE LIMITED, CONSULTING ENGINEERS, KOLKATA - MUMBAI - CHENNAI - NEW DELHI

SIEMENS LTD, 6-A, SECTOR-18, MARUTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

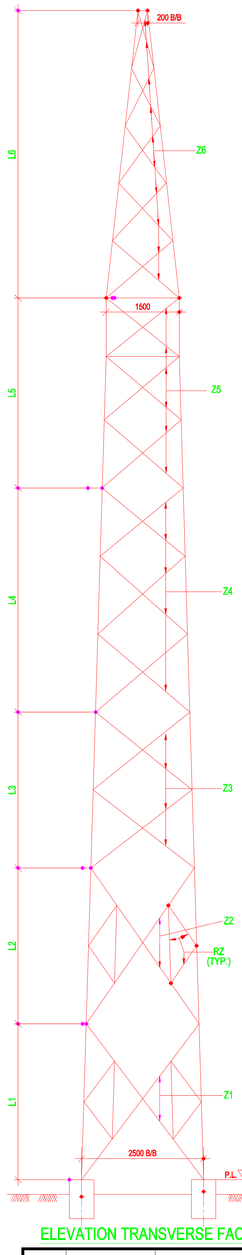
DRAWN : RNS	CHECKED : SKP	SCALE : 1:50	
REVIEWED : AKR		DATE : 12-01-2006	
APPROVED : RVS		DCPL JOB NO.:	
JOB NO. XXXXXXXXXX	DRAWING NO. REL-DCRTP-NVS-201-G-2056	REV. 0	

FILE NO. REL-DCRTP-NVS-201-G-2056

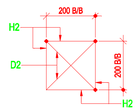
SHEET SIZE: A1



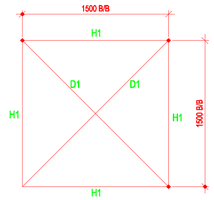
LONGITUDINAL FACE
SIDE VIEW



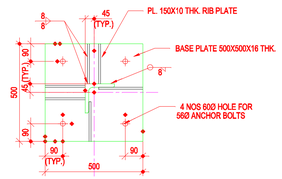
ELEVATION TRANSVERSE FACE



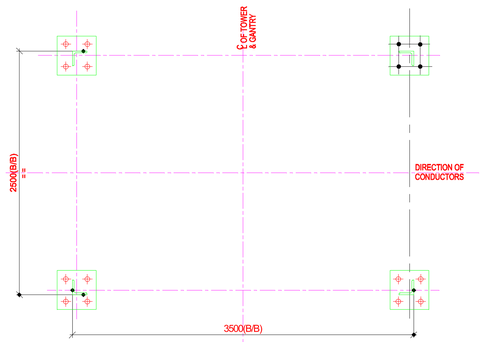
SECTION 1-1
(SCALE 1:10)



SECTION 2-2
(SCALE 1:10)



BASE PLATE DETAIL
(SCALE 1:10)



SECTION 3-3
(SCALE 1:25)

MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	150x150x20	M16	DS	14
L2	150x150x20	M16	DS	12
L3	150x150x16	M16	DS	12
L4	150x150x12	M16	DS	10
L5	110x110x10	M16	DS	06
L6	70x70x6	M16	DS	02
X1	65x65x6	M16	SS	03
X2	65x65x6	M16	SS	03
X3	65x65x6	M16	SS	03
X4	65x65x6	M16	SS	03
X5	65x65x6	M16	SS	03
X6	45x45x5	M16	SS	01
Z1	50x50x6	M16	SS	02
Z2	50x50x6	M16	SS	02
Z3	50x50x6	M16	SS	02
Z4	50x50x6	M16	SS	02
Z5	50x50x6	M16	SS	03
Z6	45x45x5	M16	SS	01
H1	50x50x6	M16	SS	02
D1	45x45x5	M16	SS	01
RZ	45x45x5	M16	SS	01
RX	45x45x5	M16	SS	01
H2	45x45x5	M16	SS	01
D2	45x45x5	M16	SS	01

AS BUILT

BUILDING LEGEND

220kV SWITCHYARD

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5Ø FOR 16Ø BOLTS OF PROPERTY CLASS 4.6 CONFORMING TO IS: 1367-1991.
3. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART-II)-1995.
4. STEP BOLTS OF 16MM AND 175MM LONG WITH 450MM SPACING SHALL PROVIDED UPTO THE TOP OF TOWER. STEP BOLTS SHALL CONFORM TO IS: 10238

LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL.	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR

REVIEWED							
		MJ	RNS	AS BUILT	AS BUILT	-	12-07-2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

220kV SWITCHYARD
TOWER MARKED CB
DETAIL OF STEEL WORK

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION, PANCHKULA, HARYANA

CONSULTANT: DESEIN, CONSULTING ENGINEERS, NEW DELHI- INDIA

CENTRAL ELECTRICITY AUTHORITY, SEVA BHAWAN, R.K.PURAM, NEW DELHI

RELIANCE ENERGY LIMITED, EPC BUSINESS GROUP, RELIANCE ENERGY TOWER A-2, SECTOR-24, NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED, CONSULTING ENGINEERS, KOLKATA - MUMBAI - CHENNAI - NEW DELHI

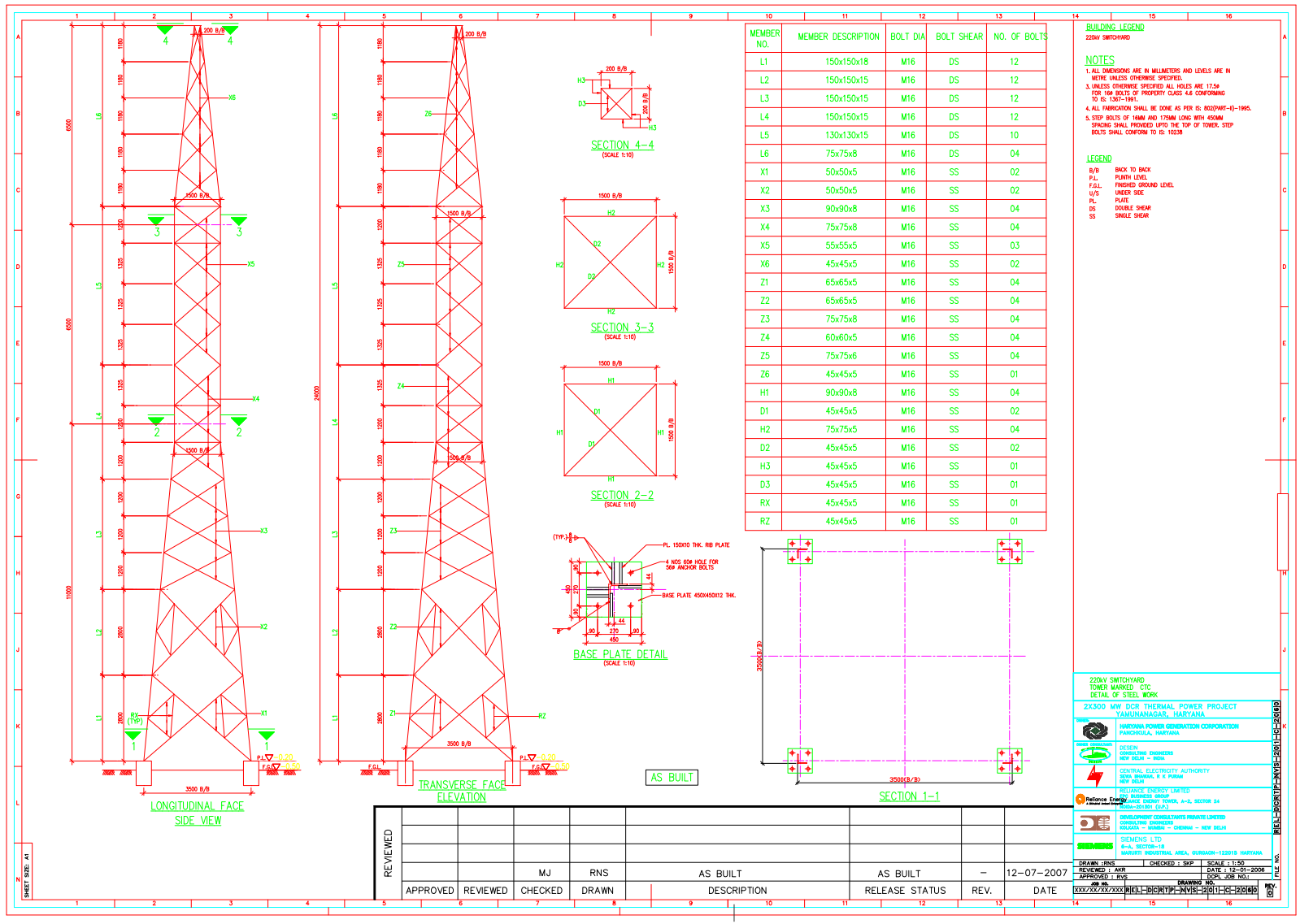
SIEMENS LTD, 6-A, SECTOR-18, MARUTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

FILE NO. REL - DCRTP - NVS - 201 - C - 2058

DRAWN : RNS	CHECKED : SKP	SCALE : 1:50
REVIEWED : AKR		DATE : 12-01-2006
APPROVED : RVS		DCPL JOB NO.:

JOB NO. XXXXXXXXXX | DRAWING NO. REL - DCRTP - NVS - 201 - C - 2058 | REV. 0

SHEET SIZE: A1



MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	150x150x18	M16	DS	12
L2	150x150x15	M16	DS	12
L3	150x150x15	M16	DS	12
L4	150x150x15	M16	DS	12
L5	130x130x15	M16	DS	10
L6	75x75x8	M16	DS	04
X1	50x50x5	M16	SS	02
X2	50x50x5	M16	SS	02
X3	90x90x8	M16	SS	04
X4	75x75x8	M16	SS	04
X5	55x55x5	M16	SS	03
X6	45x45x5	M16	SS	02
Z1	65x65x5	M16	SS	04
Z2	65x65x5	M16	SS	04
Z3	75x75x8	M16	SS	04
Z4	60x60x5	M16	SS	04
Z5	75x75x6	M16	SS	04
Z6	45x45x5	M16	SS	01
H1	90x90x8	M16	SS	04
D1	45x45x5	M16	SS	02
H2	75x75x5	M16	SS	04
D2	45x45x5	M16	SS	02
H3	45x45x5	M16	SS	01
D3	45x45x5	M16	SS	01
RX	45x45x5	M16	SS	01
RZ	45x45x5	M16	SS	01

BUILDING LEGEND
220kV SWITCHYARD

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
3. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.50 FOR 16ø BOLTS OF PROPERTY CLASS 4.6 CONFORMING TO IS: 1367–1991.
4. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART–I)–1995.
5. STEP BOLTS OF 16MM AND 175MM LONG WITH 450MM SPACING SHALL PROVIDED UPTO THE TOP OF TOWER. STEP BOLTS SHALL CONFORM TO IS: 10238

LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL.	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR

REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	–	12–07–2007	
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE	

220kV SWITCHYARD
TOWER MARKED C/C
DETAIL OF STEEL WORK

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

DESEIN
CONSULTING ENGINEERS
NEW DELHI – INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
POWER BUSINESS GROUP
RELIANCE ENERGY TOWER, A–3, SECTOR 24
NOIDA–201301 (U.P.)

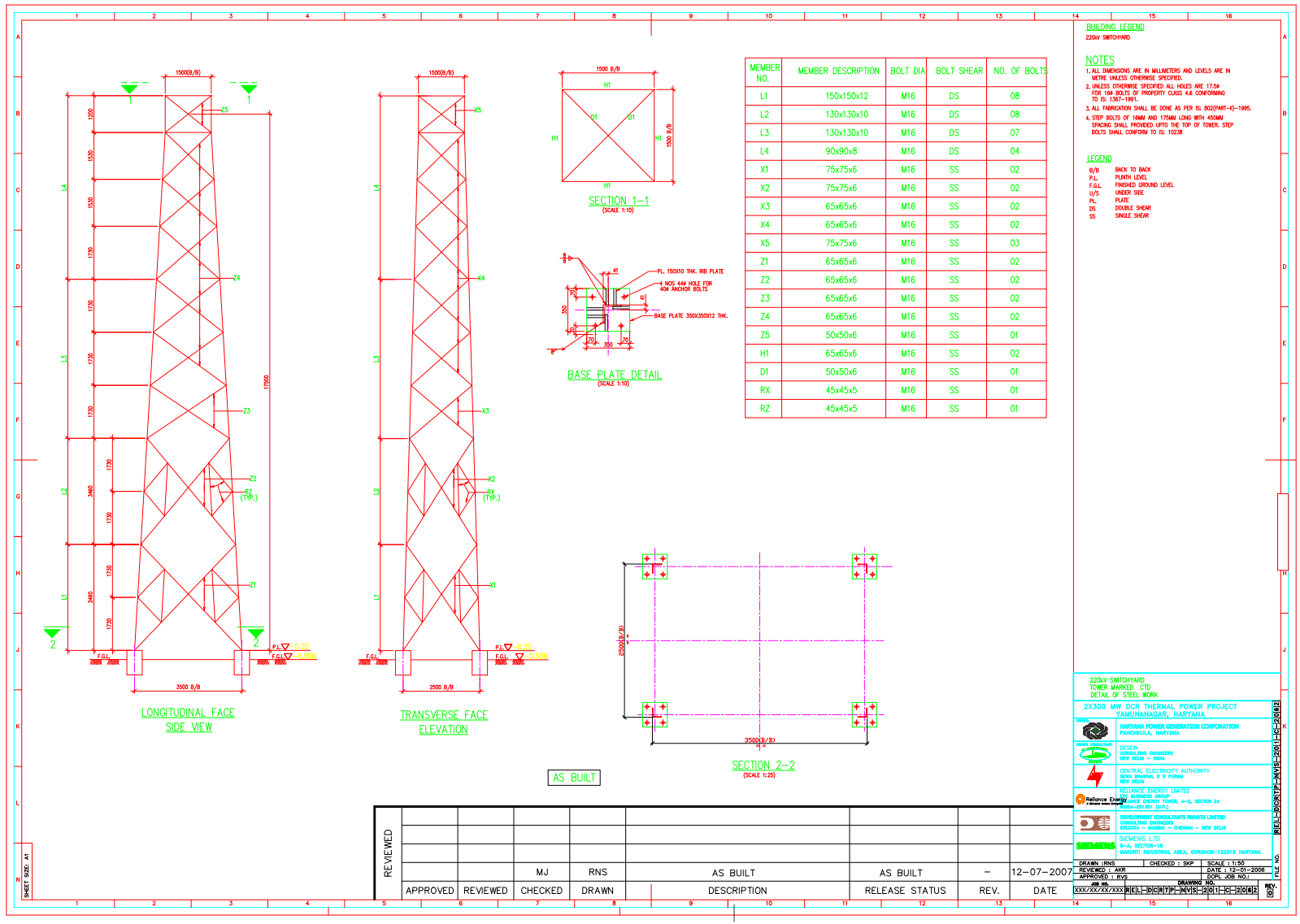
DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

SIEMENS LTD.
6–A, SECTOR–18
MARUTI INDUSTRIAL AREA, GURGAON–122015 HARYANA

DRAWN :RNS | CHECKED : SKP | SCALE : 1:50
REVIEWED : AKR | DATE : 12–01–2006
APPROVED : RVS | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. RELL–DCRTP–MVS–2011–C–2060 | REV. 0

SHEET SIZE: A1

FILE NO. RELL–DCRTP–MVS–2011–C–2060



MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	150x150x12	M16	DS	08
L2	130x130x10	M16	DS	08
L3	130x130x10	M16	DS	07
L4	90x90x8	M16	DS	04
X1	75x75x6	M16	SS	02
X2	75x75x6	M16	SS	02
X3	65x65x6	M16	SS	02
X4	65x65x6	M16	SS	02
X5	75x75x6	M16	SS	03
Z1	65x65x6	M16	SS	02
Z2	65x65x6	M16	SS	02
Z3	65x65x6	M16	SS	02
Z4	65x65x6	M16	SS	02
Z5	50x50x6	M16	SS	01
H1	65x65x6	M16	SS	02
D1	50x50x6	M16	SS	01
RX	45x45x5	M16	SS	01
RZ	45x45x5	M16	SS	01

BUILDING LEGEND
220kV SWITCHYARD

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5ø FOR 16ø BOLTS OF PROPERTY CLASS 4.6 CONFORMING TO IS: 1367-1991.
3. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART-I)-1995.
4. STEP BOLTS OF 16MM AND 175MM LONG WITH 450MM SPACING SHALL PROVIDED UPTO THE TOP OF TOWER. STEP BOLTS SHALL CONFORM TO IS: 10238

LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL.	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR

REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	–	12-07-2007	
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE	

220kV SWITCHYARD
TOWER MARKED CID
DETAIL OF STEEL WORK

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

DESEIN
CONSULTING ENGINEERS
NEW DELHI – INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
POWER BUSINESS GROUP
RELIANCE ENERGY TOWER, A-3, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

SIEMENS LTD
6-A, SECTOR-15
MARUTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

DRAWN : RNS	CHECKED : SKP	SCALE : 1:50
REVIEWED : AKR		DATE : 12-01-2006
APPROVED : RVS		DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX	DRAWING NO. RELL-DCRTP-MVIS-2011-C-2062	REV. 0

FILE NO. RELL-DCRTP-MVIS-2011-C-2062

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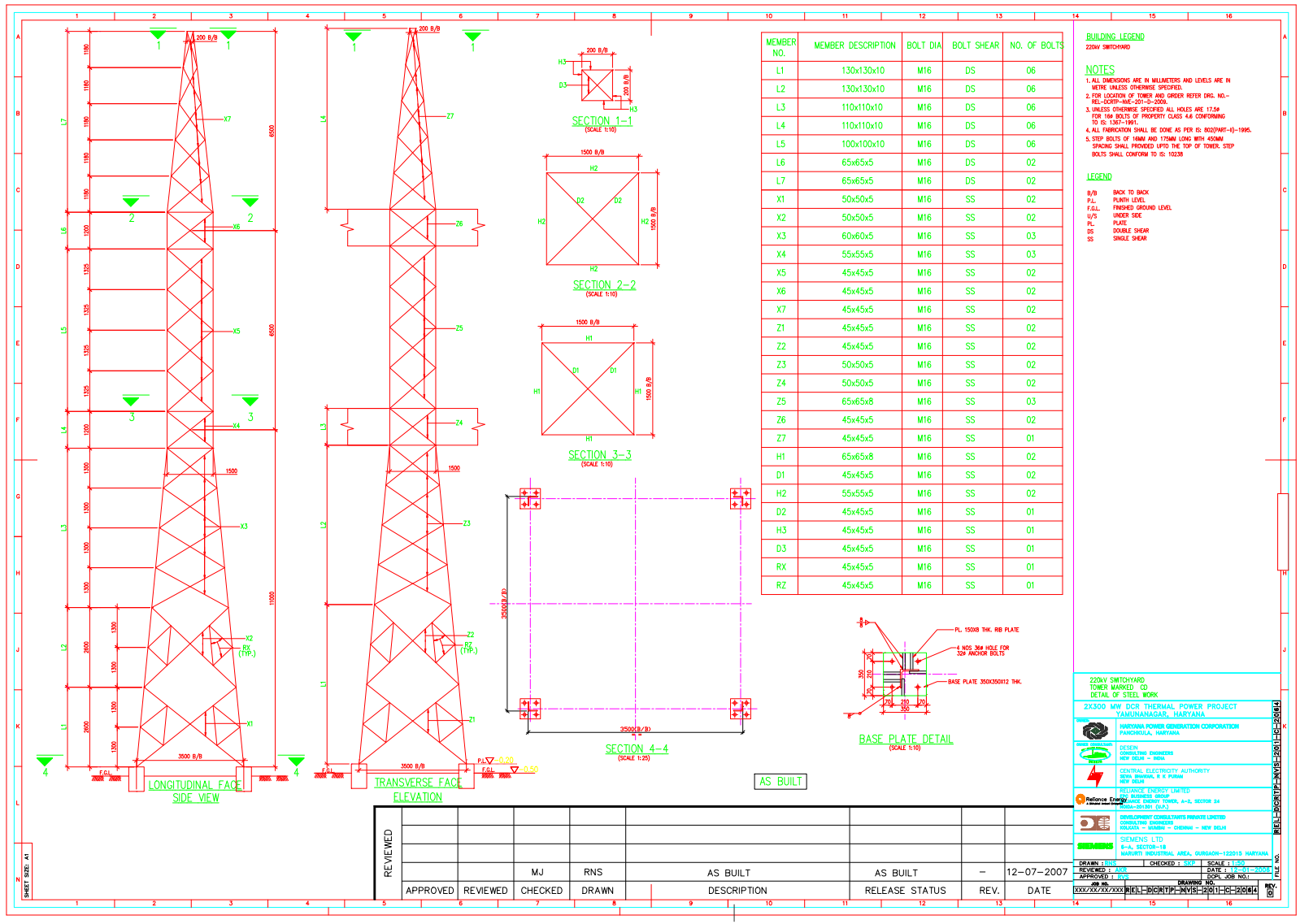

MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	130x130x10	M16	DS	06
L2	130x130x10	M16	DS	06
L3	110x110x10	M16	DS	06
L4	110x110x10	M16	DS	06
L5	100x100x10	M16	DS	06
L6	65x65x5	M16	DS	02
L7	65x65x5	M16	DS	02
X1	50x50x5	M16	SS	02
X2	50x50x5	M16	SS	02
X3	60x60x5	M16	SS	03
X4	55x55x5	M16	SS	03
X5	45x45x5	M16	SS	02
X6	45x45x5	M16	SS	02
X7	45x45x5	M16	SS	02
Z1	45x45x5	M16	SS	02
Z2	45x45x5	M16	SS	02
Z3	50x50x5	M16	SS	02
Z4	50x50x5	M16	SS	02
Z5	65x65x8	M16	SS	03
Z6	45x45x5	M16	SS	02
Z7	45x45x5	M16	SS	01
H1	65x65x8	M16	SS	02
D1	45x45x5	M16	SS	02
H2	55x55x5	M16	SS	02
D2	45x45x5	M16	SS	01
H3	45x45x5	M16	SS	01
D3	45x45x5	M16	SS	01
RX	45x45x5	M16	SS	01
RZ	45x45x5	M16	SS	01

BUILDING LEGEND
220kV SWITCHYARD

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. FOR LOCATION OF TOWER AND GIRDER REFER DRG. NO.- REL-DCRTP-NVE-201-D-2009.
3. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5ø FOR 16ø BOLTS OF PROPERTY CLASS 4.6 CONFORMING TO IS: 1367-1991.
4. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART-II)-1995.
5. STEP BOLTS OF 16MM AND 175MM LONG WITH 450MM SPACING SHALL PROVIDED UPTO THE TOP OF TOWER. STEP BOLTS SHALL CONFORM TO IS: 10238

LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL.	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR

REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	-	12-07-2007	
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE	

220kV SWITCHYARD
TOWER MARKED CD
DETAIL OF STEEL WORK

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
DESIGN CONSULTING ENGINEERS NEW DELHI - INDIA
CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
RELIANCE ENERGY LIMITED POWER BUSINESS GROUP RELIANCE ENERGY TOWER, A-3, SECTOR 24 NOIDA-201301 (U.P.)
DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
SIEMENS LTD 6-A, SECTOR-18 MARUTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

DRAWN : RNS | CHECKED : SKP | SCALE : 1:100
REVIEWED : AKR | DATE : 12-01-2008
APPROVED : RVR | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. REL-DCRTP-NVS-2011-C-2064 | REV. 0
FILE NO. REL-DCRTP-NVS-2011-C-2064
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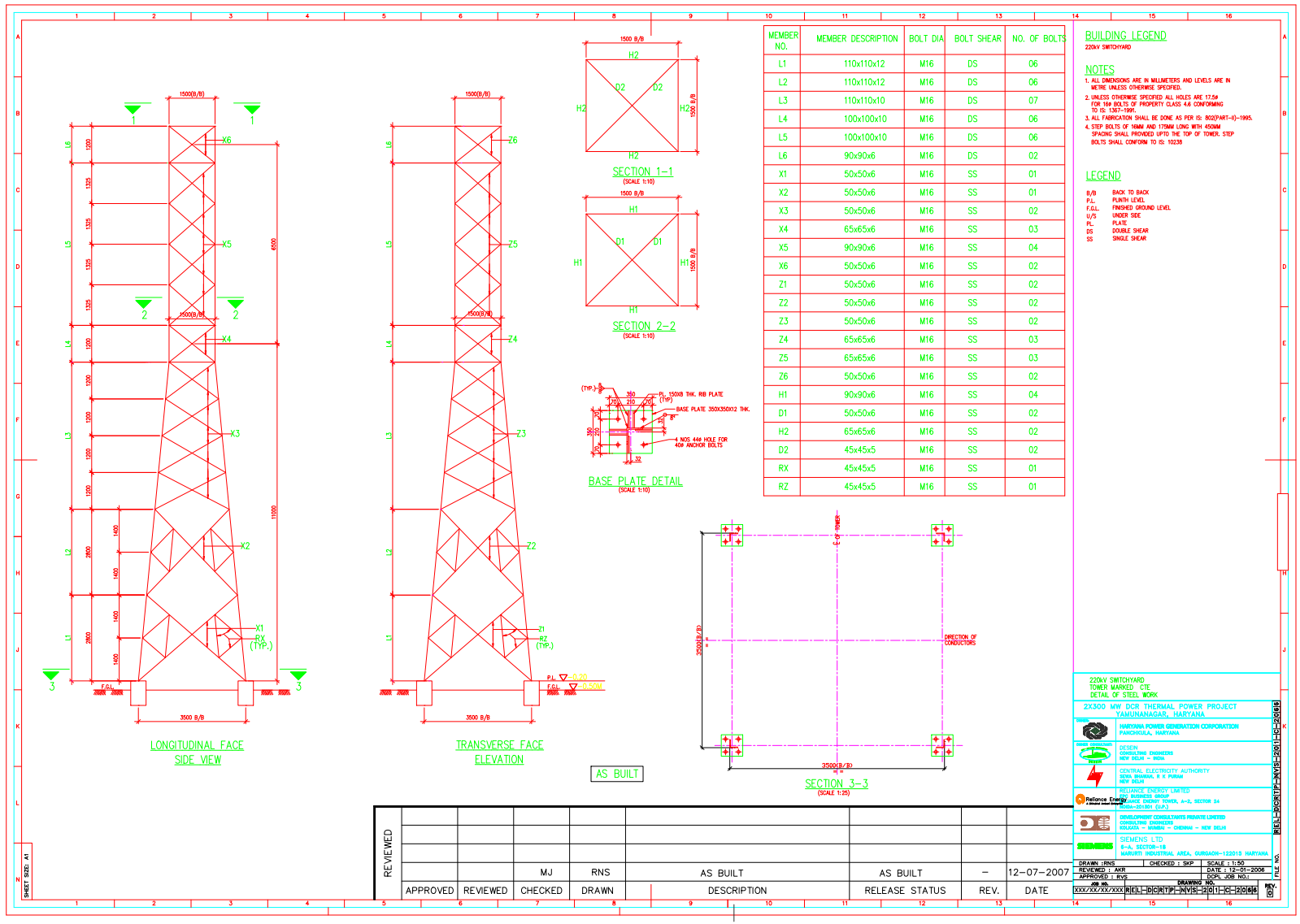


MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	110x110x12	M16	DS	06
L2	110x110x12	M16	DS	06
L3	110x110x10	M16	DS	07
L4	100x100x10	M16	DS	06
L5	100x100x10	M16	DS	06
L6	90x90x6	M16	DS	02
X1	50x50x6	M16	SS	01
X2	50x50x6	M16	SS	01
X3	50x50x6	M16	SS	02
X4	65x65x6	M16	SS	03
X5	90x90x6	M16	SS	04
X6	50x50x6	M16	SS	02
Z1	50x50x6	M16	SS	02
Z2	50x50x6	M16	SS	02
Z3	50x50x6	M16	SS	02
Z4	65x65x6	M16	SS	03
Z5	65x65x6	M16	SS	03
Z6	50x50x6	M16	SS	02
H1	90x90x6	M16	SS	04
D1	50x50x6	M16	SS	02
H2	65x65x6	M16	SS	02
D2	45x45x5	M16	SS	02
RX	45x45x5	M16	SS	01
RZ	45x45x5	M16	SS	01

BUILDING LEGEND

220kV SWITCHYARD

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5ø FOR 16ø BOLTS OF PROPERTY CLASS 4.6 CONFORMING TO IS: 1367-1991.
3. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART-II)-1995.
4. STEP BOLTS OF 16MM AND 175MM LONG WITH 450MM SPACING SHALL PROVIDED UPTO THE TOP OF TOWER. STEP BOLTS SHALL CONFORM TO IS: 10238

LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR

REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	–	12-07-2007	
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE	

220kV SWITCHYARD
TOWER MARKED CIE
DETAIL OF STEEL WORK

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

DESEIN
CONSULTING ENGINEERS
NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
POWER BUSINESS GROUP
RELIANCE ENERGY TOWER, A-3, SECTOR 24
NOIDA-201301 (U.P.)

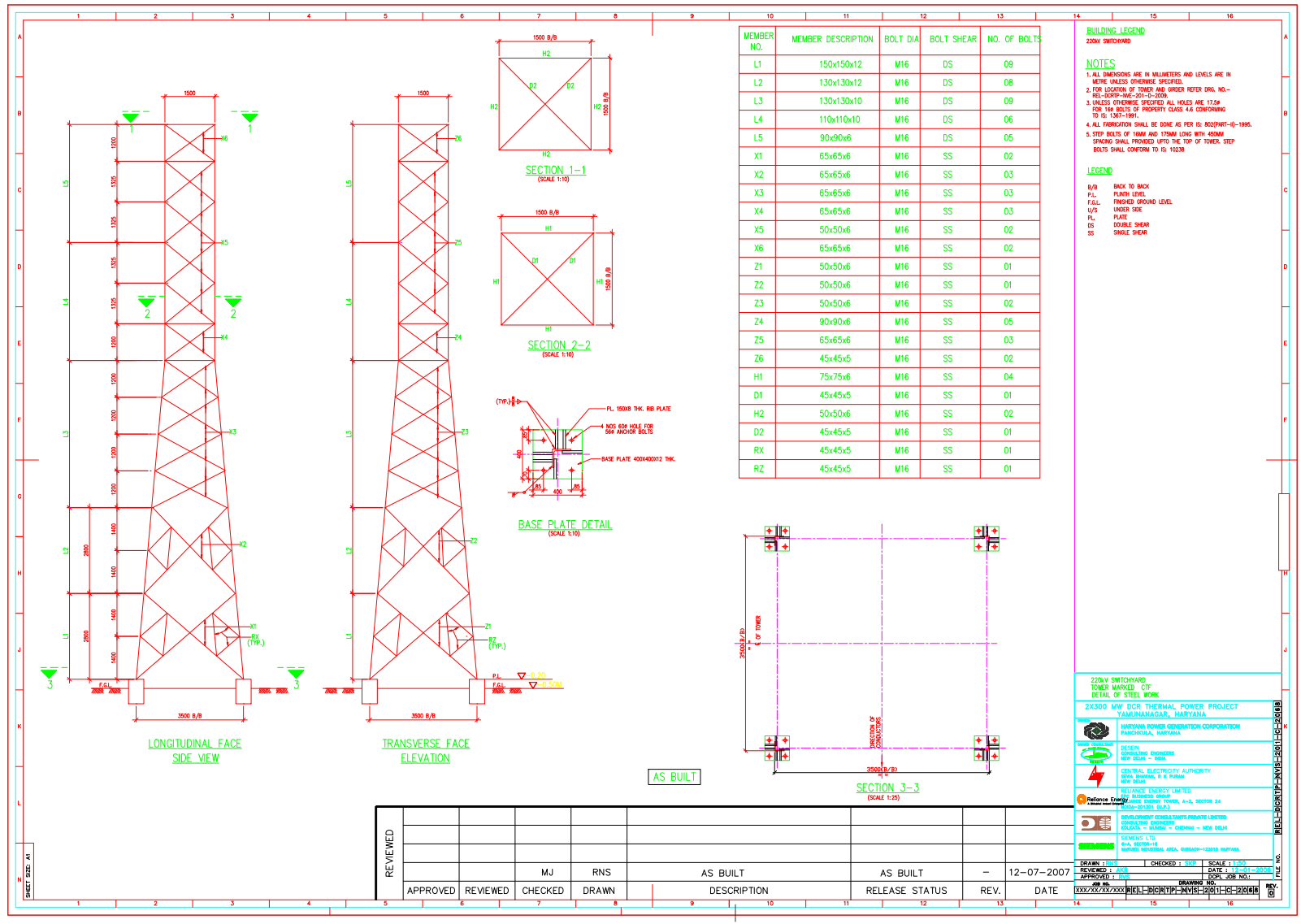
DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA - MUMBAI - CHENNAI - NEW DELHI

SIEMENS LTD
6-A, SECTOR-18
MARUTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

DRAWN : RNS	CHECKED : SKP	SCALE : 1:50
REVIEWED : AKR		DATE : 12-01-2006
APPROVED : RVS		DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX	DRAWING NO. RELL-DCRTP-HVIS-2011-C-2006	REV. 0

FILE NO. RELL-DCRTP-HVIS-2011-C-2006

SHEET SIZE: A1



MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	150x150x12	M16	DS	09
L2	130x130x12	M16	DS	08
L3	130x130x10	M16	DS	09
L4	110x110x10	M16	DS	06
L5	90x90x6	M16	DS	05
X1	65x65x6	M16	SS	02
X2	65x65x6	M16	SS	03
X3	65x65x6	M16	SS	03
X4	65x65x6	M16	SS	03
X5	50x50x6	M16	SS	02
X6	65x65x6	M16	SS	02
Z1	50x50x6	M16	SS	01
Z2	50x50x6	M16	SS	01
Z3	50x50x6	M16	SS	02
Z4	90x90x6	M16	SS	05
Z5	65x65x6	M16	SS	03
Z6	45x45x5	M16	SS	02
H1	75x75x6	M16	SS	04
D1	45x45x5	M16	SS	01
H2	50x50x6	M16	SS	02
D2	45x45x5	M16	SS	01
RX	45x45x5	M16	SS	01
RZ	45x45x5	M16	SS	01

BUILDING LEGEND
220kV SWITCHYARD

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. FOR LOCATION OF TOWER AND GIRDER REFER DRG. NO.– REL-DCRTP-MVS-201-C-2009.
3. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5ø FOR 16ø BOLTS OF PROPERTY CLASS 4.6 CONFORMING TO IS: 1367–1991.
4. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART–II)–1995.
5. STEP BOLTS OF 16MM AND 175MM LONG WITH 450MM SPACING SHALL PROVIDED UPTO THE TOP OF TOWER. STEP BOLTS SHALL CONFORM TO IS: 10238

LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR

REVIEWED								
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE
		MJ	RNS	AS BUILT	AS BUILT	–	12–07–2007

220kV SWITCHYARD
TOWER MARKED CIF
DETAIL OF STEEL WORK

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

DESEIN
CONSULTING ENGINEERS
NEW DELHI – INDIA

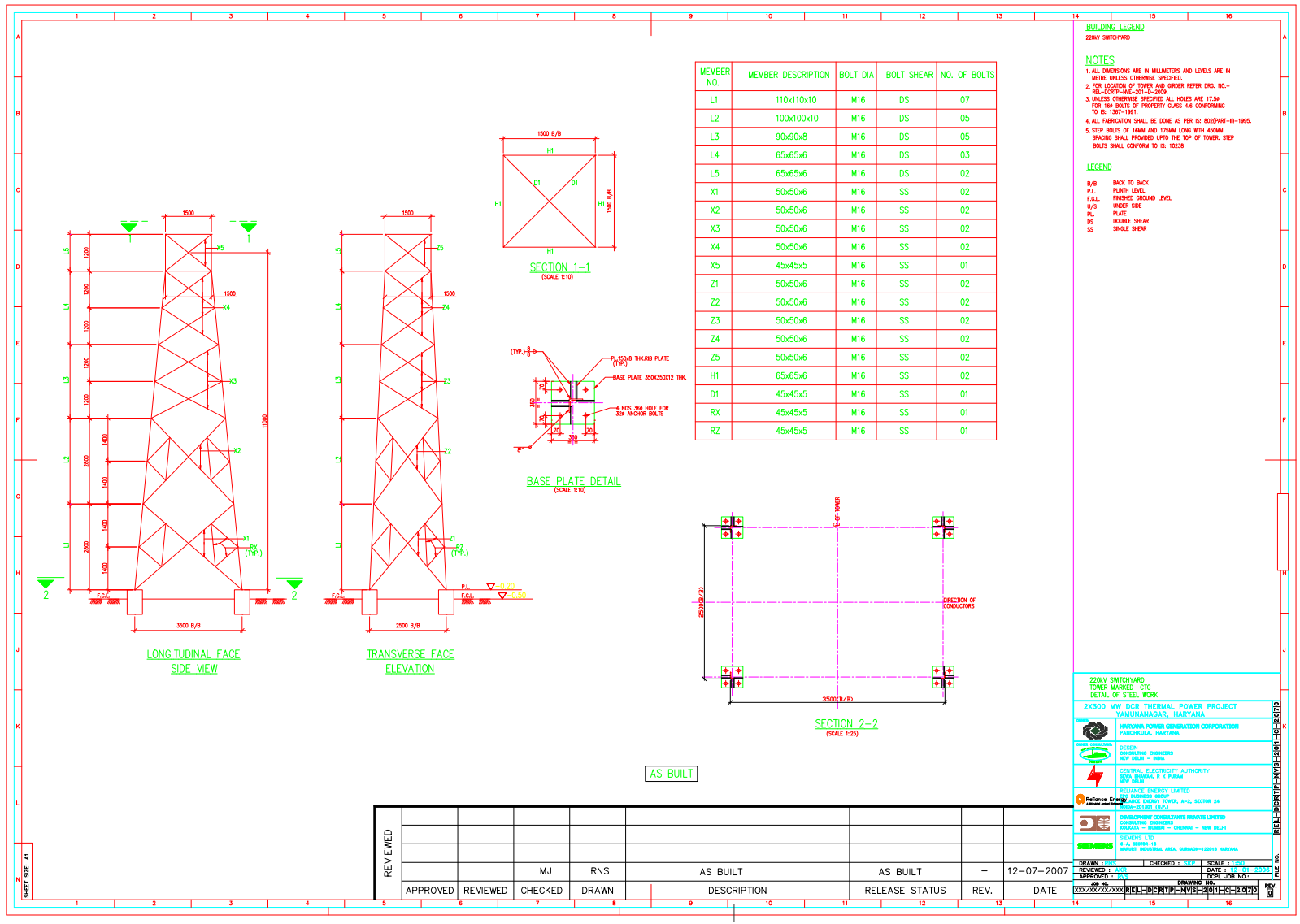
CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
POWER BUSINESS GROUP
RELIANCE ENERGY TOWER, A–3, SECTOR 24
NOIDA–201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

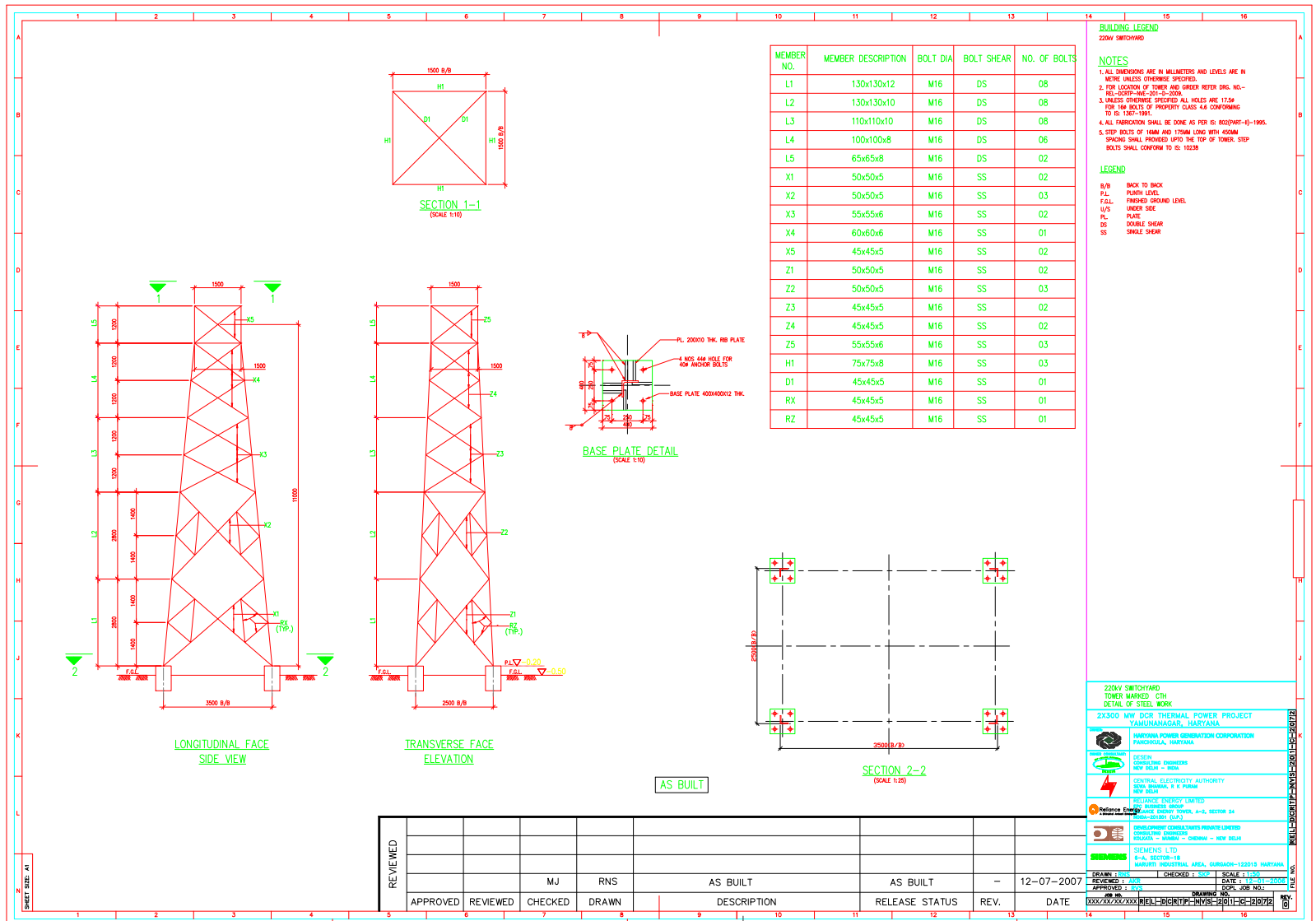
SIEMENS LTD.
B–4, SECTOR–18
MARUTI INDUSTRIAL AREA, GURGAON–122015 HARYANA

DRAWN : RNS | CHECKED : SKP | SCALE : 1:50
REVIEWED : AKR | DATE : 12–01–2006
APPROVED : RVR | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. REL–DCRTP–MVS–201–C–2068 | REV. 0
FILE NO.
SHEET SIZE: A1



MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	110x110x10	M16	DS	07
L2	100x100x10	M16	DS	05
L3	90x90x8	M16	DS	05
L4	65x65x6	M16	DS	03
L5	65x65x6	M16	DS	02
X1	50x50x6	M16	SS	02
X2	50x50x6	M16	SS	02
X3	50x50x6	M16	SS	02
X4	50x50x6	M16	SS	02
X5	45x45x5	M16	SS	01
Z1	50x50x6	M16	SS	02
Z2	50x50x6	M16	SS	02
Z3	50x50x6	M16	SS	02
Z4	50x50x6	M16	SS	02
Z5	50x50x6	M16	SS	02
H1	65x65x6	M16	SS	02
D1	45x45x5	M16	SS	01
RX	45x45x5	M16	SS	01
RZ	45x45x5	M16	SS	01

REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	–	12-07-2007	
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE	



MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	130x130x12	M16	DS	08
L2	130x130x10	M16	DS	08
L3	110x110x10	M16	DS	08
L4	100x100x8	M16	DS	06
L5	65x65x8	M16	DS	02
X1	50x50x5	M16	SS	02
X2	50x50x5	M16	SS	03
X3	55x55x6	M16	SS	02
X4	60x60x6	M16	SS	01
X5	45x45x5	M16	SS	02
Z1	50x50x5	M16	SS	02
Z2	50x50x5	M16	SS	03
Z3	45x45x5	M16	SS	02
Z4	45x45x5	M16	SS	02
Z5	55x55x6	M16	SS	03
H1	75x75x8	M16	SS	03
D1	45x45x5	M16	SS	01
RX	45x45x5	M16	SS	01
RZ	45x45x5	M16	SS	01

BUILDING LEGEND
220kV SWITCHYARD

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. FOR LOCATION OF TOWER AND ORDER REFER DRG. NO.- REL-DCRTP-ANC-201-D-2009.
3. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5ø FOR 16ø BOLTS OF PROPERTY CLASS 4.6 CONFORMING TO IS: 1367-1991.
4. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART-II)-1995.
5. STEP BOLTS OF 14MM AND 175MM LONG WITH 400MM SPACING SHALL PROVIDED UPTO THE TOP OF TOWER. STEP BOLTS SHALL CONFORM TO IS: 10238

LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL.	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR

REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	–	12-07-2007	
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE	

220kV SWITCHYARD
TOWER MARKED CTH
DETAIL OF STEEL WORK

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

DESEIN
CONSULTING ENGINEERS
NEW DELHI – INDIA

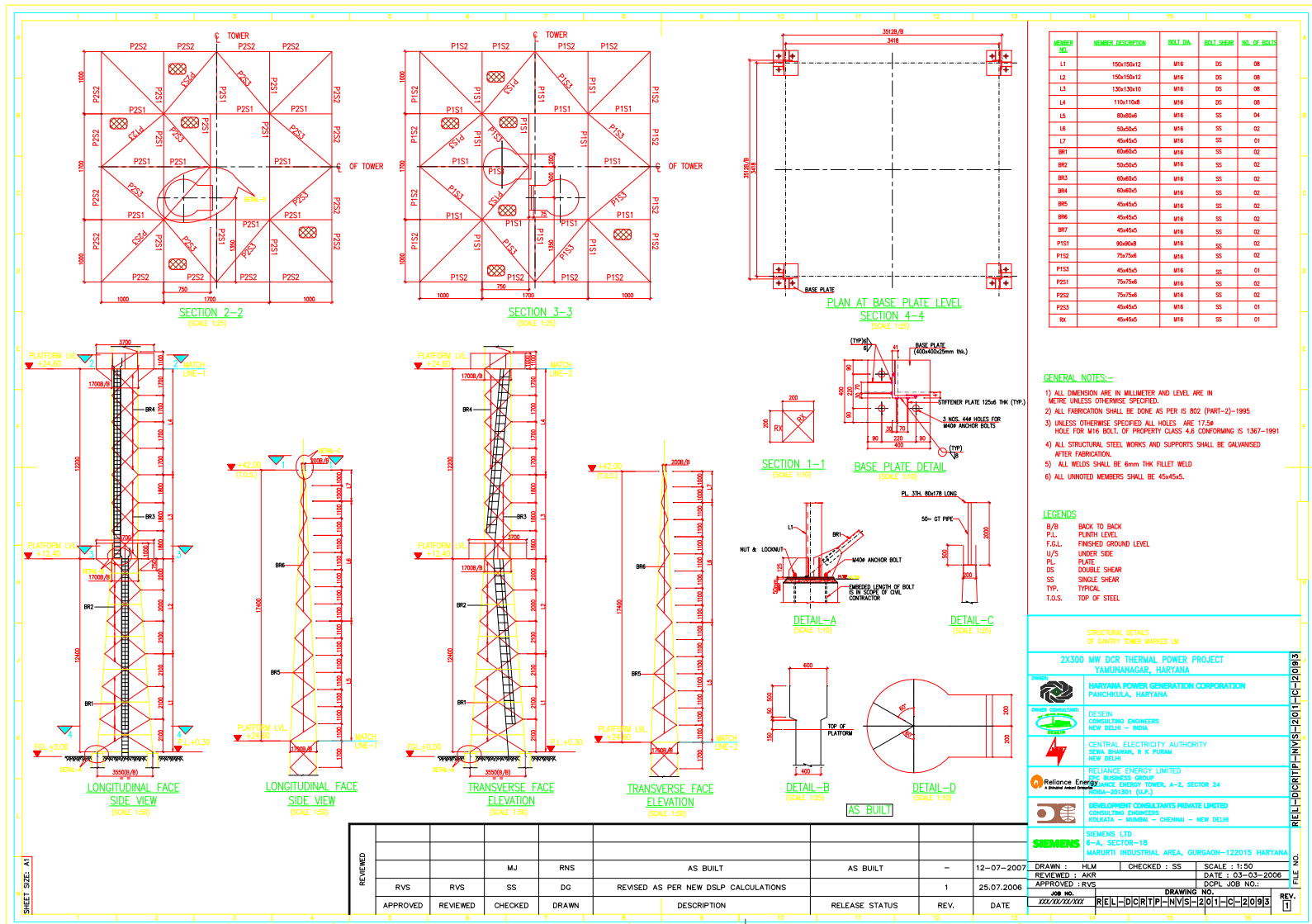
CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
POWER BUSINESS GROUP
RELIANCE ENERGY TOWER, A-3, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

SIEMENS LTD
6+A, SECTOR-18
MARUTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

DRAWN : RNS | CHECKED : SKP | SCALE : 1:50
REVIEWED : AKR | DATE : 12-01-2006
APPROVED : RVR | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. REL-DCRTP-MVS-2011-C-2072 | REV. 0
SHEET SIZE: A1 | FILE NO.



MEMBER NO.	MEMBER DESCRIPTION	BOLT DIA	BOLT SHEAR	NO. OF BOLTS
L1	150x150x12	M16	DS	08
L2	150x150x12	M16	DS	08
L3	130x130x10	M16	DS	08
L4	110x110x8	M16	DS	08
L5	80x80x6	M16	SS	04
L6	50x50x5	M16	SS	02
L7	45x45x5	M16	SS	01
BR1	60x60x5	M16	SS	02
BR2	50x50x5	M16	SS	02
BR3	60x60x5	M16	SS	02
BR4	60x60x5	M16	SS	02
BR5	45x45x5	M16	SS	02
BR6	45x45x5	M16	SS	02
BR7	45x45x5	M16	SS	02
P1S1	90x90x8	M16	SS	02
P1S2	75x75x6	M16	SS	02
P1S3	45x45x5	M16	SS	01
P2S1	75x75x6	M16	SS	02
P2S2	75x75x6	M16	SS	02
P2S3	45x45x5	M16	SS	01
RX	45x45x5	M16	SS	01

GENERAL NOTES:-

1) ALL DIMENSION ARE IN MILLIMETER AND LEVEL ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2) ALL FABRICATION SHALL BE DONE AS PER IS 802 (PART-2)-1995
3) UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5ø HOLE FOR M16 BOLT. OF PROPERTY CLASS 4.6 CONFORMING IS 1367-1991
4) ALL STRUCTURAL STEEL WORKS AND SUPPORTS SHALL BE GALVANISED AFTER FABRICATION.
5) ALL WELDS SHALL BE 6mm THK FILLET WELD
6) ALL UNNOTED MEMBERS SHALL BE 45x45x5.

LEGENDS

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL.	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR
TYP.	TYPICAL
T.O.S.	TOP OF STEEL

STRUCTURAL DETAILS OF GANTRY TOWER MARKED LM

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION, PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN, CONSULTING ENGINEERS, NEW DELHI – INDIA

CENTRAL ELECTRICITY AUTHORITY, SEWA BHAWAN, R K PURAM, NEW DELHI

RELIANCE ENERGY LIMITED, DLF BUSINESS GROUP, RELIANCE ENERGY TOWER, A-2, SECTOR 24, NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED, CONSULTING ENGINEERS, KOLKATA – MUMBAI – CHENNAI – NEW DELHI

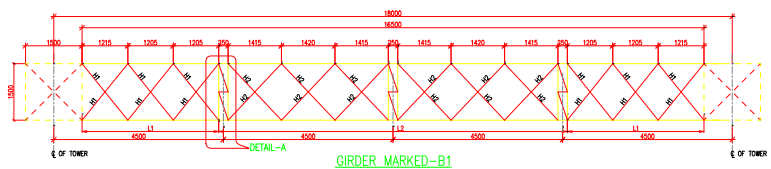
SIEMENS LTD, 6-A, SECTOR-18, MARURTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	–	12-07-2007
RVS	RVS	SS	DG	REVISED AS PER NEW DSLP CALCULATIONS		1	25.07.2006
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

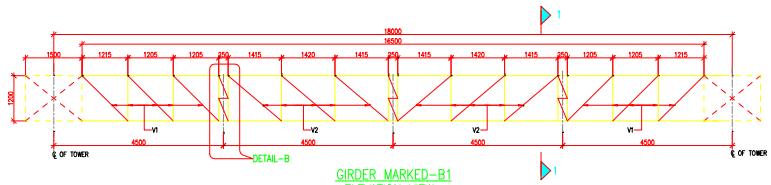
DRAWN : HLM | CHECKED : SS | SCALE : 1:50
REVIEWED : AKR | DATE : 03-03-2006
APPROVED : RVS | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. REL-DCRTP-NVS-201-C-2093 | REV. 1

FILE NO. REL-DCRTP-NVS-201-C-2093

SHEET SIZE: A1



GIRDER MARKED-B1
TOP & BOTTOM PLAN VIEW
(SCALE 1:50)



GIRDER MARKED-B1
ELEVATION VIEW
(SCALE 1:50)

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5ø FOR 16ø BOLTS OF PROPERTY CLASS 4.6 CONFORMING TO IS: 1367-1991.
3. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART-II)-1995.

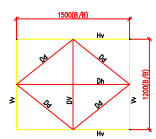
LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL.	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR
TYP.	TYPICAL
GL.	GROUND LEVEL
FS.	FARSIDE FACE
NS.	NEARSIDE FACE
BOP.	BOTTOM OF PLATE
TOS.	TOP OF STEEL
TOC.	TOP OF CONCRETE

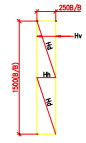
REFERENCE DRAWINGS:-

1) 220kV SWITCHYARD STRUCTURAL LAYOUT-PLAN & SECTION : REL-DCRTP-NVS-201-D-2009

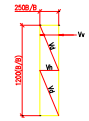
MEMBER NO.	MEMBER DESCRIPTION	GRADE OF STEEL	BOLT DIA.	SHEAR	NO. OF BOLT
L1	L 90x90x8	S235 JR	M-16	DS	06
L2	L 100x100x8	S235 JR	M-16	DS	04
H1	L 70x70x5	S235 JR	M-16	SS	04
H2	L 60x60x5	S235 JR	M-16	SS	02
V1	L 60x60x5	S235 JR	M-16	SS	02
V2	L60x60x5	S235 JR	M-16	SS	02
Vv	L 45x45x5	S235 JR	M-16	SS	01
Dd	L 45x45x5	S235 JR	M-10	SS	01
Dh	L 45x45x5	S235 JR	M-16	SS	01
Dv	L 45x45x5	S235 JR	M-16	SS	01
Vd	L 45x45x5	S235 JR	M-16	SS	01
Vh	L 45x45x5	S235 JR	M-16	SS	01
Hv	L 45x45x5	S235 JR	M-16	SS	01
Hd	L 45x45x5	S235 JR	M-16	SS	01
Hh	L 45x45x5	S235 JR	M-10	SS	01



SECTION 1-1
(SCALE 1:25)



TYPICAL DETAIL-A
(SCALE 1:25)



TYPICAL DETAIL-B
(SCALE 1:25)

AS BUILT

REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	–	12-07-2007	
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE	

SHEET SIZE: A1

220kV SWITCHYARD
DETAIL OF GIRDER MARKED B1

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION, PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN, CONSULTING ENGINEERS, NEW DELHI – INDIA

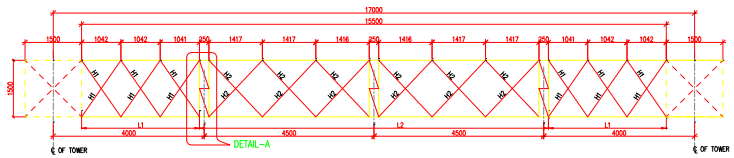
CENTRAL ELECTRICITY AUTHORITY, SEWA BHAWAN, R K PURAM, NEW DELHI

RELIANCE ENERGY LIMITED, ADA BUSINESS GROUP, RELIANCE ENERGY TOWER, A-2, SECTOR 24, NOIDA-201301 (U.P.)

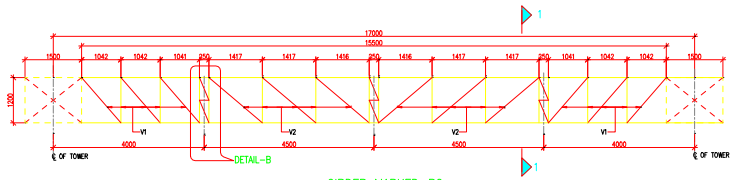
DEVELOPMENT CONSULTANTS PRIVATE LIMITED, CONSULTING ENGINEERS, KOLKATA – MUMBAI – CHENNAI – NEW DELHI

SIEMENS LTD, 6-A, SECTOR-18, MARURTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

DRAWN : HLM	CHECKED : SS	SCALE : 1:50	
REVIEWED : AKR		DATE : 24-02-2006	
APPROVED : RVS		DCPL JOB NO.:	
JOB NO. XXX/XX/XX/XXX	DRAWING NO. REL-DCRTP-NVS-201-C-2096	REV. 0	FILE NO. REL-DCRTP-NVS-201-R-2096

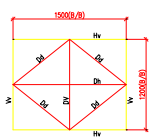


GIRDER MARKED-B2
TOP & BOTTOM PLAN VIEW
(SCALE 1:50)

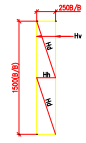


GIRDER MARKED-B2
ELEVATION VIEW
(SCALE 1:50)

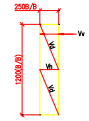
MEMBER NO.	MEMBER DESCRIPTION	GRADE OF STEEL	BOLT DIA.	SHEAR	NO. OF BOLT
L1	L 80x80x6	S235 JR	M-16	DS	06
L2	L 100x100x8	S235 JR	M-16	DS	06
H1	L60x60x5	S235 JR	M-16	SS	04
H2	L60x60x5	S235 JR	M-16	SS	02
V1	L60x60x5	S235 JR	M-16	SS	02
V2	L60x60x5	S235 JR	M-16	SS	02
Vv	L 45x45x5	S235 JR	M-16	SS	02
Dd	L 45x45x5	S235 JR	M-10	SS	01
Dh	L 45x45x5	S235 JR	M-16	SS	01
Dv	L 45x45x5	S235 JR	M-16	SS	01
Vd	L 45x45x5	S235 JR	M-16	SS	01
Vh	L 45x45x5	S235 JR	M-16	SS	01
Hv	L 45x45x5	S235 JR	M-16	SS	01
Hd	L 45x45x5	S235 JR	M-16	SS	01
Hh	L 45x45x5	S235 JR	M-10	SS	01



SECTION 1-1
(SCALE 1:25)



TYPICAL DETAIL-A
(SCALE 1:25)



TYPICAL DETAIL-B
(SCALE 1:25)

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. UNLESS OTHERWISE SPECIFIED ALL HOLES ARE 17.5ø FOR 16ø BOLTS OF PROPERTY CLASS 4.6 CONFORMING TO IS: 1367-1991.
3. ALL FABRICATION SHALL BE DONE AS PER IS: 802(PART-II)-1995.

LEGEND

B/B	BACK TO BACK
P.L.	PLINTH LEVEL
F.G.L.	FINISHED GROUND LEVEL
U/S	UNDER SIDE
PL.	PLATE
DS	DOUBLE SHEAR
SS	SINGLE SHEAR
TYP.	TYPICAL
GL.	GROUND LEVEL
FS.	FARSIDE FACE
NS.	NEARSIDE FACE
BOP.	BOTTOM OF PLATE
TOS.	TOP OF STEEL
TOC.	TOP OF CONCRETE

REFERENCE DRAWINGS:-
1) 220kV SWITCHYARD STRUCTURAL LAYOUT-PLAN & SECTION : REL-DCRTP-NVE-201-D-2009

AS BUILT

REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	–	12-07-2007	
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE	

220kV SWITCHYARD
DETAIL OF GIRDER MARKED B2

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN
CONSULTING ENGINEERS
NEW DELHI – INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
DCC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

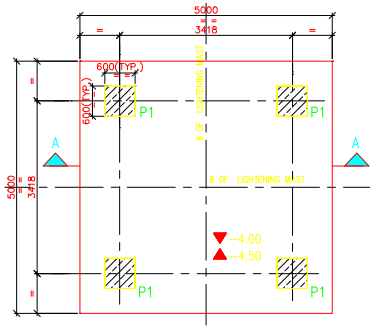
DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

SIEMENS LTD
6-A, SECTOR-18
MARURTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

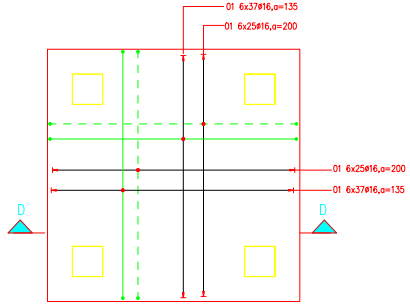
DRAWN : HLM | CHECKED : SS | SCALE : 1:50
REVIEWED : AKR | DATE : 24-02-2006
APPROVED : RVS | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. REL-DCRTP-NVS-201-C-2097 | REV. 0

FILE NO. REL-DCRTP-NVS-2011-R1-20197

SHEET SIZE: A1

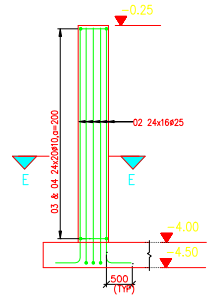


FOUNDATION PLAN AT −4.00M LEVEL
(GENERAL ARRANGEMENT PLAN)
(6 NOS REQD)

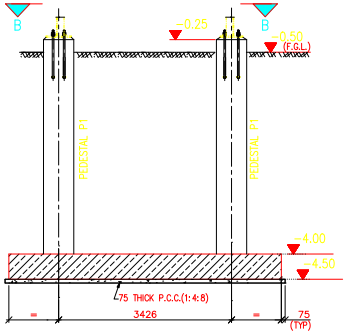


FOUNDATION PLAN AT −4.00M LEVEL
(REINFORCEMENT DETAIL PLAN)

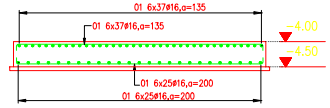
TOP REINFORCEMENT
BOTTOM REINFORCEMENT



REINFORCEMENT DETAIL OF
PEDESTAL MKD P1
(4x6 NOS REQD)



SECTION A−A



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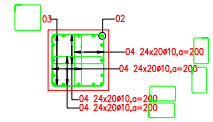

SECTION E−E
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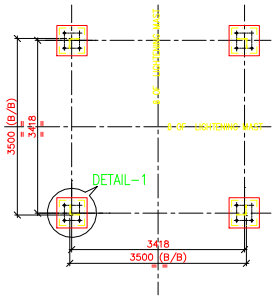
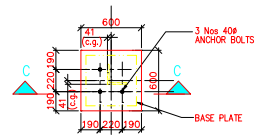
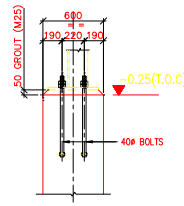


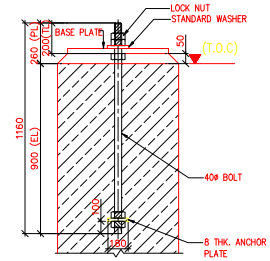
PLAN VIEW B−B
(SCALE 1:50)



DETAIL−1
(SCALE 1:25)



SECTION C−C
(SCALE 1:25)



TYPICAL DETAIL OF 40ø BOLT

QUANTITY(APPROX):	FOR SIX LIGHTENING MAST FDN
R.C.C. (M20)	105.0m^3
P.C.C. (1:4:8)	12.0m^3

AS BUILT

BUILDING LEGEND

220kV SWITCHYARD

A. GENERAL

1. DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
2. IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ARCHITECTURE DRAWING AND STRUCTURAL DRAWINGS CONTRACTOR. SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
3. EL(−)0.50 LEVEL CORRESPONDS TO REDUCED LEVEL +270.0m.
4. EL(−)0.50 CORRESPONDS TO THE FINISHED GROUND LEVEL IN THE SWITCHYARD.
5. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED TO BE 10 T/SQ.M.

B. CONCRETE/CONCRETING

1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
3. LOCATION AND DETAILS OF CONSTRUCTION JOINT SHALL BE PROVIDED WITH PRIOR APPROVAL OF ENGINEER IN CHARGE UNLESS SHOWN OTHERWISE IN THE DRAWING.
4. ALL CONCRETE SURFACES IN CONTACT WITH EARTH SHALL BE PAINTED WITH TWO COATS OF INDUSTRIAL GRADE HOT BITUMEN.

C. REINFORCEMENT/ANCHORAGE

1. ALL REINFORCEMENT SHALL BE OF TESTED QUALITY.
2. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS−1786 SHALL BE USED AS REINFORCEMENT STEEL DETAILING SHALL BE CONFORM TO SP−34 & IS−13920.
3. UNLESS NOTED OTHERWISE, THE LAP LENGTH OF BARS SHALL BE 50xDIA OF BAR.
4. LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.

D. COVER

1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a). FOOTING	75	75	75
b). COLUMN	–	–	40

LEGEND

▼	TOP OF CONCRETE LEVEL (T.O.C)
▲	BOTTOM OF CONCRETE LEVEL (B.O.C)
	REINFORCED CONCRETE
	BEDDING/LEAN CONCRETE
	GROUND LEVEL
℄	CENTRE LINE
TYP	TYPICAL
F.G.L	FINISH GROUND LEVEL
B/B	BACK TO BACK
C/C	CENTER TO CENTER
———	TOP BAR
- - -	BOTTOM BAR

BAR NUMBERING SYSTEM :−

EXAMPLE:−
10 2X20ø12,a=150

- BAR SPACING CENTER TO CENTER
- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD LM
GENERAL ARRANGEMENT &
REINFORCEMENT DETAIL OF FOUNDATION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN
CONSULTING ENGINEERS
NEW DELHI − INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A−2, SECTOR 24
NOIDA−201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA − MUMBAI − CHENNAI − NEW DELHI

SIEMENS LTD
6−A, SECTOR−18
MARURTI INDUSTRIAL AREA, GURGAON−122015 HARYANA

REVIEWED							
		MJ	RNS	AS BUILT	AS BUILT	–	12−07−2007
RVS	RVS	SS	DG	REVISED AS PER NEW DSLP CALCULATIONS		1	25.07.2006
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

DRAWN :RNS | CHECKED : SS | SCALE : 1:50
REVIEWED : AKR | DATE : 23−01−2006
APPROVED : RVS | DCPL JOB NO.:

JOB NO. XXX/XX/XX/XXX | DRAWING NO. REL−DCRPT−NVS−201−C−2094 | REV. 1

FILE NO. REL−DCRPT−NVS−201−R−2094

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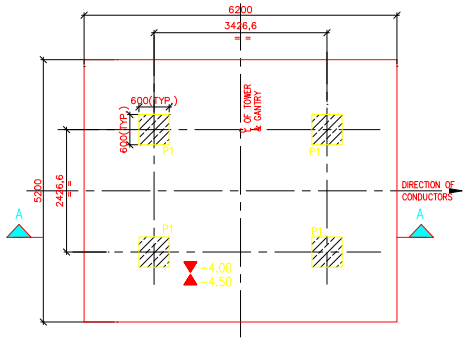
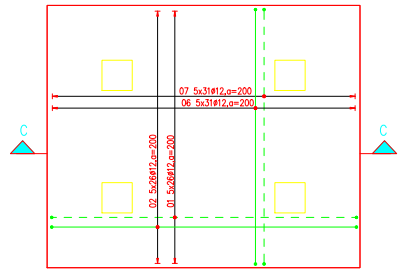
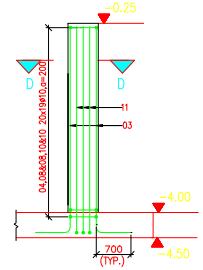


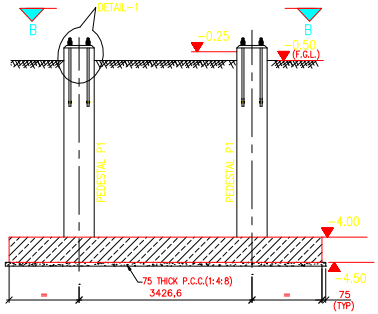
FOUNDATION PLAN AT -4.00M LEVEL
(GENERAL ARRANGEMENT PLAN)
(5 Nos REQD)



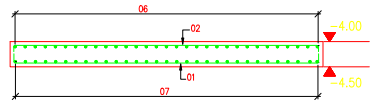
FOUNDATION PLAN AT -4.00M LEVEL
(REINFORCEMENT DETAIL PLAN)



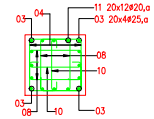
REINFORCEMENT DETAIL OF PEDESTAL MKD P1
(5x4 NOS REQD)



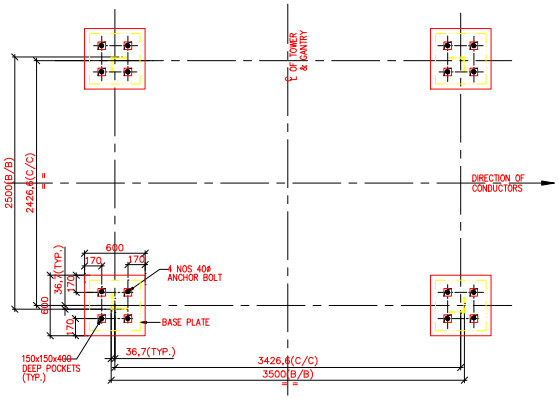
SECTION A-A



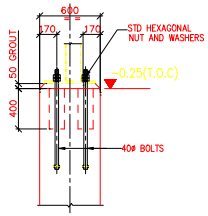
SECTION C-C
(SHOWING RAFT REINFORCEMENT ONLY)



SECTION D-D
(SCALE 1:25)



PLAN VIEW B-B
(SCALE 1:25)



DETAIL-1
(SCALE 1:25)

AS BUILT

QUANTITY(APPROX): FOR FIVE TOWER FDN	
R.C.C. (M25)	108.0m^3
P.C.C. (1:4:8)	12.5m^3

BUILDING LEGEND

220kV SWITCHYARD

A. GENERAL

1. DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
2. IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ARCHITECTURE DRAWING AND STRUCTURAL DRAWINGS CONTRACTOR. SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
3. EL(-)0.50 LEVEL CORRESPONDS TO REDUCED LEVEL +270.0m.
4. EL(-)0.50 CORRESPONDS TO THE FINISHED GROUND LEVEL IN THE SWITCHYARD.
5. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED TO BE 10 T/SQ.M.

B. CONCRETE/CONCRETING

1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
3. LOCATION AND DETAILS OF CONSTRUCTION JOINT SHALL BE PROVIDED WITH PRIOR APPROVAL OF ENGINEER IN CHARGE UNLESS SHOWN OTHERWISE IN THE DRAWING.
4. ALL CONCRETE SURFACES IN CONTACT WITH EARTH SHALL BE PAINTED WITH TWO COATS OF INDUSTRIAL GRADE HOT BITUMEN.

C. REINFORCEMENT/ANCHORAGE

1. ALL REINFORCEMENT SHALL BE OF TESTED QUALITY.
2. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS-1786 SHALL BE USED AS REINFORCEMENT STEEL DETAILING SHALL BE CONFORM TO SP-34 & IS-13920.
3. UNLESS NOTED OTHERWISE, THE LAP LENGTH OF BARS SHALL BE 50xDIA OF BAR.
4. LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.

D. COVER

1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a). FOOTING	75	75	75
b). COLUMN	-	-	40

LEGEND

- TOP OF CONCRETE LEVEL (T.O.C)
- BOTTOM OF CONCRETE LEVEL (B.O.C)
- REINFORCED CONCRETE
- BEDDING/LEAN CONCRETE
- GROUND LEVEL
- ℄ CENTRE LINE
- TYP TYPICAL
- F.G.L FINISH GROUND LEVEL
- B/B BACK TO BACK
- C/C CENTER TO CENTER
- TOP BAR
- BOTTOM BAR

BAR NUMBERING SYSTEM :-

EXAMPLE:-
10 2X20ø12,a=150

- BAR SPACING CENTER TO CENTER
- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD CTA
GENERAL ARRANGEMENT &
REINFORCEMENT DETAIL OF FOUNDATION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN
CONSULTING ENGINEERS
NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA - MUMBAI - CHENNAI - NEW DELHI

SIEMENS LTD
6-A, SECTOR-18
MARURTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

		MJ	RNS	AS BUILT	AS BUILT	-	12-07-2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

REVIEWED

DRAWN : RNS | CHECKED : SKP | SCALE : 1:50
REVIEWED : AKR | DATE : 23-01-2006
APPROVED : RVS | DCPL JOB NO.:

JOB NO. XXX/XX/XX/XXX | DRAWING NO. RELDCRTPNVS2011C2083 | REV. 0

FILE NO. RELDCRTPNVS2011C2083

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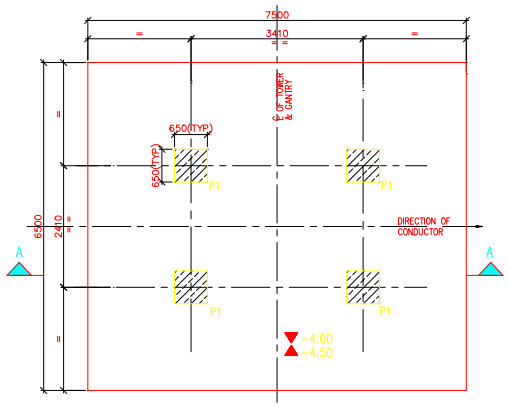
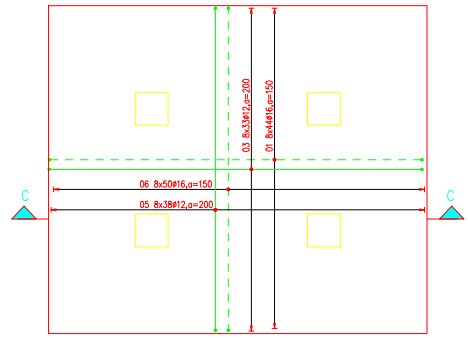
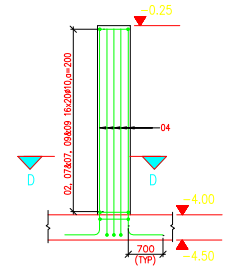


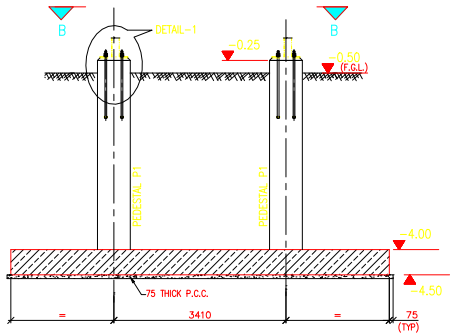
FOUNDATION PLAN AT -4.00M LEVEL
(GENERAL ARRANGEMENT PLAN)
(8 NOS REQD)



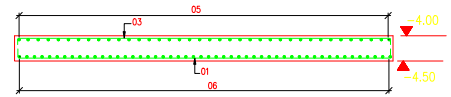
FOUNDATION PLAN AT -4.00M LEVEL
(REINFORCEMENT DETAIL PLAN)
(8 NOS REQD)



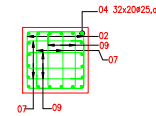
REINFORCEMENT DETAIL OF PEDESTAL MKD P1
(8x4 NOS REQD)



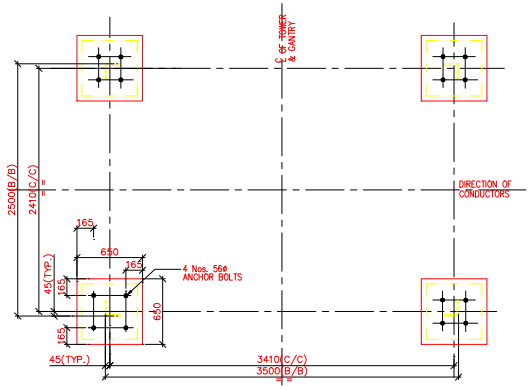
SECTION A-A



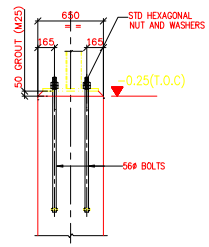
SECTION C-C
(SHOWING RAFT REINFORCEMENT ONLY)



SECTION D-D
(SCALE 1:25)



PLAN VIEW B-B
(SCALE 1:25)



DETAIL-1
(SCALE 1:25)

AS BUILT

QUANTITY(APPROX):	FOR EIGHT TOWER FDN
R.C.C. (M25)	246.0m^3
P.C.C. (M15)	31.0m^3

BUILDING LEGEND

220kV SWITCHYARD

A. GENERAL

1. DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
2. IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ARCHITECTURE DRAWING AND STRUCTURAL DRAWINGS CONTRACTOR. SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
3. EL(-)0.50 LEVEL CORRESPONDS TO REDUCED LEVEL +270.0m.
4. EL(-)0.50 CORRESPONDS TO THE FINISHED GROUND LEVEL IN THE SWITCHYARD.
5. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED TO BE 10 T/SQ.M.

B. CONCRETE/CONCRETING

1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
3. LOCATION AND DETAILS OF CONSTRUCTION JOINT SHALL BE PROVIDED WITH PRIOR APPROVAL OF ENGINEER IN CHARGE UNLESS SHOWN OTHERWISE IN THE DRAWING.
4. ALL CONCRETE SURFACES IN CONTACT WITH EARTH SHALL BE PAINTED WITH TWO COATS OF INDUSTRIAL GRADE HOT BITUMEN.

C. REINFORCEMENT/ANCHORAGE

1. ALL REINFORCEMENT SHALL BE OF TESTED QUALITY.
2. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS-1786 SHALL BE USED AS REINFORCEMENT STEEL DETAILING SHALL BE CONFORM TO SP-34 & IS-13920.
3. UNLESS NOTED OTHERWISE, THE LAP LENGTH OF BARS SHALL BE 50xDIA OF BAR.
4. LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.

D. COVER

1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a). FOOTING	75	75	75
b). COLUMN	–	–	40

LEGEND

	TOP OF CONCRETE LEVEL (T.O.C)
	BOTTOM OF CONCRETE LEVEL (B.O.C)
	REINFORCED CONCRETE
	BEDDING/LEAN CONCRETE
	GROUND LEVEL
℄	CENTRE LINE
TYP	TYPICAL
F.G.L	FINISH GROUND LEVEL
B/B	BACK TO BACK
C/C	CENTER TO CENTER
———	TOP BAR
- - -	BOTTOM BAR

BAR NUMBERING SYSTEM :-

EXAMPLE:-
10 2X20ø12,a=150

- BAR SPACING CENTER TO CENTER
- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD 03
GENERAL ARRANGEMENT & REINFORCEMENT DETAIL OF FOUNDATION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION, PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN, CONSULTING ENGINEERS, NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY, SEWA BHAWAN, R K PURAM, NEW DELHI

RELIANCE ENERGY LIMITED, EPC BUSINESS GROUP, RELIANCE ENERGY TOWER, A-2, SECTOR 24, NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED, CONSULTING ENGINEERS, KOLKATA - MUMBAI - CHENNAI - NEW DELHI

SIEMENS LTD, 6-A, SECTOR-18, MARUTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

		MJ	RNS	AS BUILT	AS BUILT	–	12-07-2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

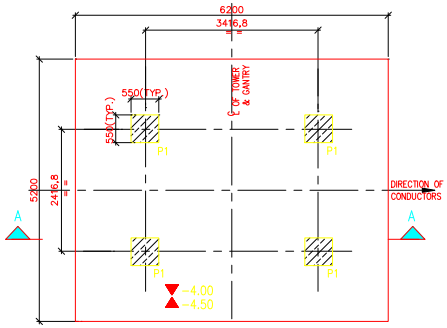
REVIEWED

DRAWN : RNS | CHECKED : SKP | SCALE : 1:50
REVIEWED : AKR | DATE : 23-01-2006
APPROVED : RVS | DCPL JOB NO.:

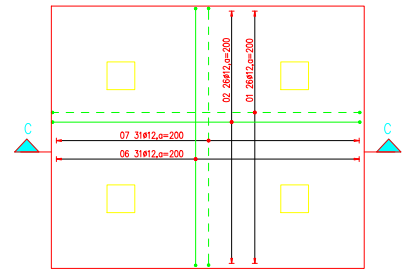
JOB NO. XXX/XX/XX/XXX | DRAWING NO. RELL-DCRTP-NVS-2011-C-20814 | REV. 0

FILE NO. RELL-DCRTP-NVS-2011-C-20814

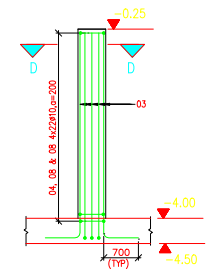
SHEET SIZE: A1



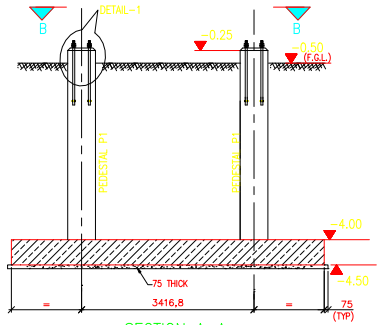
FOUNDATION PLAN AT −4.00M LEVEL
(GENERAL ARRANGEMENT PLAN)
(1 Nos REQD)



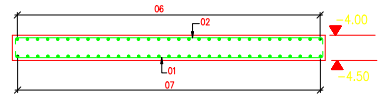
FOUNDATION PLAN AT −4.00M LEVEL
(REINFORCEMENT DETAIL PLAN)



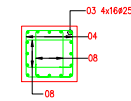
REINFORCEMENT DETAIL OF PEDESTAL MKD P1
(1x4 NOS REQD)



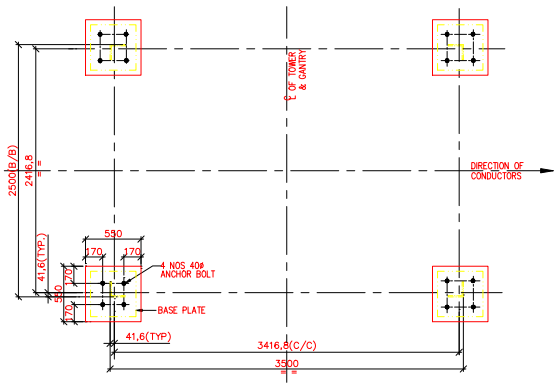
SECTION A−A



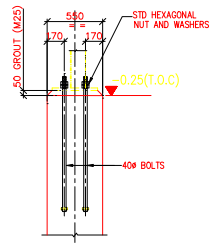
SECTION C−C
(SHOWING RAFT REINFORCEMENT ONLY)



SECTION D−D
(SCALE 1:25)



PLAN VIEW B−B
(SCALE 1:25)



DETAIL−1
(SCALE 1:25)

AS BUILT

QUANTITY(APPROX):	FOR ONE TOWER FDN
R.C.C. (M25)	21.0m³
P.C.C. (1:4:8)	3.0m³

BUILDING LEGEND

220kV SWITCHYARD

A. GENERAL

1. DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
2. IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ARCHITECTURE DRAWING AND STRUCTURAL DRAWINGS CONTRACTOR SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
3. EL(−)0.50 LEVEL CORRESPONDS TO REDUCED LEVEL +270.0m.
4. EL(−)0.50 CORRESPONDS TO THE FINISHED GROUND LEVEL IN THE SWITCHYARD.
5. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED TO BE 10 T/SQ.M.

B. CONCRETE/CONCRETING

1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
3. LOCATION AND DETAILS OF CONSTRUCTION JOINT SHALL BE PROVIDED WITH PRIOR APPROVAL OF ENGINEER IN CHARGE UNLESS SHOWN OTHERWISE IN THE DRAWING.
4. ALL CONCRETE SURFACES IN CONTACT WITH EARTH SHALL BE PAINTED WITH TWO COATS OF INDUSTRIAL GRADE HOT BITUMEN.

C. REINFORCEMENT/ANCHORAGE

1. ALL REINFORCEMENT SHALL BE OF TESTED QUALITY.
2. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS−1786 SHALL BE USED AS REINFORCEMENT STEEL DETAILING SHALL BE CONFORM TO SP−34 & IS−13920.
3. UNLESS NOTED OTHERWISE, THE LAP LENGTH OF BARS SHALL BE 50xDIA OF BAR.
4. LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.

D. COVER

1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a). FOOTING	75	75	75
b). COLUMN	–	–	40

LEGEND

▼	TOP OF CONCRETE LEVEL (T.O.C)
▲	BOTTOM OF CONCRETE LEVEL (B.O.C)
	REINFORCED CONCRETE
	BEDDING/LEAN CONCRETE
	GROUND LEVEL
℄	CENTRE LINE
TYP	TYPICAL
F.G.L	FINISH GROUND LEVEL
B/B	BACK TO BACK
C/C	CENTER TO CENTER
———	TOP BAR
- - -	BOTTOM BAR

BAR NUMBERING SYSTEM :−

EXAMPLE:−
10 2X20ø12,a=150

- BAR SPACING CENTER TO CENTER
- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD STD
GENERAL ARRANGEMENT &
REINFORCEMENT DETAIL OF FOUNDATION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN
CONSULTING ENGINEERS
NEW DELHI − INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A−2, SECTOR 24
NOIDA−201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA − MUMBAI − CHENNAI − NEW DELHI

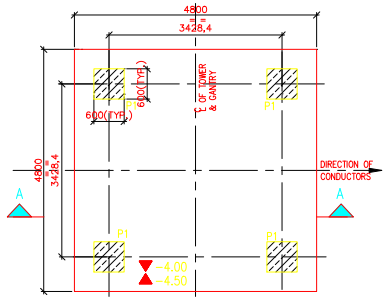
SIEMENS LTD
6−A, SECTOR−18
MARURTI INDUSTRIAL AREA, GURGAON−122015 HARYANA

FILE NO. REL−DCRTP−NVS−2011−C−20866

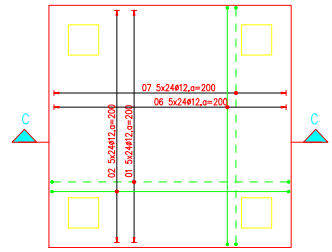
REVIEWED							
		MJ	RNS	AS BUILT	AS BUILT	−	12−07−2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

DRAWN :RNS | CHECKED : SKP | SCALE : 1:50
REVIEWED : AKR | DATE : 23−01−2006
APPROVED : RVS | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. REL−DCRTP−NVS−2011−C−20866 | REV. 0

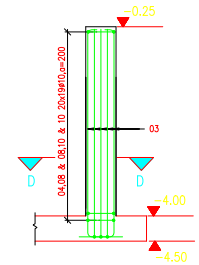
SHEET SIZE: A1



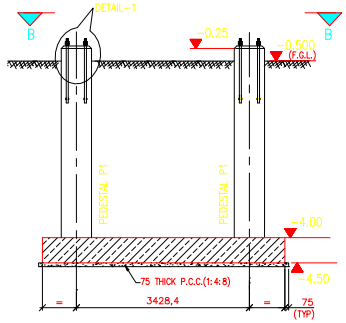
FOUNDATION PLAN AT −4.00M LEVEL
(GENERAL ARRANGEMENT PLAN)
(5 Nos REQD)



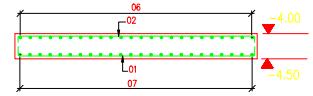
FOUNDATION PLAN AT −4.00M LEVEL
(REINFORCEMENT DETAIL PLAN)



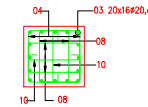
REINFORCEMENT DETAIL OF PEDESTAL MKD P1
(5x4 NOS REQD)



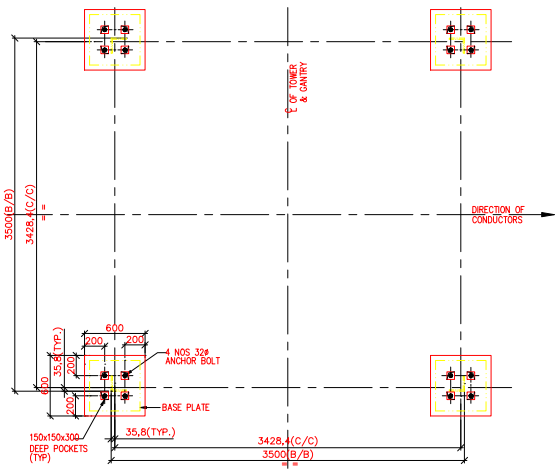
SECTION A−A



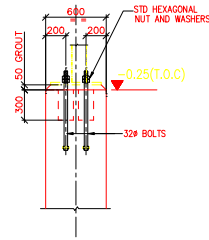
SECTION C−C
(SHOWING RAFT REINFORCEMENT ONLY)



SECTION D−D
(SCALE 1:25)



PLAN VIEW B−B
(SCALE 1:25)



DETAIL−1
(SCALE 1:25)

AS BUILT

QUANTITY(APPROX): FOR FIVE TOWER FDN	
R.C.C. (M25)	85.0m^3
P.C.C. (1:4:8)	9.0m^3

BUILDING LEGEND

220kV SWITCHYARD

A. GENERAL

1. DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
2. IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ARCHITECTURE DRAWING AND STRUCTURAL DRAWINGS CONTRACTOR SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
3. EL(−)0.50 LEVEL CORRESPONDS TO REDUCED LEVEL +270.0m.
4. EL(−)0.50 CORRESPONDS TO THE FINISHED GROUND LEVEL IN THE SWITCHYARD.
5. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED TO BE 10 T/SQ.M.

B. CONCRETE/CONCRETING

1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
3. LOCATION AND DETAILS OF CONSTRUCTION JOINT SHALL BE PROVIDED WITH PRIOR APPROVAL OF ENGINEER IN CHARGE UNLESS SHOWN OTHERWISE IN THE DRAWING.
4. ALL CONCRETE SURFACES IN CONTACT WITH EARTH SHALL BE PAINTED WITH TWO COATS OF INDUSTRIAL GRADE HOT BITUMEN.

C. REINFORCEMENT/ANCHORAGE

1. ALL REINFORCEMENT SHALL BE OF TESTED QUALITY.
2. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS−1786 SHALL BE USED AS REINFORCEMENT STEEL DETAILING SHALL BE CONFORM TO SP−34 & IS−13920.
3. UNLESS NOTED OTHERWISE, THE LAP LENGTH OF BARS SHALL BE 50xDIA OF BAR.
4. LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.

D. COVER

1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a). FOOTING	75	75	75
b). COLUMN	–	–	40

LEGEND

▼	TOP OF CONCRETE LEVEL (T.O.C)
▲	BOTTOM OF CONCRETE LEVEL (B.O.C)
	REINFORCED CONCRETE
	BEDDING/LEAN CONCRETE
	GROUND LEVEL
℄	CENTRE LINE
TYP	TYPICAL
F.G.L	FINISH GROUND LEVEL
B/B	BACK TO BACK
C/C	CENTER TO CENTER
———	TOP BAR
- - -	BOTTOM BAR

BAR NUMBERING SYSTEM :−

EXAMPLE:−
10 2X20#12,a=150

- BAR SPACING CENTER TO CENTER
- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD GD
GENERAL ARRANGEMENT & REINFORCEMENT DETAIL OF FOUNDATION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN
CONSULTING ENGINEERS
NEW DELHI − INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
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RELIANCE ENERGY LIMITED
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RELIANCE ENERGY TOWER, A−2, SECTOR 24
NOIDA−201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA − MUMBAI − CHENNAI − NEW DELHI

SIEMENS LTD
6−A, SECTOR−18
MARUTI INDUSTRIAL AREA, GURGAON−122015 HARYANA

		MJ	RNS	AS BUILT	AS BUILT	−	12−07−2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

REVIEWED

DRAWN : RNS | CHECKED : SKP | SCALE : 1:50
REVIEWED : AKR | DATE : 23−01−2006
APPROVED : RVS | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. RELL−DCRTP−NVS−2011−C−20817 | REV. 0
FILE NO. RELL−DCRTP−NVS−2011−C−20817

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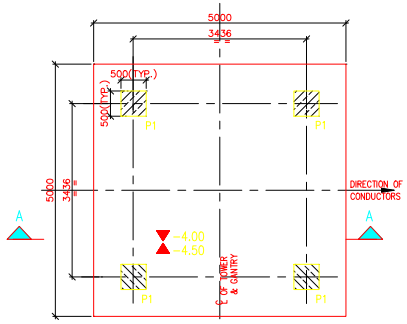
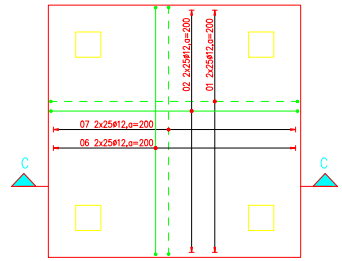
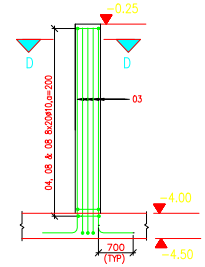


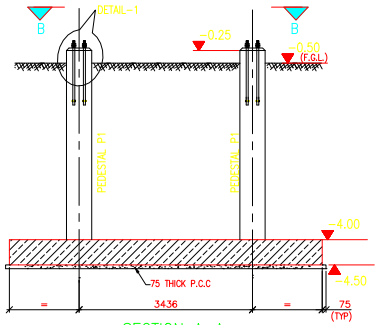
FOUNDATION PLAN AT −4.00M LEVEL
(GENERAL ARRANGEMENT PLAN)
(2 Nos REQD)



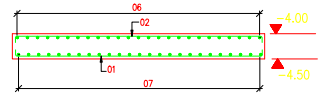
FOUNDATION PLAN AT −4.00M LEVEL
(REINFORCEMENT DETAIL PLAN)



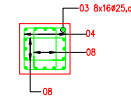
REINFORCEMENT DETAIL OF PEDESTAL MKD P1
(2x4 NOS REQD)



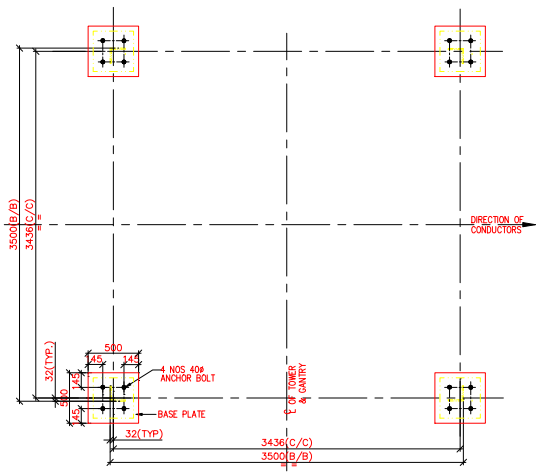
SECTION A−A



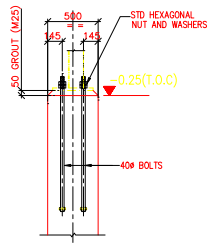
SECTION C−C
(SHOWING RAFT REINFORCEMENT ONLY)



SECTION D−D
(SCALE 1:25)



PLAN VIEW B−B
(SCALE 1:25)



DETAIL−1
(SCALE 1:25)

QUANTITY(APPROX):	FOR TWO TOWER FDN
R.C.C. (M25)	33.0m^3
P.C.C.	4.0m^3

AS BUILT

BUILDING LEGEND

220kV SWITCHYARD

A. GENERAL

1. DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
2. IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ARCHITECTURE DRAWING AND STRUCTURAL DRAWINGS CONTRACTOR SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
3. EL(−)0.50 LEVEL CORRESPONDS TO REDUCED LEVEL +270.0m.
4. EL(−)0.50 CORRESPONDS TO THE FINISHED GROUND LEVEL IN THE SWITCHYARD.
5. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED TO BE 10 T/SQ.M.

B. CONCRETE/CONCRETING

1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
3. LOCATION AND DETAILS OF CONSTRUCTION JOINT SHALL BE PROVIDED WITH PRIOR APPROVAL OF ENGINEER IN CHARGE UNLESS SHOWN OTHERWISE IN THE DRAWING.
4. ALL CONCRETE SURFACES IN CONTACT WITH EARTH SHALL BE PAINTED WITH TWO COATS OF INDUSTRIAL GRADE HOT BITUMEN.

C. REINFORCEMENT/ANCHORAGE

1. ALL REINFORCEMENT SHALL BE OF TESTED QUALITY.
2. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS−1786 SHALL BE USED AS REINFORCEMENT STEEL DETAILING SHALL BE CONFORM TO SP−34 & IS−13920.
3. UNLESS NOTED OTHERWISE, THE LAP LENGTH OF BARS SHALL BE 50xDIA OF BAR.
4. LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.

D. COVER

1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a). FOOTING	75	75	75
b). COLUMN	–	–	40

LEGEND

▼	TOP OF CONCRETE LEVEL (T.O.C)
▲	BOTTOM OF CONCRETE LEVEL (B.O.C)
	REINFORCED CONCRETE
	BEDDING/LEAN CONCRETE
	GROUND LEVEL
℄	CENTRE LINE
TYP	TYPICAL
F.G.L	FINISH GROUND LEVEL
B/B	BACK TO BACK
C/C	CENTER TO CENTER
———	TOP BAR
- - -	BOTTOM BAR

BAR NUMBERING SYSTEM :−

EXAMPLE:−
10 2X20ø12,a=150

- BAR SPACING CENTER TO CENTER
- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD GTE
GENERAL ARRANGEMENT &
REINFORCEMENT DETAIL OF FOUNDATION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN
CONSULTING ENGINEERS
NEW DELHI − INDIA

CENTRAL ELECTRICITY AUTHORITY
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DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA − MUMBAI − CHENNAI − NEW DELHI

SIEMENS LTD
6−A, SECTOR−18
MARURTI INDUSTRIAL AREA, GURGAON−122015 HARYANA

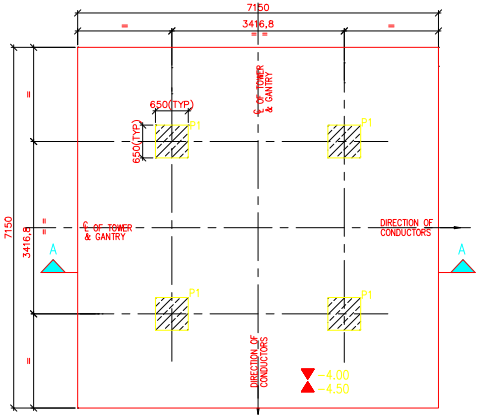
REVIEWED								
		MJ	RNS	AS BUILT	AS BUILT	−	12−07−2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

DRAWN :RNS | CHECKED : SKP | SCALE : 1:50
REVIEWED : AKR | DATE : 23−01−2006
APPROVED : RVS | DCPL JOB NO.:

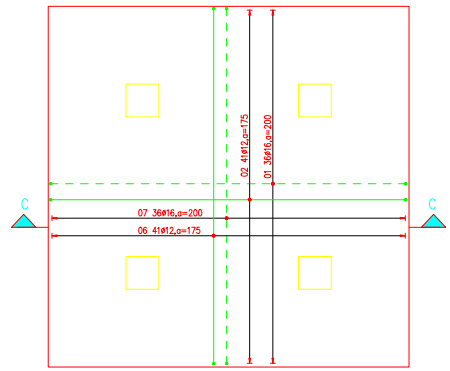
JOB NO. XXX/XX/XX/XXX | DRAWING NO. RELL−DCRTP−NVS−2011−C−2088 | REV. 0

FILE NO. RELL−DCRTP−NVS−2011−C−2088

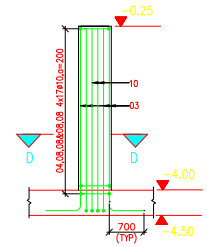
SHEET SIZE: A1



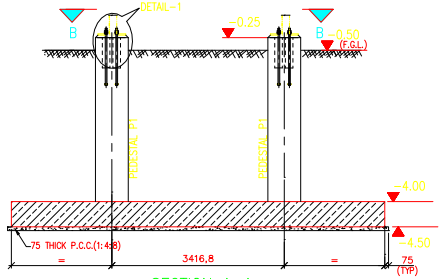
FOUNDATION PLAN AT −4.00M LEVEL
(GENERAL ARRANGEMENT PLAN)
(1NOS REQD)



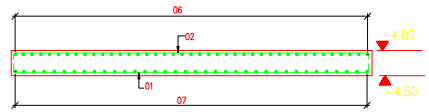
FOUNDATION PLAN AT −4.00M LEVEL
(REINFORCEMENT DETAIL PLAN)



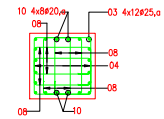
REINFORCEMENT DETAIL OF PEDESTAL MKD P1
(1x4 NOS REQD)



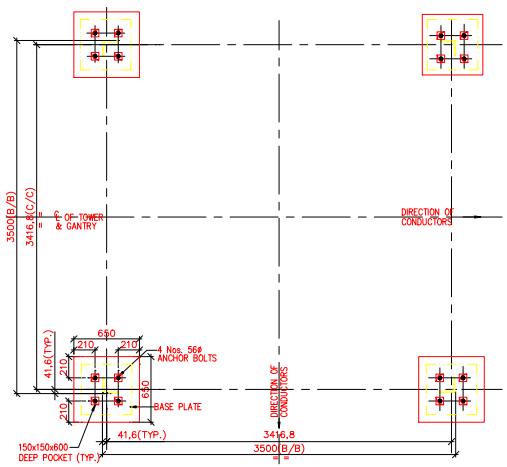
SECTION A−A



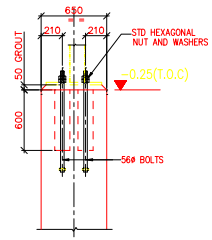
SECTION C−C
(SHOWING RAFT REINFORCEMENT ONLY)



SECTION D−D
(SCALE 1:25)



PLAN VIEW B−B
(SCALE 1:25)



DETAIL−1
(SCALE 1:25)

AS BUILT

QUANTITY(APPROX):	FOR ONE TOWER FDN
R.C.C. (M25)	31.0m³
P.C.C. (M15)	4.0m³

BUILDING LEGEND

220kV SWITCHYARD

A. GENERAL

1. DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
2. IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ARCHITECTURE DRAWING AND STRUCTURAL DRAWINGS CONTRACTOR SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
3. EL(−)0.50 LEVEL CORRESPONDS TO REDUCED LEVEL +270.0m.
4. EL(−)0.50 CORRESPONDS TO THE FINISHED GROUND LEVEL IN THE SWITCHYARD.
5. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED TO BE 10 T/SQ.M.

B. CONCRETE/CONCRETING

1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
3. LOCATION AND DETAILS OF CONSTRUCTION JOINT SHALL BE PROVIDED WITH PRIOR APPROVAL OF ENGINEER IN CHARGE UNLESS SHOWN OTHERWISE IN THE DRAWING.
4. ALL CONCRETE SURFACES IN CONTACT WITH EARTH SHALL BE PAINTED WITH TWO COATS OF INDUSTRIAL GRADE HOT BITUMEN.

C. REINFORCEMENT/ANCHORAGE

1. ALL REINFORCEMENT SHALL BE OF TESTED QUALITY.
2. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS−1786 SHALL BE USED AS REINFORCEMENT STEEL DETAILING SHALL BE CONFORM TO SP−34 & IS−13920.
3. UNLESS NOTED OTHERWISE, THE LAP LENGTH OF BARS SHALL BE 50xDIA OF BAR.
4. LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.

D. COVER

1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a). FOOTING	75	75	75
b). COLUMN	–	–	40

LEGEND

▼	TOP OF CONCRETE LEVEL (T.O.C)
▲	BOTTOM OF CONCRETE LEVEL (B.O.C)
	REINFORCED CONCRETE
	BEDDING/LEAN CONCRETE
	GROUND LEVEL
℄	CENTRE LINE
TYP	TYPICAL
F.G.L	FINISH GROUND LEVEL
B/B	BACK TO BACK
C/C	CENTER TO CENTER
———	TOP BAR
- - -	BOTTOM BAR

BAR NUMBERING SYSTEM :−

EXAMPLE:−
10 2X20#12,a=150

- BAR SPACING CENTER TO CENTER
- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD GTF
GENERAL ARRANGEMENT &
REINFORCEMENT DETAIL OF FOUNDATION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN
CONSULTING ENGINEERS
NEW DELHI − INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A−2, SECTOR 24
NOIDA−201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA − MUMBAI − CHENNAI − NEW DELHI

SIEMENS LTD
6−A, SECTOR−18
MARURTI INDUSTRIAL AREA, GURGAON−122015 HARYANA

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		MJ	RNS	AS BUILT	AS BUILT	−	12−07−2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

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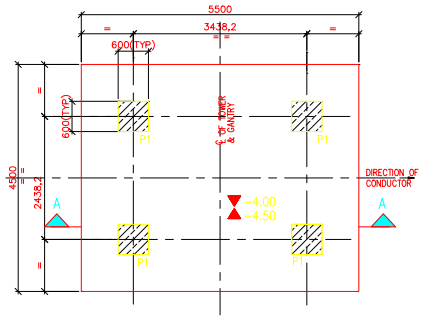
APPROVED : RVS | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. REL−DCRTP−NVS−201−C−2089 | REV. 0
FILE NO. REL−DCRTP−NVS−201−C−2089

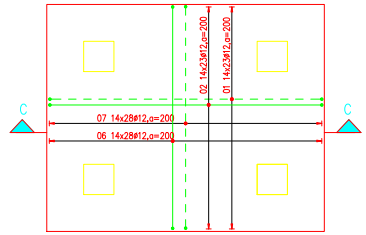
SHEET SIZE: A1



FOUNDATION PLAN AT -4.00M LEVEL

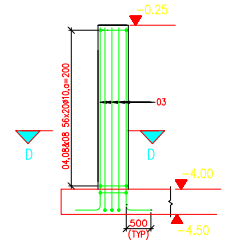
(GENERAL ARRANGEMENT PLAN)

(14 NOS REQD)



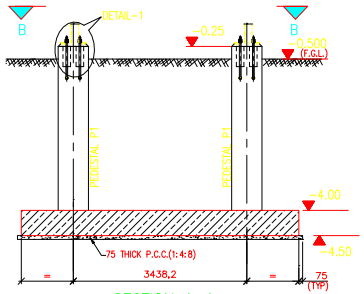
FOUNDATION PLAN AT -4.00M LEVEL

(REINFORCEMENT DETAIL PLAN)

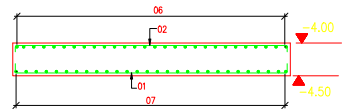


REINFORCEMENT DETAIL OF PEDESTAL MKD P1

(4x14 NOS REQD)

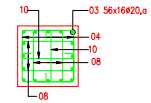


SECTION A-A



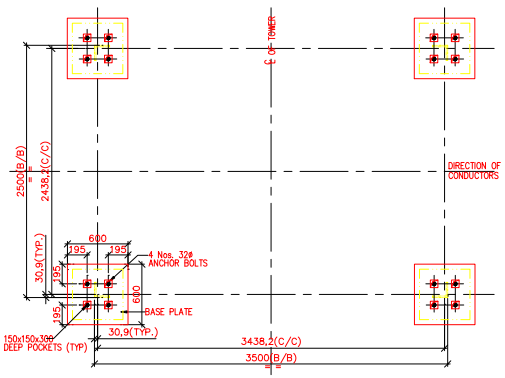
SECTION C-C

(SHOWING RAFT REINFORCEMENT ONLY)



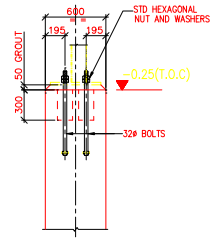
SECTION D-D

(SCALE 1:25)



PLAN VIEW B-B

(SCALE 1:25)



DETAIL-1

(SCALE 1:25)

AS BUILT

QUANTITY(APPROX):	FOR 14 TOWER FDNS
R.C.C. (M25)	239.0m^3
P.C.C. (M15)	27.0m^3

BUILDING LEGEND

220kV SWITCHYARD

A. GENERAL

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2. IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ARCHITECTURE DRAWING AND STRUCTURAL DRAWINGS CONTRACTOR SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
3. EL(-)0.50 LEVEL CORRESPONDS TO REDUCED LEVEL +270.0m.
4. EL(-)0.50 CORRESPONDS TO THE FINISHED GROUND LEVEL IN THE SWITCHYARD.
5. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED TO BE 10 T/SQ.M.

B. CONCRETE/CONCRETING

1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
3. LOCATION AND DETAILS OF CONSTRUCTION JOINT SHALL BE PROVIDED WITH PRIOR APPROVAL OF ENGINEER IN CHARGE UNLESS SHOWN OTHERWISE IN THE DRAWING.
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C. REINFORCEMENT/ANCHORAGE

1. ALL REINFORCEMENT SHALL BE OF TESTED QUALITY.
2. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS-1786 SHALL BE USED AS REINFORCEMENT STEEL DETAILING SHALL BE CONFORM TO SP-34 & IS-13920.
3. UNLESS NOTED OTHERWISE, THE LAP LENGTH OF BARS SHALL BE 50xDIA OF BAR.
4. LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.

D. COVER

1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a). FOOTING	75	75	75
b). COLUMN	–	–	40

LEGEND

▼	TOP OF CONCRETE LEVEL (T.O.C)
▲	BOTTOM OF CONCRETE LEVEL (B.O.C)
	REINFORCED CONCRETE
	BEDDING/LEAN CONCRETE
	GROUND LEVEL
℄	CENTRE LINE
TYP	TYPICAL
F.G.L	FINISH GROUND LEVEL
B/B	BACK TO BACK
C/C	CENTER TO CENTER
———	TOP BAR
- - -	BOTTOM BAR

BAR NUMBERING SYSTEM :-

EXAMPLE:-

10 2X20ø12,a=150

- BAR SPACING CENTER TO CENTER
- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD GTG
GENERAL ARRANGEMENT &
REINFORCEMENT DETAIL OF FOUNDATION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN
CONSULTING ENGINEERS
NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA - MUMBAI - CHENNAI - NEW DELHI

SIEMENS LTD
6-A, SECTOR-18
MARURTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

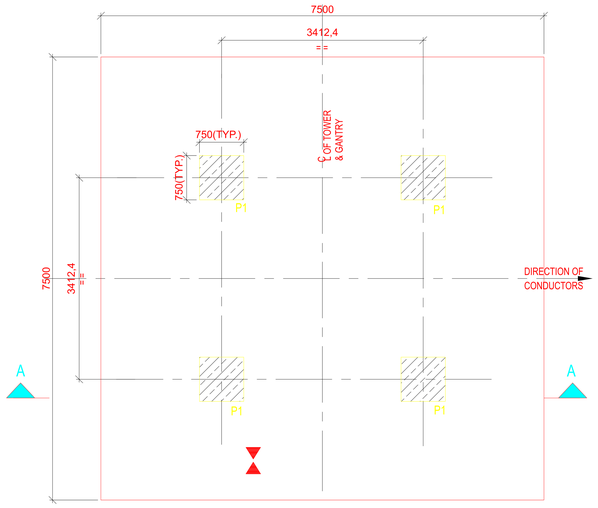
		MJ	RNS	AS BUILT	AS BUILT	–	12-07-2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

REVIEWED

DRAWN : RNS | CHECKED : SKP | SCALE : 1:50
REVIEWED : AKR | DATE : 23-01-2006
APPROVED : RVS | DCPL JOB NO.:
JOB NO. XXX/XX/XX/XXX | DRAWING NO. RELL-DCRTP-NVS-2011-C-2090 | REV. 0

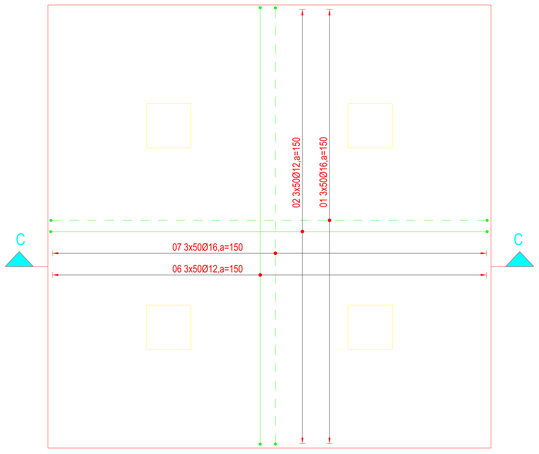
FILE NO. RELL-DCRTP-NVS-2011-C-2090

SHEET SIZE: A1



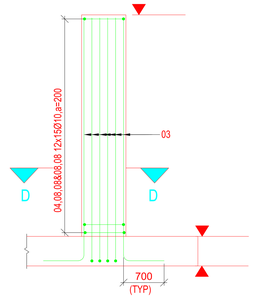
FOUNDATION PLAN AT -4.00M LEVEL

(GENERAL ARRANGEMENT PLAN)
(3 Nos REQD)



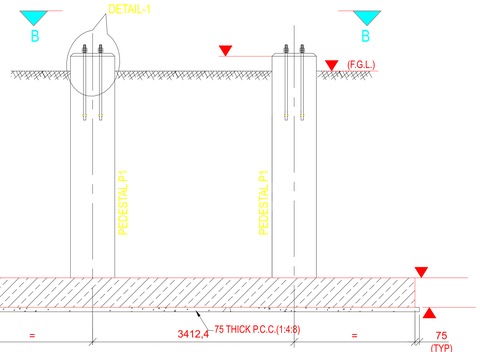
FOUNDATION PLAN AT -4.00M LEVEL

(REINFORCEMENT DETAIL PLAN)

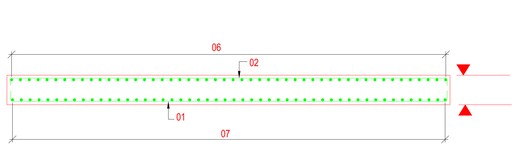


REINFORCEMENT DETAIL OF PEDESTAL MKD P1

(3x4 NOS REQD)

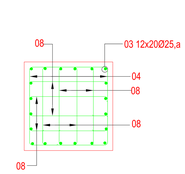


SECTION A-A



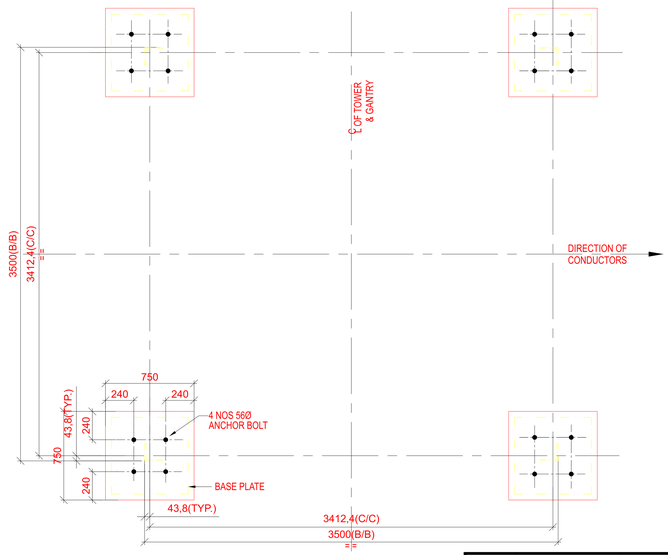
SECTION C-C

(SHOWING RAFT REINFORCEMENT ONLY)



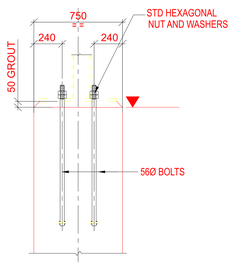
SECTION D-D

(SCALE 1:25)



PLAN VIEW B-B

(SCALE 1:25)



DETAIL-1

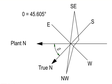
(SCALE 1:25)

AS BUILT

QUANTITY(APPROX):	FOR THREE TOWER FDN
R.C.C. (M25)	110.0m 3
P.C.C. (1:4:8)	13.0m 3

BUILDING LEGEND

220kV SWITCHYARD



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1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
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1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

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EXAMPLE:-
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- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD CTC
GENERAL ARRANGEMENT &
REINFORCEMENT DETAIL OF FOUNDATION

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RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA - MUMBAI - CHENNAI - NEW DELHI

SIEMENS
SIEMENS LTD
6-A, SECTOR-18
MARURTI INDUSTRIAL AREA, GURGAON-122015 HARYANA

		MJ	RNS	AS BUILT	AS BUILT	-	12-07-2007
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	RELEASE STATUS	REV.	DATE

REVIEWED

DRAWN : RNS | CHECKED : SKP | SCALE : 1:50
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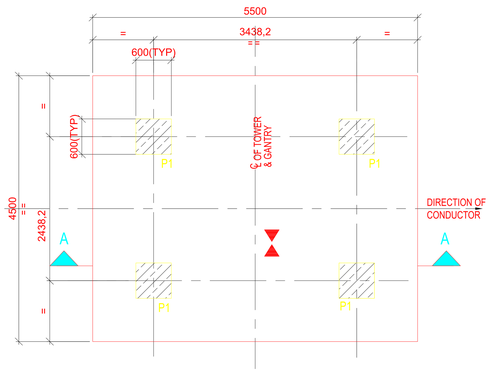
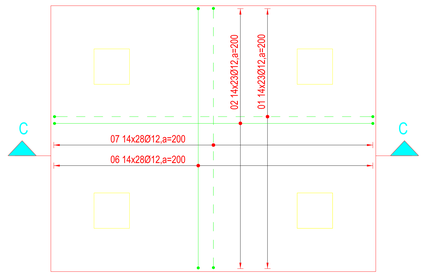
REV. 0

FILE NO. REL-DCRTP-NVS-201-C-2085

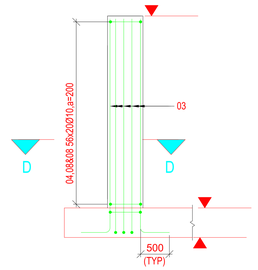
SHEET SIZE: A1



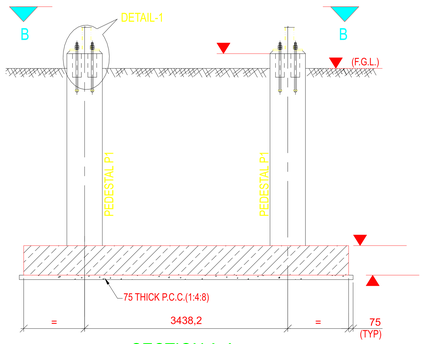
FOUNDATION PLAN AT -4.00M LEVEL
(GENERAL ARRANGEMENT PLAN)
(14 NOS REQD)



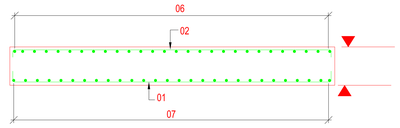
FOUNDATION PLAN AT -4.00M LEVEL
(REINFORCEMENT DETAIL PLAN)



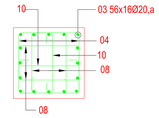
REINFORCEMENT DETAIL OF PEDESTAL MKD P1
(4x14 NOS REQD)



SECTION A-A



SECTION C-C
(SHOWING RAFT REINFORCEMENT ONLY)



SECTION D-D
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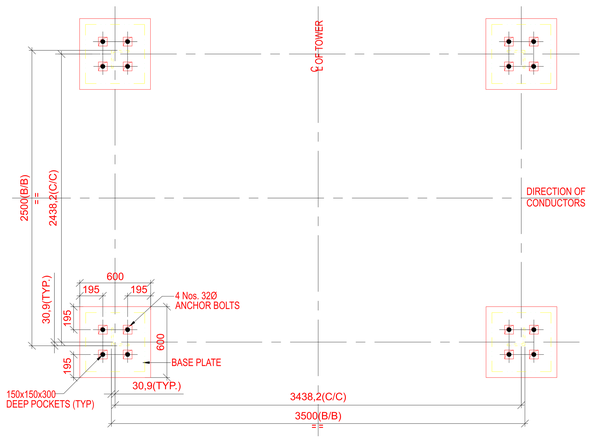
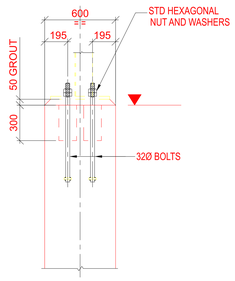


PLAN VIEW B-B
(SCALE 1:25)



DETAIL-1
(SCALE 1:25)

AS BUILT

QUANTITY(APPROX):	FOR 14 TOWER FDNS
R.C.C. (M25)	239.0m ^{3}
P.C.C. (M15)	27.0m ^{3}

BUILDING LEGEND
220kV SWITCHYARD

A. GENERAL
1. DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
2. IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ARCHITECTURE DRAWING AND STRUCTURAL DRAWINGS CONTRACTOR. SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
3. EL(-)0.50 LEVEL CORRESPONDS TO REDUCED LEVEL +270.0m.
4. EL(-)0.50 CORRESPONDS TO THE FINISHED GROUND LEVEL IN THE SWITCHYARD.
5. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED TO BE 10 T/SQ.M.

B. CONCRETE/CONCRETING
1. UNLESS NOTED OTHERWISE, BLINDING CONCRETE SHALL BE M15 AND 75mm THICK AND 75mm PROJECTED BEYOND FACE OF FOOTING.
2. UNLESS NOTED OTHERWISE, THE GRADE OF CONCRETE FOR R.C.C. WORK SHALL BE M25 IN CONFORMITY WITH IS:456 & TECHNICAL SPECIFICATIONS.
3. LOCATION AND DETAILS OF CONSTRUCTION JOINT SHALL BE PROVIDED WITH PRIOR APPROVAL OF ENGINEER IN CHARGE UNLESS SHOWN OTHERWISE IN THE DRAWING.
4. ALL CONCRETE SURFACES IN CONTACT WITH EARTH SHALL BE PAINTED WITH TWO COATS OF INDUSTRIAL GRADE HOT BITUMEN.

C. REINFORCEMENT/ANCHORAGE
1. ALL REINFORCEMENT SHALL BE OF TESTED QUALITY.
2. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS-1786 SHALL BE USED AS REINFORCEMENT STEEL DETAILING SHALL BE CONFORM TO SP-34 & IS-13920.
3. UNLESS NOTED OTHERWISE, THE LAP LENGTH OF BARS SHALL BE 50xDIA OF BAR.
4. LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.

D. COVER
1. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS:

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a). FOOTING	75	75	75
b). COLUMN	-	-	40

LEGEND

▼	TOP OF CONCRETE LEVEL (T.O.C)
▲	BOTTOM OF CONCRETE LEVEL (B.O.C)
	REINFORCED CONCRETE
	BEDDING/LEAN CONCRETE
	GROUND LEVEL
℄	CENTRE LINE
TYP	TYPICAL
F.G.L	FINISH GROUND LEVEL
B/B	BACK TO BACK
C/C	CENTER TO CENTER
	TOP BAR
	BOTTOM BAR

BAR NUMBERING SYSTEM :-
EXAMPLE:-
10 2X20Ø12,a=150

- BAR SPACING CENTER TO CENTER
- DIAMETER OF THE BAR
- NUMBER OF BARS
- NUMBER OF GROUPS
- BAR MARK

220kV SWITCHYARD
TOWER MKD CTG
GENERAL ARRANGEMENT &
REINFORCEMENT DETAIL OF FOUNDATION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER:
HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT:
DESEIN
CONSULTING ENGINEERS
NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

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SHEET SIZE: A1

Attachment-2

GAS FILLING AND EVACUATING PLANT : (GAS PROCESSINGUNIT)

THE PLANT NECESSARY FOR FILLING AND EVACUATING THE SF6 GAS IN THE SWITCHGEAR SHALL BE SUPPLIED TO ENABLE ANY MAINTENANCE WORK TO BE CARRIED OUT. THIS SHALL INCLUDE ALL THE NECESSARY GAS CYLINDERS FOR TEMPORARILY STORING THE EVACUATED SF6 GAS. THE CAPACITY OF THE TEMPORARY STORAGE FACILITIES SHALL AT LEAST BE SUFFICIENT FOR STORING THE MAXIMUM QUANTITY OF GAS THAT COULD BE REMOVED FROM AT LEAST ONE PHASE OF ONE COMPLETE BAY (SWITCHGEAR AND ASSOCIATED EQUIPMENT).

WHERE ANY ITEM OF THE FILLING AND EVACUATING PLANT IS OF SUCH A WEIGHT THAT IT CANNOT EASILY BE CARRIED BY MAINTENANCE PERSONNEL, IT SHALL BE PROVIDED WITH LIFTING HOOKS FOR LIFTING AND MOVING WITH THE OVERHEADCRANES.

THE MINIMUM CAPACITY PARAMETERS OF EVACUATION PLANT WILL BE AS UNDER :

- OIL FREE SUCTION(RECOVERY)PUMP: $30M^3$/HOUR
- COMPRESSOR(TWOSTAGE): $15M^3$/HOUR
- OIL FREEVACUUMPUMP: 100 M^3/HOUR

THE EVACUATION EQUIPMENT SHALL BE PROVIDED WITH ALL THE NECESSARY PIPES, COUPLINGS, FLEXIBLE TUBES AND VALVES FOR COUPLING UP TO THE SWITCHGEAR FOR FILLING OR EVACUATING ALL THEGASES.

DETAILS OF THE FILLING AND EVACUATING PLANT THAT WILL BE SUPPLIED, AS WELL AS THE DESCRIPTION OF THE FILLING AND EVACUATING PROCEDURES SHALL BE FURNISHED

POLYMER LONG ROD INSULATOR

LONG ROD INSULATORS SHALL CONFORM TO IEC-60433. INSULATOR HARDWARE SHALL CONFORM TO IS:2486**.** COMPOSITE LONG ROD POLYMER INSULATOR SHALL CONFORM TO IEC:61109. FURTHER, THE CONTRACTOR SHALL SUPPLY INSULATORS AS PER DETAILS MENTIONED BELOW:

COMPOSITE LONG ROD POLYMER INSULATOR

BIDDER SHALL OFFER COMPOSITE LONG ROD POLYMER INSULATORS WITH SUITABLE HARDWARE FITTINGS.

DETAILS OF COMPOSITE LONG ROD INSULATORS

- INSULATORS SHALL HAVE SHEDS OF THE -OPEN AERODYNAMIC PROFILE WITHOUT ANY UNDER RIBS‖ WITH GOOD SELF-CLEANING PROPERTIES. INSULATOR SHED PROFILE, SPACING PROJECTION ETC. SHALL BE STRICTLY IN ACCORDANCE WITH THE RECOMMENDATION OF IEC-60815.

- BALL AND SOCKET SHALL BE 20MM DESIGNATION FOR 120KN & 24MM DESIGNATION FOR 210KN INSULATORS IN ACCORDANCE WITH THE STANDARD DIMENSIONS STATED IN IEC:60120/ IS:2486 (PART-II). INSULATORS SHALL BE INTERCHANGEABLE AND SHALL BE SUITABLE FOR FORMING EITHER SUSPENSION OR TENSION STRINGS. EACH INSULATOR SHALL HAVE LASER MARKINGS ON HOUSINGS FOR MANUFACTURER'S NAME, MONTH & YEAR OF MANUFACTURING, RATED STRENGTH MARKINGS ON EACH COMPOSITE INSULATOR ROD UNIT. NO NEGATIVE TOLERANCE SHALL BE APPLICABLE TO CREEPAGE DISTANCE OF COMPOSITE INSULATORS

- **ALL FERROUS PARTS SHALL BE HOT DIP GALVANIZED AS PER SECTION-GTR WITH MINIMUM WEIGHT OF ZINC COATING AS 610 GM/SQ.M FOR NORMAL AREA.**

MATERIAL

➢ CORE

IT SHALL BE A GLASS-FIBER REINFORCED (FRP) EPOXY RESIN ROD OF HIGH STRENGTH. THE ROD SHALL BE RESISTANT TO HYDROLYSIS. THE ROD SHALL BE OF ELECTRICAL GRADE CORROSION RESISTANT (ECR), BORON FREE GLASS AND SHALL EXHIBIT BOTH HIGH ELECTRICAL INTEGRITY AND HIGH RESISTANCE TO ACID CORROSION.

➢ HOUSING & WEATHERSHEDS

THE FRP ROD SHALL BE COVERED BY A SHEATH OF A SILICONE RUBBER COMPOUND OF A THICKNESS OF MINIMUM **5MM**. THE HOUSING & WEATHER SHEDS SHOULD HAVE SILICON CONTENT OF MINIMUM 30% BY WEIGHT. IT SHOULD PROTECT THE FRP ROD AGAINST ENVIRONMENTAL INFLUENCES, EXTERNAL POLLUTION AND HUMIDITY. IT SHALL BE EXTRUDED OR DIRECTLY MOLDED ON THE CORE. THE INTERFACE BETWEEN THE HOUSING AND THE CORE MUST BE UNIFORM AND WITHOUT VOIDS. THE STRENGTH OF THE BOND SHALL BE GREATER THAN THE TEARING STRENGTH OF THE POLYMER. THE MANUFACTURER SHALL FOLLOW NON-DESTRUCTIVE TECHNIQUE (N.D.T.) TO CHECK THE QUALITY OF JOINTING OF THE HOUSING INTERFACE WITH THE CORE.

THE WEATHER SHEDS OF THE INSULATORS SHALL BE OF ALTERNATE SHED PROFILE. THE WEATHER SHEDS SHALL BE VULCANIZED TO THE SHEATH (EXTRUSION PROCESS) OR MOLDED AS PART OF THE SHEATH (INJECTION MOULDING PROCESS) AND FREE FROM IMPERFECTIONS. THE VULCANIZATION FOR EXTRUSION PROCESS SHALL BE AT HIGH TEMPERATURE AND FOR INJECTION MOULDING SHALL BE AT HIGH TEMPERATURE & HIGH PRESSURE. ANY SEAMS/ BURRS PROTRUDING AXIALLY ALONG THE INSULATOR, RESULTING FROM THE INJECTION MOULDING PROCESS SHALL BE REMOVED COMPLETELY WITHOUT CAUSING ANY DAMAGE TO THE HOUSING. THE TRACK RESISTANCE OF HOUSING AND SHED MATERIAL SHALL BE CLASS 1A4.5 ACCORDING TO IEC60587. THE STRENGTH OF THE WEATHER SHED TO SHEATH INTERFACE SHALL BE GREATER THAN THE TEARING STRENGTH OF THE POLYMER. THE COMPOSITE INSULATOR SHALL BE CAPABLE OF HIGH PRESSURE WASHING.

- **END FITTINGS**

END FITTINGS TRANSMIT THE MECHANICAL LOAD TO THE CORE. THEY SHALL BE MADE OF MALLEABLE CAST IRON/ SPHEROIDAL GRAPHITE OR FORGED STEEL. THEY SHALL BE CONNECTED TO THE ROD BY MEANS OF A CONTROLLED COMPRESSION TECHNIQUE. THE MANUFACTURER SHALL HAVE IN-PROCESS ACOUSTIC EMISSION ARRANGEMENT OR SOME OTHER ARRANGEMENT TO ENSURE THAT THERE IS NO DAMAGE TO THE CORE DURING CRIMPING. THIS VERIFICATION SHALL BE IN-PROCESS AND DONE ON EACH INSULATOR. THE SYSTEM OF ATTACHMENT OF END FITTING TO THE ROD SHALL PROVIDE SUPERIOR SEALING PERFORMANCE BETWEEN HOUSING AND METAL CONNECTION. THE GAP BETWEEN FITTING AND SHEATH SHALL BE SEALED BY A FLEXIBLE SILICONE RUBBER COMPOUND. THE SEALING SHALL STICK TO BOTH HOUSING AND METAL END FITTING. THE SEALING MUST BE HUMIDITY PROOF AND DURABLE WITH TIME.

END FITTINGS SHALL HAVE SUITABLE PROVISIONS FOR FIXING GRADING RINGS AT THE CORRECT POSITION AS PER DESIGN REQUIREMENTS.

- **GRADING RINGS**

GRADING RINGS SHALL BE USED AT BOTH ENDS OF EACH COMPOSITE INSULATOR UNIT FOR REDUCING THE VOLTAGE GRADIENT ON AND WITHIN THE INSULATOR AND TO REDUCE TV NOISE TO ACCEPTABLE LEVELS. THE SIZE AND PLACEMENT OF THE METALLIC GRADING RINGS SHALL BE DESIGNED TO ELIMINATE DRY BAND ARCING/CORONA CUTTING/ EXCEEDING OF PERMISSIBLE ELECTRICAL STRESS OF MATERIAL. THE INSULATOR SUPPLIER SHALL FURNISH DESIGN CALCULATIONS USING APPROPRIATE ELECTRIC FIELD SOFTWARE SHOWING ELECTRIC FIELD AT SURFACE OF HOUSING, INSIDE HOUSING & CORE AND AT THE INTERFACE OF HOUSING AND METAL FITTINGS WITH THE PROPOSED PLACEMENT AND DESIGN OF CORONA **RINGS**. GRADING RINGS SHALL BE CAPABLE OF INSTALLATION AND REMOVAL WITH HOT LINE TOOLS WITHOUT DISASSEMBLING ANY OTHER PART OF THE INSULATOR ASSEMBLY.

THE DESIGN & SUPPLY OF GRADING RINGS SHALL BE IN THE SCOPE OF THE COMPOSITE INSULATOR SUPPLIER.

TESTS

- **TYPE TESTS**

THE TEST REPORTS FOR FOLLOWING TYPE TESTS ON LONG ROD UNITS, COMPONENTS, MATERIALS OR COMPLETE STRINGS SHALL BE SUBMITTED FOR APPROVAL.

1. **ON THE COMPLETE COMPOSITE LONG ROD POLYMER INSULATOR STRING WITH HARDWARE FITTINGS**:-

a) POWER FREQUENCY VOLTAGE WITHSTAND TEST WITH CORONA CONTROL RINGS/GRADING RING AND ARCING HORNS (IF PROVIDED) UNDER WET CONDITION AS PER IEC:60383-1993.

b) SWITCHING SURGE VOLTAGE WITHSTAND TEST UNDER WET CONDITION AS PER IEC:60383- 1993.

c) IMPULSE VOLTAGE WITHSTAND TEST UNDER DRY CONDITION AS PER IEC:60383-1993

d) CORONA AND RIV TEST UNDER DRY CONDITION. [132KV AND ABOVE CLASS ONLY]

THE SAMPLE ASSEMBLY WHEN SUBJECTED TO POWER FREQUENCY VOLTAGE SHALL HAVE A CORONA EXTINCTION VOLTAGE OF 320 KV RMS. THERE SHALL BE NO EVIDENCE OF CORONA ON ANY PART OF THE SAMPLE. THE ATMOSPHERIC CONDITION DURING TESTING SHALL BE RECORDED AND THE TEST RESULTS SHALL BE ACCORDINGLY CORRECTED WITH SUITABLE CORRECTION FACTOR AS STIPULATED IN IEC 60383.

UNDER THE CONDITIONS AS SPECIFIED ABOVE THE INSULATOR STRING ALONGWITH COMPLETE HARDWARE FITTINGS SHALL HAVE A RADIO INTERFERENCE VOLTAGE LEVEL OF 1000 (MAX) AT 320KV. THE TEST PROCEDURE SHALL BE IN ACCORDANCE WITH IS 8263/IEC-60437.

e) MECHANICAL STRENGTH TEST: THE TEST SHALL BE CARRIED OUT AS PER FOLLOWING PROCEDURE.

THE COMPLETE INSULATOR STRING ALONGWITH ITS HARDWARE FITTING EXCLUDING ARCING HORN, CORONA CONTROL RING, GRADING RING, TENSION/SUSPENSION CLAMPS SHALL BE SUBJECTED TO A LOAD EQUAL TO 50% OF THE SPECIFIED MINIMUM ULTIMATE TENSILE STRENGTH (UTS) WHICH SHALL BE INCREASED AT A STEADY RATE TO 67% OF THE MINIMUM UTS SPECIFIED. THE LOAD SHALL BE HELD FOR FIVE MINUTES AND THEN REMOVED. AFTER REMOVAL OF THE LOAD, THE STRING COMPONENTS SHALL NOT SHOW ANY VISUAL DEFORMATION AND IT SHALL BE POSSIBLE TO DISMANTLE THEM BY HAND. HAND TOOLS MAY BE USED TO REMOVE COTTER PINS AND LOOSEN THE NUTS INITIALLY. THE STRING SHALL THEN BE REASSEMBLED AND LOADED TO 50% OF UTS AND THE LOAD SHALL BE FURTHER INCREASED AT A STEADY RATE TILL THE SPECIFIED MINIMUM UTS AND HELD FOR ONE MINUTE. NO FRACTURE SHOULD OCCUR DURING THIS PERIOD. THE APPLIED LOAD SHALL THEN BE INCREASED UNTIL THE FAILING LOAD IS REACHED AND THE VALUE RECORDED.

f) SALT-FOG POLLUTION WITHSTAND TEST AS PER IEC: 60507. THE SALINITY LEVEL FOR COMPOSITE LONG ROD INSULATORS SHALL BE 160 KG/M3 NACL.

2. ON COMPOSITE POLYMER INSULATOR UNITS

a) TESTS ON INTERFACES AND CONNECTIONS OF METAL FITTINGS AS PER IEC: 61109-2008.

b) ASSEMBLED CORE LOAD TIME TEST AS PER IEC: 61109-2008.

c) DAMAGE LIMIT PROOF TEST AND TEST OF TIGHTNESS OF INTERFACE BETWEEN END FIRINGS AND INSULATOR HOUSING AS PER IEC: 61109-2008

d) HIGH PRESSURE WASHING TEST

THE WASHING OF A COMPLETE INSULATOR OF EACH E&M RATING IS TO BE CARRIED OUT AT 3800 KPA WITH NOZZLES OF 6 MM DIAMETER AT A DISTANCE OF 3M FROM NOZZLES TO THE INSULATOR, THE WASHING SHALL BE CARRIED OUT FOR 10MINUTES. THERE SHALL BE NO DAMAGE TO THE SHEATH OR METAL FITTING TO HOUSING INTERFACE. THE VERIFICATION SHALL BE DONE BY 1 MINUTE WET POWER FREQUENCY WITHSTAND TEST AT 680KV R.M.S FOR 400KV.

e) BRITTLE FRACTURE RESISTANCE TEST

THE TEST ARRANGEMENT SHALL BE ACCORDING TO DAMAGE LIMIT PROOF TEST WITH SIMULTANEOUS APPLICATION OF 1N-HNO3 ACID DIRECTLY IN CONTACT WITH NAKED FRP ROD. THE CONTACT LENGTH OF ACID SHALL NOT BE LESS THAN 40MM AND THICKNESS AROUND THE CORE NOT LESS THAN 10MM.THE ROD SHALL WITHSTAND 80% OF SML FOR 96 HOURS.

f) DYE PENETRATION TEST AS PER IEC: 61109-2008

g) WATER DIFFUSION TEST AS PER IEC: 61109-2008

h) TRACKING AND EROSION TEST AS PER IEC: 61109-2008.

i) HARDNESS TEST AS PER IEC: 61109-2008.

j) ACCELERATED WEATHERING TEST AS PER IEC: 61109-2008.

k) FLAMMABILITY TEST AS PER IEC: 61109-2008.

l) SILICONE CONTENT TEST

MINIMUM CONTENT OF SILICONE SHALL BE 30% AND THE SAME SHALL BE VERIFIED THROUGH FT-IR SPECTROSCOPY & TGA ANALYSIS OR ANY OTHER APPROVED/ ACCEPTABLE METHOD.

m) RECOVERY OF HYDROPHOBICITY TEST

- THE SURFACE OF SELECTED SAMPLES SHALL BE CLEANED WITH ISOPROPYL ALCOHOL. ALLOW THE SURFACE TO DRY AND SPRAY WITH WATER. RECORD THE HC CLASSIFICATION. DRY THE SAMPLE SURFACE.

- TREAT THE SURFACE WITH CORONA DISCHARGES TO DESTROY THE HYDROPHOBICITY. THIS CAN BE DONE UTILIZING A HIGH FREQUENCY CORONA TESTER, HOLDING THE ELECTRODE APPROXIMATELY 3MM FROM THE SAMPLE SURFACE, SLOWLY MOVE THE ELECTRODE OVER AN AREA APPROXIMATELY 1" X 1". CONTINUE TREATING THIS AREA FOR 2 – 3 MINUTES, OPERATING THE TESTER AT MAXIMUM OUTPUT.

- IMMEDIATELY AFTER THE CORONA TREATMENT, SPRAY THE SURFACE WITH WATER AND RECORD THE HC CLASSIFICATION. THE SURFACE

SHOULD BE HYDROPHILIC, WITH AN HC VALUE OF 6 OR 7. IF NOT, DRY THE SURFACE AND REPEAT THE CORONA TREATMENT FOR A LONGER TIME UNTIL AN HC OF 6 OR 7 IS OBTAINED. DRY THE SAMPLE SURFACE.

- ALLOW THE SAMPLE TO RECOVER AND REPEAT THE HYDROPHOBICITY MEASUREMENT AT SEVERAL TIME INTERVALS. SILICONE RUBBER SHOULD RECOVER TO HC 1 – HC 2 WITHIN 24 TO 48 HOURS, DEPENDING ON THE MATERIAL AND THE INTENSITY OF THE CORONA TREATMENT.

n) TORSION TEST

THREE COMPLETE INSULATORS OF EACH ELECTRICAL AND MECHANICAL RATING SHALL BE SUBJECTED TO A TORSIONAL LOAD OF 55NM. THE TORSIONAL STRENGTH TEST SHALL BE MADE WITH TEST SPECIMEN ADEQUATELY SECURED TO THE TESTING MACHINE. THE TORSIONAL LOAD SHALL BE APPLIED TO THE TEST SPECIMEN THROUGH A TORQUE MEMBER SO CONSTRUCTED THAT THE TEST SPECIMEN IS NOT SUBJECTED TO ANY CANTILEVER STRESS. THE INSULATOR AFTER TORSION TEST MUST PASS THE DYE PENETRATION TEST AS PER IEC 61109.

o) ACCELERATED AGEING TEST OF 5000HRS AS DESCRIBED IN APPENDIX-C OF IEC 61109 OR TEST AT MULTIPLE STRESSES OF 5000 HRS AS DESCRIBED IN ANNEX-B OF IEC - 62217

- **ACCEPTANCE TESTS:**

FOR COMPOSITE LONG ROD POLYMER INSULATORS

A.	VERIFICATION OF DIMENSIONS	IEC : 61109-2008
B.	GALVANIZING TEST	IEC : 60383
C.	VERIFICATION OF END FITTINGS	IEC : 61109-2008
D.	RECOVERY OF HYDROPHOBICITY	AS PER **CL. M** ABOVE
E.	VERIFICATION OF TIGHTNESS OF INTERFACE BETWEEN END FITTINGS AND INSULATOR HOUSING AND OF SPECIFIED MECHANICAL LOAD	IEC : 61109-2008
F.	SILICONE CONTENT TEST	AS PER **CL. L** ABOVE
G.	BRITTLE FRACTURE RESISTANCE TEST	AS PER **CL. E** ABOVE
H.	DYE PENETRATION TEST	IEC : 61109-2008
I.	WATER DIFFUSION TEST	IEC : 61109-2008

IN THE EVENT OF FAILURE OF THE SAMPLE TO SATISFY THE ACCEPTANCE TEST(S) SPECIFIED ABOVE, THE **RE-TEST** PROCEDURE SHALL BE AS PER IEC 61109.

- **ROUTINE TESTS**

FOR COMPOSITE LONG ROD POLYMER INSULATOR UNITS

A)	VISUAL EXAMINATION	AS PER IEC:61109-2008
B)	MECHANICAL ROUTINE TEST	AS PER IEC:61109 -2008

Attachment No.- 04

Limestone Analysis

S.No.	Parameter	Unit	Design Point	Guarantee Point
1	CaO	% dry weight	43.8	50.2
2	Reactive $CaCO_3$		79	89
3	MgO		5.75	5.26
4	$MgCO_3$		12	11
5	Reactive $MgCO_3$		0 (Non Reactive)	
6	Fe_2O_3		0.46-1.1	
7	Al_2O_3		0.9-5.21	
8	Si_2O_3		4.7-13.2	
9	P_2O_5		Traces	
10	Cl_2		<0.015	
11	Na_2O		0.2-1.2	
12	K_2O		0.18-0.22	
13	TiO_2		<0.02	
14	MnO		<0.01	
15	Total Sulfur		<0.1	
16	LOI		37.5-41.3	
17	Bond Index	kWh/Sh.t	13	

Attachment No.- 05

TO VOLUME III, CHAPTER 30, FLUGAS DESULPHURISATION SYSTEM

LIMESTONE HANDLING SYSTEM

1.0 Scope of work

The scope of Limestone Handling Plant {LHP} to be furnished, erected and commissioned under this specification shall be as detailed hereinafter. The contractor shall be fully responsible for system and detailed design, engineering, manufacture, shop fabrication, assembly, testing & inspection at manufacturer's works, packing, dispatch, transportation, transit insurance, custom clearance etc as applicable, delivery to site, unloading, handling & storage at site, insurance during storage, construction, erection, its supervision, testing, inspection, commissioning and handing over to owner and guarantee testing, including all associated mechanical, civil & structural steel works, architectural works, electrical, control & instrumentation works.

1.1 The scope of the contractor shall be deemed to include all such items which although not specifically mentioned in the bid documents and/ or in contractor's proposal but are needed to make the LHP package complete in all respects for its safe, reliable, efficient and trouble free operation. The general description of the proposed LHP package and the broad scope of work under this specification shall include but not be limited to as elaborated below.

1.2 It is not the intent to specify completely herein, all aspects of design and construction of above Limestone Handling Plant. However, Limestone Handling Plant shall conform in all aspects to high standard of engineering, design and workmanship and be capable of performing satisfactorily during continuous commercial operation in a manner acceptable to Owner, who shall interpret the meaning of the specification, drawings and shall have the right to reject or accept any work or material which in their assessment is not conforming to this specification and/ or to applicable Indian/ International Standards. Notwithstanding the details furnished in this document, it shall be the responsibility of the Contractor to complete the work in all respects, commission, and complete the final trials & performance tests to the satisfaction of Owner.

1.3 **Broad list of Mechanical equipments /items of work are furnished below.:** Limestone Handling Plant shall be supplied complete in all respects which shall include but not be limited to providing the following items / items of work and facilities for a complete and satisfactory Limestone Handling Plant

S. No.	Item Description	Qty	Remarks
1.	Front End Loader	4	To feed limestone from stockpile into feed hopper mounted on surface feeder/ BRU # SF-1A/1B
2.	Bulldozer	2	For stockpile formation/management of stockpile in limestone shed.
3.	Box feeder or Bulk material receiving unit (BRU) or Surface feeder	2	To feed lime stone to conveyor

4.	Bidder to note that only profile of conveyors may be altered to suit the FGD plant layout without compromising on general layout requirements, O&M facility etc for limestone handling system & FGD plant as a whole.	4	To transport Limestone from Storage Shed to Day Bin
5.	Fixed tripper# FT-1A/1B	2	Mounted above Day Bin.
6.	Discharge chute	Lot	As per flow diagram/ system requirement
7.	Debris chute/ tramp iron chute	Lot	As per system requirement
8.	Flap Gate (FG)	Lot	As per flow diagram
9.	In line Magnetic Separator# ILMS-1A/1B complete with Electric Hoist & Tramp Metal Trolley	2	One Tramp metal collection trolley shall be provided for each In line Magnetic Separator.
10.	Suspended Electro Magnet# SEM-1A/1B complete with Manual Hoist with Electric Trolley.	2	One Tramp metal collection trolley shall be provided for each suspended electromagnet.
11.	Belt Weigher # BW-1A/1B	2	To know feed rates to Day Bin
12.	Metal Detector # MD-1A/1B, 2A/2B	4	---------
13.	Vibrating Grizzly feeder # VGF-1A/1B	2	To screen limestone of size (-) 20 mm
14.	Crusher# CR-1A/1B	2	Necessary RCC Deck, GERB Make Vibration Isolation System along with temperature detection system & vibration monitoring system shall be provided for each crusher.
15.	Electric Hoist/ Manual Hoist with monorail	Lot	Suitable number of Electric hoists shall be provided for maintenance of Equipment/ component inside limestone shed. Suitable number for equipment/ component removal for maintenance purpose as required to be provided..
16.	Sump Pumps# SP-1A/1B/2A/2B complete with discharge piping upto nearest drain	4	As per flow diagram/ system requirement. Sump pit and pumps shall be located in the crusher house to prevent any rain

			water from entering. Discharge from sump pumps shall be led to guard pond.
17.	Belt Vulcanizing Machine# BVM-1	1	-----
18.	Dry Type Dust Extraction [DE] System	Lot	DE system shall be provided for LHS
19.	Mandatory Spares	Lot	Refer enclosed list
20.	Limestone shed	1	Capacity of shed shall be minimum 15 days storage requirement of limestone. For other details refer Volume VI of specification

1.4 Brief Description- Lime Stone Handling Plant

1.4.1 Limestone trucks/dumpers will dump crushed limestone [lump size up to (-) 250mm] in the Limestone Shed to form limestone stockpile. Bulldozers and front loader shall be deployed to form the limestone stockpile in the shed.

1.4.2 Two (2) parallel conveying streams of limestone shall be provided [i.e. 1Working+1Standy] commencing from shed to day bin. Refer enclosed Flow Diagram.

All the parallel streams shall be completely independent so that maintenance of anyc equipment will not affect the operation of the other stream.

1.4.3 Front End Loader (FEL) shall scoop limestone from stockpile and feed it into surface feeder # SF-1A/ 1B/ bulk receiving unit (BRU) and shall feed limestone to Belt conveyor#BCN-1A/1B.

1.4.4 BCN-1A/1B will feed limestone to vibrating grizzly feeder VGF – 1A/ 1B located in the Crusher house, which will screen the particles before feeding to crusher.

1.4.5 Limestone crusher shall crush the limestone to (-)20mm product and discharge it onto belt conveyor#BCN-2A/2B which in turn will deliver crushed limestone of lump size (-)20mm into Daybin#1/2 via Fixed Tripper#FT-1A/1B.

1.4.6 Belt Weigher [to know throughput rate], metal detector [for separation of non-ferrous metal] and magnetic separator i.e. inline magnetic separator and suspended electromagnet [for separation of tramp metal] shall be provided as shown in flow diagram.

1.4.7 Each dedicated limestone flow stream shall permit maintenance of equipment, hoppers and chutes without affecting the operation of other stream.

1.5 Performance Guarantee Requirements:

Following rated capacities / ratings etc. shall be guaranteed:-

1.5.1	Belt Conveyors	Min 100 tph [guaranteed] each for all conveyors
1.5.2	Fixed Tripper	Min 100 tph [guaranteed] each
1.5.3	Vibrating Grizzly feeder	Min 100 tph [guaranteed] each Feed size: (-) 250 mm, Limestone Grizzly: Size suitable to pass (-) 20 mm limestone Output: Uniform feeding of (+) 20 mm limestone to crusher
1.5.4	Surface feeder	Min 100 tph [guaranteed] each
1.5.5	Crusher	Min 100 tph each [guaranteed] Feed size: (-)250mm, Limestone Product size: (-)20mm (95%)
1.5.6	In Line Magnetic Separator	It shall pick 20 mm size MS cube (free lift), upto 15Kg Brake shoe of Railway Wagon & up to 50 kg rail piece/ MS Round bar (L/D not exceeding 5), M.S plate of 250mmx250mm (50kg max.), Shovel teeth & spikes (material – CS), MS Bolt M20x100 long.
1.5.7	Suspended Electro Magnet	It shall pick 20 mm size MS cube (free lift), upto 15Kg Brake shoe of Railway Wagon & up to 50 kg rail piece/ MS Round bar (L/D not exceeding 5), M.S plate of 250mmx250mm (50kg max.), Shovel teeth & spikes (material – CS), MS Bolt M20x100 long.
1.5.8	Metal Detector	It shall detect 25mm aluminium sphere & other metals brass, copper, stainless steel, manganese, steel bars, scraps etc.
1.5.9	Belt Weigher	Accuracy : ±0.25% over full weighing range
1.5.10	Dust Extraction System	Dust emission level in exhaust (clean) air shall not exceed 30mg / Nm^3 or as per stipulations of Pollution Control Board whichever is lower. Bag filter/ Bin vent filter efficiency shall be minimum 99.9% down to 5-micron particles.
1.5.11	Noise Level	The equivalent weighted average of sound level measured at a distance of 1.5 m above floor level in each elevation and one meter horizontally from the base of any equipments furnished and installed under these specifications, expressed in decibel

		to a reference of 0.0002 microbar, shall not exceed 85 dB(A), except for: a)Wet ball Mill <90 dB(A) b) Crusher < 90 dB(A).
1.5.12	Vibration Levels	Limits shall be as per VDI2056/BS4675
1.5.13	Illumination Levels	Average illumination level (as specified in Specification for Electrical Works) shall be achieved during normal operation of the plant with dust-laden atmosphere for one (1) month.
1.5.14	Earthing Resistance	Less than one (1) ohm shall be achieved when measured after-isolating CHP earthing system from main grid.

1.6 Service / Maintenance Facility for LHP Buildings

1.6.1 Monorail for Magnetic Separators (ILMS & SEM) shall extend outside the building by minimum 2.0m. Tramp iron chute (up to ground level) shall be provided at floor on which above magnetic separators are installed. The monorail beam shall extend through suitable opening in the building fitted with an approved double flap steel door [with chain/ better opening & closing mechanism], removable handrails, platform etc to enable removal of equipment to ground level or vice versa.

1.6.2 Monorail beam with Electric / Manual Hoist shall be provided as specified at all locations where equipment like conveyor drives, pumps or other heavy equipment are located. The monorail shall be extended to outside the buildings by minimum 2m. The monorail beam shall extend through suitable opening in the building fitted with an approved double flap steel door [with chain/ better opening & closing mechanism], removable handrails, platforms etc to enable removal of equipment to ground level or vice-versa. Suitable machinery-hatch, removable steel gratings / covers / hand-railing etc. shall be provided in Buildings etc as found necessary during detailed engineering.

1.6.3 Single/ Double flap (Sliding or swing doors) shall be provided in all LHP buildings as per Owner's approval.

1.6.4 Approach with a platform to each Electric Hoist shall be provided on one side for maintenance purpose.

1.6.5 Monorail beam with hook & manual hoist shall be provided above Cwt. of HGTU.

1.6.6 Mono rail beam with hook and Manual Hoist shall be fixed above floating T.U. Pulley centre line of all vertical gravity take-up arrangements for belt conveyors so as to lift the take-up pulley / counterweight at the time of belt joining to get the required loop.

1.6.7 All safety guards wherever needed shall be provided for safety of operators. All pulley guards

shall have adequate opening so that pulley bearings can be lubricated without removing the entire guard.

The safety guard for the Take-up Carriage / Cwt. box of the Gravity Take-up unit shall be provided with a removable panel for entry of operating personnel for greasing / maintenance of pulleys etc.

1.6.8 Each Floor cleaning chute of LHP buildings shall terminate at about 1.2 m above ground level. Floor cleaning chute (debris chute) shall be connected to tramp metal chute wherever feasible.

1.6.9 For all Belt Conveyors / Feeders, steel fabricated stools shall be provided suitably for fixing base plate of short post / Steel Frames of Head, Tail, Bend Pulleys etc. in areas where RCC floor is provided.

1.6.10 Adequate maintenance space (minimum 1200mm clear) around equipment and the drives, suitable O & M platforms of minimum1200mm width as necessary for access to equipment, gates, pumps & other equipment etc. shall be provided.

1.6.11 Monorails, inserts 12thk (minimum), handrails of 32 NB (M) pipe with toe guards, stairs/ ladders (as applicable) and angle protection for cut-outs in RCC floors shall be provided wherever required.

1.6.12 Manual Hoists ,Electric Hoists shall be provided as per criteria indicated on Volume III, Chapter 28.

1.7	**Design Criteria & General Requirement for LHP**	
1.7.1	Physical Characteristic of Limestone / Other Technical Parameters	
a)	Material handled	Limestone
b)	Max. lump size of Limestone received at Limestone Shed	250mm & below
c)	Bulk Density of Limestone	1.4 t/m^3
d)	Moisture Content	Upto 15%
e)	Angle of surcharge	25 degree
f)	Max. Height of stockpile	6m (from Ground level) or max FEL stocking height.
g)	Size of Crushed limestone	(-)20 mm
h)	Angle of repose of Limestone	38 degree
1.7.2	No. of streams provided	Two (2) [1 working + 1 standby]
1.7.3	LHP Operation	Complete Limestone Handling Plant shall be designed to operate 24 hour per day round the clock. Also, both streams shall be designed to work simultaneously as & when

		required.
1.7.4	Maximum Inclination of Belt	Not more than 16 degree.
1.7.5	**Stockpile Details**	
a.	No. of Stockpiles provided in shed	One(1)
b.	Type of cross section of stockpile	Trapezoidal
c.	Height of each stockpile	6 m
d.	Total capacity of one stockpile	15 days requirement at design point.
1.7.6	The drive equipment including motor for equipment viz Gates/ Feeders/ Crushers etc shall be sized for minimum 120% of requirement of driven equipment at its guaranteed capacity.	
1.7.7	Each equipment & conveyor drive except Crusher shall be capable to start under fully loaded condition.	
1.7.8	Temperature & vibration monitoring equipments of approved make only shall be provided for Crusher	
1.7.9	Junction Towers/other applicable building of LHP shall be designed for:	
a)	• In steel frame construction including roof (above ground portion) providing sufficient space to accommodate the entire equipment like head end, drive unit and tail end of various conveyors, transfer chutes, supports for conveyor bridges, tensioning arrangements etc. and other equipments. Floors of all Junction Towers shall be in RCC. Floor to mount gate [viz. flap gate] shall be in steel construction with cheq. plate floor. Steel doors and windows fitted with glazed glass, access doors, platforms, equipment hatch, monorails, hoists etc as necessary shall be provided. • Underground portion of above buildings, its all floors/ access stairs (1500mm clear width) shall be of RCC. • One (1) external independent steel staircase up to roof level [minimum 1200mm (clear) width] shall be provided for above buildings (for over ground portion) with landing facility at all floors.	
b)	Edges of floor openings shall be protected by embedding ISA 75 x 75 x 6 all around its periphery. Safety handrails shall be provided around the openings.	
c)	Working floors and equipment floors & roof shall be provided/ enclosed with suitable pre-colour coated metal claddings to ensure full protection from rain and strong wind. Also claddings shall be designed to provide sufficient day lighting and ventilation	
d)	Necessary rain water down comer minimum four (4) no. for all LHP buildings shall be provided.	
e)	RCC staircase (1500mm clear width) shall be provided for approach to Tail/ portion of Conveyor/ other equipment etc which are located in pit/ underground /semi ground.	
f)	Drains of minimum 200mm width shall be provided for drainage in tunnels. Sump pits will be minimum 1.2m wide x 1.2m long x 1.0m deep complete with steel grating to suit the pump mounting arrangement. Two (2) sump pumps (1W+1S) shall be provided in the sump pit. Sump	

	pit and pumps shall be located in the covered shed to prevent any rain water from entering and Discharge point of the sump pump shall be indicated. Rain water drain shall sump pit. Floor water drain shall be connected to sump pit.
g)	The contractor shall ensure/ make water proofing arrangement to provide for 100% leak-proof construction of buildings, structures, underground RCC work etc. including tunnels.
h)	Belt conveyor shall be housed in Closed gallery with necessary Lighting, Fire fighting arrangements etc.
i)	For maintenance purpose of equipment/ drive etc, ample space shall be provided around each equipment. Minimum 1200mm clearance around drive unit/ equipment etc shall be available for maintenance purpose.
j)	Clear Walkway dimensions in gallery and tunnel: In between conveyors: 1000 mm Either side of conveyors: 800 mm Clear walkway height in gallery and tunnel: 2400 mm
k)	In all conveyor tunnels, suitable insert plates at about 1.5m spacing shall be embedded in both sides of tunnel and underside of tunnel roof for fixing supports/ brackets etc for mounting the cable trays, lighting fixtures, fire fighting headers, handrails, ventilation ducts, control panels etc. Steps shall be provided in conveyor tunnels if tunnel slope is equal to 10 degrees or more.
1.7.10	The clearance between underside of Monorail and top of drive pulley at discharge end shall be minimum 3m (clear) or more, if required. For mounting ILMS & SEM, the clearance shall be minimum 5m between top of pulley & bottom of monorail. Machinery hatch and monorail arrangement etc (as per owner's approval) shall be provided so as to ensure trouble free handling of equipment/ material for maintenance purposes.
1.7.11	Cross-over shall be provided at 60m spacing for conveyors longer than 60m. For conveyor shorter than 60m minimum one crossover shall be provided.
1.7.12	Contractor shall indicate the particulars of standard / code that have been followed against each work. The contractor shall be in a position to produce details of particular standard / code, if asked to do so by Owner/ consultant.
1.7.13	Limestone Handling plant included under this specification shall comply with all currently applicable statutes, regulation and safety codes related to design, construction and operation of Bulk Material Handling Facility in the locality where the system will be installed. Nothing in this specification shall be construed as to relieve the contractor of the statutory responsibility.
1.8	**Painting & Surface Treatment** (For all Technological Structure / Equipment / Conveyor posts support, Misc Structure such as T.U Tower / O&M platform for maintenance & ladder etc)
1.8.1	**General :-** All structural steel components / site welding joints of equipment / structure / pipe work etc. shall be effectively protected by painting. Before packing & transportation, all equipment / items / fabricated or shop manufactured items shall be painted. Approved quality / make of primer & finish paint shall be used. An approved color scheme shall be followed for Painting.

1.8.2	**Preparation of Surfaces for Painting** **Refer Volume – II, Chapter 7 for painting**

1.9	**Drawings / Documents**
1.9.1	Broad list of drawings/documents (soft & hard copies) to be furnished during design & engineering stage are given below
a.	GA / Layout / schematic drawings / design calculations / technical data / other relevant documents to be submitted for Approval
b.	Flow Diagram of LHP, Layout Plan of LHP showing the coordinates / location of various LHP buildings/other related buildings etc.
c.	GA drawing of all conveyors / other equipments of entire LHP
d.	Civil / structural design calculations along with relevant GA / other applicable drawings
e.	Single line diagram / PLC / operation & control philosophy / other relevant calculations / documents / drawings etc. for electrical equipment / components / items including those for instrumentation work etc.
f.	Technical data/particulars of all equipments / conveyors etc.
g.	Design Calculation / technical documents
	i. Conveyor calculation for motor kW rating / Drive Components & Belting Selection/ Pulley dia & its rim thk, Shaft Diameter / radius of curvature / coasting down time / Load data Calculation etc.
	ii. Design calculation / Load data for conveyor gallery, trestle, Surface feeders, limestone shed, junction towers, other building / Structures etc.
	iii. Stock pile capacity calculation, sizing calculation of crusher etc.
	iv. QAP for all manufactured and sub contracted items.
	v. Procedure for conducting Performance guarantee test along with the Performa.
	vi. Manufacturer's standard test list along with test certificate etc.
h.	Any other drawing / document which may be called for by Owner.
1.9.2	Drawings / documents/schedules to be submitted for Information Category / Record / Reference. Each of above items shall be comprehensive in nature indicating qty/technical particulars/ratings/locations etc. on "As Built Basis".
a.	Electric load list / Hoist Schedule (manual & electric)
b.	Idler / Pulley / belting / drive components schedule/Safety Switch Schedule & other applicable schedule for conveyors
c.	Calculations in support of EOT crane items viz motor kW rating/wire rope/wheel dia etc.

d.	Motor data sheet including Characteristic curves / Coupling / Gearbox / other items & components for all equipment & systems, Sizing calculation of drive components selected.
e.	Specification / Catalogues of all standard bought-out-items / components etc.
f.	Conveyor component drawings, such as idlers, pulleys, skirt boards, safety switches etc.
g.	As built drawings for equipments / system / building / structures etc for the Limestone handling plant.
h.	Operation / Maintenance / Spare Parts Manuals.
i.	Vendor / Supplier's drawings for all electrical / electro-mechanical / Instrumentation items etc
j.	Any other drawing / document required by Owner
1.9.3	Information / Guarantee data to be furnished along with the Bid.
a.	Guaranteed capacity for Belt conveyors / Belt Feeders / EOT crane/and all other equipments of LHP
b.	Motor list for all Equipment.

1.10	**Technical Specification**					
M-1	**BELT CONVEYORS / BELT FEEDERS**					
1	Each belt conveyor shall be complete with all types of idler/ belting/ pulley assemblies/ drive unit/ take-up device/ deck plate/ skirt board/ primary & secondary belt scrapers/ V-plow cleaners/ discharge chute/ stringer/ short post with base plate/ seal plate/ all types of safety switches/ all hardware etc. Bidder shall ensure that all bought out items viz. gear box, motor, coupling, belting etc are reputed, proven and approved make.					
2	**Applicable Standards & Codes**					
	Belt Conveyors with their components and accessories shall be designed and manufactured in accordance with the latest revision of the Indian Standards listed below. Wherever IS are not available, British Standards, American Standards, DIN, ISO or other reputed standards shall be followed. i) IS: 4776 (Part-I) : Specification for troughed belt conveyor for surface installations. ii) IS: 4776 (Part-II) : Specification for troughed belt conveyors for underground installation iii) IS: 8598 : Specification for Idler sets for belt conveyors. iv) IS: 8531 : Specification for pulleys for belt conveyors. v) IS: 1891(Part-I) : Specification for rubber conveyor and elevator belting. vi) IS: 7155 : Code of Practice for conveyor safety					
3	**DESIGN BASIS**					
a)	Under all operating conditions including running, starting, fully or partially loaded or empty belt, the belt shall not lift off the idlers. The radius of curvature shall be adequate so that there is no lift off of the belt in case of Concave curve and no overstress at edges of belt or lack of tension at belt centre in case of Convex curve. An extra allowance of minimum 20% shall be kept on the calculated radius of curvature.					
b)	All Conveyors shall be capable of starting fully loaded. All inclined Conveyors shall be provided with holdback device. As an additional safety, each inclined Conveyor shall also be provided with brake. Brake shall also be provided on conveyors where coasting time is to be adjusted.					
c)	Clearance between top of road and bottom of conveyor gallery shall be kept at least (6) meter for conveyor gallery crossing over road.					
d)	Structural steel, covered conveyor galleries with steel trestles as required shall be provided for all above ground conveyors. 650mm wide, Crossovers shall be provided.					
e)	Components of belt conveyors shall be standardized to the best possible extent viz. belting, pulleys, bearings, gearboxes and coupling to facilitate Interchangeability as well as inventory control.					
4	**CONVEYOR COMPONENTS**					
A.0	**BELT CONVEYORS**					
Sr no	**Item description**	**Conv#BCN-1A/B**		**Conv#BCN-2A/B**		

A.1	Belt width, mm	←---------- min 800 mm or Sized to feed unit (whichever is higher x 20°tr. x 3-eq. roll ----------→						
A.2	Min Guaranteed capacity, tph	←---------- 100 ----------→						
A.3	Material handled	←-(-)250mmlimestone --→		←-------- (-)20mm limestone -------→				
A.4	Belt speed, m/s [max]	←---------- 1.2 ----------→						
A.5	Length/ lift	←---------- To suit ----------→						
A.6	Type of take up device	Gravity take up		Gravity take up				
A.7	Belt sag	←---------- Not more than 2% of tr idler spacing ----------→						
A.8	Wrap angle (approx.)	←---------- 210° ----------→						
A.9	Minimum Motor, kW	Minimum kW rating = 1.2 x Power required by driven equipment at motor shaft. [use CEMA 5th Ed. For above calculation and belting selection calculation use ky value of not less than 0.023]. Also all conveyors & feeders shall be capable of starting fully loaded.						
A.10	Motor rpm [nominal]	←---------- 1500 ----------→						
A.11	Belting	Nylon/ Nylon Belting, Heavy Duty with minimum 3-ply Cover:6 mm Top/ 3mm bottom, Grade: M-24, Minimum Rating not less than 400/3, HD Identical belting shall be provided for all conveyors. Maximum operating tension in belt shall not exceed eighty (80) percent of maximum allowable working tension of the belt at the specified load						
B.0	**Idlers**							
B.1	Roll construction	a) ERW tube to IS: 9295,Idler Construction to IS: 8598 b) Tube OD steel:88.9mmx4.05mmthk for all types of idlers except impact idler c) Tube OD steel:76.1mmx4.5mm,OD rubber disc:101mm for rubber disc impact idler, shore hardness min.50° on shore A scale d) Spindle:20mm ø, EN-8/equal						
B.2	Idler Frame	MS plate/ structural section,IS:2062						
B.3	Bearings	`Sealed and lubricated for life' provided with double labyrinth seal and rain cap. 20ø Deep Groove ball bearing with C-3 clearance of SKF/ FAG make only.						
B.4	**Type of Idler**	**Carrying Idler**		**Self-Aligning Carrying Idler**		**Return Idler**		
a)	No. of Rolls	3 Equal rolls x 20 degree tr.				Single Roll Flat		
b)	Spacing, m	1.5		15		3		
c)	Transition idlers	These shall be identical in construction to carrying Idler except for troughing angle, Tr. Angle range : 5-10 Deg.						
d)	Deflector Roller	Suitable deflector roller of at least 101.4 mm OD x 4.5 thk shell on						

		20mm dia. [min.] lagged with 5mm thk natural rubber lagging shall be provided for each conveyor.
e)	Non Magnetic Idler	Non-magnetic idlers made of aluminum/equal tube lagged with 5mm natural rubber lagging shall be provided in conveyor portion over which magnetic separator (Suspended Electromagnet) is mounted.
C.0	**Pulley**	
C.1	Type of Construction	Welded Steel Construction & shall conform to the requirement of IS: 1891/ IS: 8531, Face Width:750mm Shell thickness [finished]: 8mm [minimum] for drive pulley and 6mm[minimum] for non-drive pulley
C.2	Pulley Dia., mm, (min.)	a) Drive pulley/ HT bend pulley: 400mm b) Non Drive pulley/ LT bend pulley: 315mm c) Snub pulley: 200mm
C.3	Bearing centers, mm, (minimum)	1200
C.4	MOC of shell / end discs	Mild Steel (IS:2062 / Equal) for all pulley except non-magnetic pulley. For Non-magnetic pulley, SS-304 shell & end discs shall be provided
C.5	MOC of Shaft & hub	EN-8 / equal & C-20/ equal
C.6	Shaft Diameter	As per design requirements. Shaft deflection shall not exceed six (6) minute for any pulley. Pulley assemblies shall be statically balanced and run concentric when mounted on shaft. T1/T2 shall be based on rubber lagging only
C.7	Lagging	For Drive Pulley: Min.12 mm (4mm ceramic + 8mm rubber) thick Ceramic rubber lagging For Non Drive Pulley: Min. 12 mm thick (plain) natural rubber lagging having 50 to 60 degree hardness on shore "A" scale.
C.8	Type of Bearing	Heavy duty antifriction - double row self-aligning spherical roller bearings with double labyrinth seals and grease nipples. L10 Life of bearing shall be 60000 hrs minimum
C.9	Type of Plummer Block	Bearings shall be housed in horizontally split type Plummer block and complete with side covers. Plummer blocks shall be of cast iron construction. Adjustable screw and lock nut shall be provided on one side of Plummer block for alignment purpose
D.0	**Deck Plate**	3.15mm thk, M.S continuous , throughout length of conveyor
E.0	**Conveyor Technological Structure**	
E.1	Stringer /short post [minimum size]	ISMC-100/ ISA: 50x 50 x 6thk
E.2	Short support spacing	3m (Maximum) Non loading area and 2.5 m (Maximum) in impact loading zone.
E.3	Seal Plate	3.15mm thk, M.S continuous , throughout length of conveyor

F.0	**Skirt Board**	
F.1	MOC	12 mm thk SAILHARD/ Equal shall be provided at each loading point
F.2	Minimum length	3.5 m
F.3	Minimum Height	400 mm
F.4	Clear width	Shall be 70% of belt width for all conveyors
F.5	Rubber Strip	The gap between the skirt and the belt shall be closed or controlled by exterior rubber strips of 50-60 degree durometer hardness on shore 'A' scale. Rubber strip shall be minimum 200 mm deep x 20 mm thk. The rubber strips shall be held in position by steel clamps spaced at maximum spacing of 400mm. The rubber strips shall be adjustable for minimum height of 20 mm.
F.6	Construction	Skirt board shall be covered from top and provided with necessary flanges for connecting to feed chute. 4 mm thk. MS cover plate along with minimum 3mm thk neoprene rubber gasket, bolted to skirt flanges shall be provided for dust tightness. Rubber curtain shall be fixed at skirt board end for reducing dust nuisance. Back plate of skirt board shall be kept about 200mm away from the feed chute edge.
G.0	**Belt Cleaner/ Scrapers**	
G.1	Multi bladed Type Secondary Belt Cleaner [External]:	A multi bladed (full belt width is made up of small individual cleaners) having tungsten carbide blades mounted on a carrier assembly of steel tube shall be provided. The steel tube shall be supported on both sides with elastomount or equivalent arrangement having tensioning arrangement such that blade adjustment towards wear is automatic. The cleaner shall be located in such a way that effective cleaning of belt is ensured and all scrapped material is lead into the main chute. Main chute shall enclose the snub pulley. Qty: one (1) per discharge pulley (located between discharge and snub pulley).
G.2	Primary Belt Cleaner [External]:	Construction of this type of cleaner shall generally be similar to Multi-bladed Type cleaner but the blade shall be made out of polyurethane material for such application. Qty: One (1) no. per discharge pulley
G.3	V-plow type cleaner [Internal]	This cleaner shall be made out of MS flats and polyurethane strips 10mm thk (minimum) mounted suitably with the conveyor frame. Qty: 1 no. on return side near tail pulley + 1 no. on first bend pulley of each VGTU/HGTU and also One (1) no. on bend pulley (return side) of fixed tripper.

H.0	**Drive Unit**		
H.1	Location	Indoor	
H.2	Ambient Temperature	50 ^{o}C	
H.3	Duty	24 hrs operation/day	
H.4	**Gear Box**		
a)	Type	Bevel Helical or helical gear box, natural/ fan cooled shall be provided for conveyor drive.	
b)	Service factor	1.8 x kW required at Drive Pulley Shaft	
c)	Holdback	For all inclined conveyors holdback built in with gear box shall be provided.	
H.5	**Coupling**		
a)	**Motor kw rating**	**Type of LS coupling**	**Type of H.S. Coupling**
b)	Less than 30 kw	Geared type	Pin bush type or Better
c)	30 kw and ≤ 160 kw	Geared type	Delay Filled Chamber (DFC) type fluid Coupling
H.6	**Brakes**		
a)	Type	Hydraulically operated Thrustor brake	
b)	Mounting	On brake drum of High Speed coupling	
c)	Thrustor Protection	Degree of protection Class-B Insulation, IP-55	
I.0	**Belt Take-ups**		
I.1	Counter Weight	Counter weights shall be made out of cast iron with standardized denominations. In all cases space shall be provided for an addition of 25% of the counter weight. Provision shall be made for dismantling the counter weight or relieving the tension in the belt. Height of the take-up guide steel sections frame shall be sufficient to allow the take-up main pulley at the time of belt joining to get the required loop.	
I.2	Travel	2.5 % of C/C Pulley (mm)+ 600mm	
I.3	Design	The design of the counter weight assembly shall have a self-cleaning top. For HGTU – twin sheave/loop arrangement shall be provided to reduce Counter wt travel to about 50%.	
I.4	Rope	Reputed & Proven Make, flexible wire rope,6 x 37M (minimum) construction with fibre core, IS: 2266, Grade: 1770	
I.5	Guards	The area below the counter weight shall be guarded to a height of 1.8 m above any access level. Sand Bags shall be provided below the counter wt. box in addition to safety guard.	
I.6	Hoist & Beam	A lifting beam with Manual Hoist of minimum capacity 150% the total weight of counter wt unit shall be provided, located on the centre line of the take-up unit and above the Take-up Pulley in case of VGTU and above the Cwt. Box in case of HGTU.	

I.7	Switches	End Travel limit switch shall be provided at both ends of take-up travel.
J.0	**Belt Protection Switches**	
J.1	Pull Cord Switches (in pair): Addressable Type with built on Terminal Box	Manual reset type x 5 Amp rating, pull cord type emergency stop switches (in pairs) shall be provided at 30 m intervals for all Conveyors longer than 30m. Minimum one pair of switch shall be provided for conveyor of 30m length or shorter than 30m length. Each switch shall have Cast aluminium field mounting enclosure epoxy painted, IP-65, 2NO +2NC, with LED indicating lamp. PC wire shall be 6mm O.D x PVC coated GI wire conforming to the relevant Indian Standards. One pair of above switch shall be provided within 15m interval from both conveyor ends.
J.2	Belt Sway Switches (in pair): Addressable Type with built on Terminal Box	Mechanical lever operated, auto reset type, 5A, die cast aluminium, field mounting enclosure epoxy painted, IP-65, 2NO +2NC, Belt sway switches (in pairs) shall be provided at 45 meters intervals for all conveyors having length greater than 45m. Minimum One (1) pair of belt sway switches shall be provided for conveyor of 45m or shorter than 45m length. Ball bearing shall be provided for Roller & Cam Shaft.
J.3	Zero Speed (Electronic, Non-Contact Type) Location: at tail pulley	One Zero speed switch with cast aluminum housing of 5 A electrical rating shall be provided to permit monitoring of correct mechanical operation of conveyor belt. The unit shall be field mounting model,IP-65, electronic speed monitor having output contact two (2) change over contact , complete with initial bypass time delay.

M-2	**CHUTES**	
i)	All Chutes / hopper shall be of welded steel construction. The material of construction shall be as per Data Sheet.	
ii)	Each chute shall have adequate cross sectional area with minimum sloping angle of 60 degrees or more [to horizontal] to ensure smooth flow of material. Belt loading chute shall be designed so as to ensure centralized loading of material on the receiving belt to prevent off Centre loading/ excessive swaying of belt.	
iii)	Each chute shall be made in a suitable number of units complete with matching flanges. These units shall be suitably bolt jointed. Each joint shall be made dust leak proof by providing neoprene rubber gaskets minimum 3mm thk. Dust tight hinged inspection doors/bolted removable covers/manhole covers at strategic locations shall be provided to facilitate inspection and to clear jammed limestone in the chute.	
iv)	Chute / Bin brackets shall be welded to the main plate and suitably anchored to the floors/ platforms	
v)	**Technical Data:**	
A.0	**Main Discharge Chutes**	
a)	Location	As per flow scheme
b)	Material of Mother plate	10 mm thk MS mother plate (IS: 2062)
c)	Material of Liner Plate	20 mm TISCRAL/ SAILHARD/LSIAS07 on sliding surface

		adjacent side
d)	Minimum Chute inclination	60 Deg for Limestone 70 deg for Gypsum
B.0	**Tramp iron / floor cleaning chutes**	
a)	Location	At various floor of Junction Towers.
b)	Number of chutes	Lot
c)	Material of chute (tramp iron/debris chute)	250NB x 5.9mmm thk x 273mm OD Pipe (IS: 1161) with 25thk grating at top
e)	Type of construction / Configuration	Floor cleaning chute [debris] shall be provided at all floors, which shall be suitably connected to a main down-coming debris chute. Suitable grating as necessary shall be provided at the chute opening in the floor for safety. Chute shall terminate outside the building at 1.2m above ground. One (1) no. Mobile Trolley shall be provided for collection of tramp metal for each Magnetic Separator to dispose of tramp metal into tramp metal chute whose mouth is flushed with floor.
Note # 1: In chute layout- inspection door, poking holes etc. shall be provided suitably and main discharge chute shall enclose the snub pulley to the extent possible.		
Note # 2: Where inline magnetic separator is provided, chute made out of non-magnetic material (parent plate) of minimum 12mm thk SS-304 steel for a distance of 1.5m [minimum] from magnet face shall be provided		

M-3	GATES	
1.0	**Flap Gate (FG)**	
1.1	**Technical Data:**	
a)	Type	Motor operated linear Actuator with Flap. All flap gates shall be identical. Linear actuator Unit shall be dust tight and of adequate thrust rating considering worst loading out of moving weight of limestone and/or vertical limestone column in chute. Flap gate actuator shall be supported from floor/platform, not from the chute body.
b)	Qty.	As per flow Diagram
c)	Travel range	To suit.
d)	Face of Flap Gate	20 mm thick TISCRAL or equivalent
e)	Alternate Operation	Provision for alternative manual operation shall also be made using declutchable hand wheel. Manual effort required to operation the flap gate shall not exceed 25 kg.
f)	Gate Body (Leaf)	2 Nos. of 12 mm (Min.) thick plate of SAILHARD / TISCRAL welded together to form the desired shape.
g)	Type of bearing (Minimum)	Dust tight, antifriction, ball or spherical roller bearings
h)	Gate shaft	EN-8 / Equal
i)	Bearing life (minimum)	50,000 hr (L-10)
j)	Drive Equipment	It shall be capable of being operated for at least fifteen (15) switching /hr with minimum ten (10) consecutive starts.
k)	Flap gate position indication on control panel mimic	Two (2) position
l)	Other MOC	All parts of the gate in contact with limestone shall be of stainless steel construction.

M-4	MONORAIL & HOISTS
A.0	**General**
a)	Each Hoist shall be sturdy, compact unit complete with all the needed accessories and shall conform to duty Class-II as per relevant Indian Standards Specifications and shall operate on I-section beam.
b)	Ropes, pulleys hoist blocks and other accessories shall have liberal factor of safety. All steel wire ropes shall be flexible 6x37 construction with UTS of 160 to180 kgf/sq mm. Safety factor of minimum Six (6) or as specified in IS shall be used to select the rope.
c)	All needed safety devices, end stops, guards etc., proper lubrication arrangement, anti-friction ball/roller or bush bearings with dust tight enclosures shall be provided.
d)	Hook shall be of swiveling type made of solid, forged, heat treated alloy or carbon steel. It shall be provided with a safety latch/locking arrangement to suit the requirement.

e)	All hoists shall be tested for minimum 125 percent of the rated load.	
B.0	**Electric Hoists:**	
i)	Type	Electrically operated Hoist & Trolley with Pendant switch
ii)	Class/ Duty	Class 2, Indoor, IS: 3938
iii)	Hoist Speed	4 M/Min (max.)
iv)	Carriage travel speed	12 M/Min (max.)
v)	**Material of Construction**	
a.	Drum & Sheave	M.S./Cast steel as per IS:3938
b.	Load Hook	As per IS:3815
c.	Wire rope	Construction 6x37 as per IS:3938 with hemp core regular lay with min. strength of 160-180 kgf/sq. mm. Safety factor of minimum Six (6) or as specified in IS shall be used to select the rope.
d.	Gear	Forged / Cast steel
vi)	Brake type	To suit duty and of adequate rating
vii)	Brake for Hoist & Trolley	To be provided
viii)	Bearing	Ball/ Roller of reputed make viz. SKF/FAG/NTN
ix)	Lubrication	Oil/ Grease
x)	Motor	Suitable for hoist duty, 415V+/- 10%, 50Hz+/- 5%, 3 phase AC supply
xi)	Type of power feeding arrangement	Festoon cabling.
xii)	Type of limit switch	Over lowering and over hoisting and for Over travel at end position
xiii)	Control Station	Weather and dust proof with specified degree of protection in electrical specification
xix)	Necessary Electrical Protective devices provided : : Yes, to be provided	
xv)	**Tests:** All tests as per relevant codes and standard, manufacturer's standard shall be conducted Over load test as per IS: 3832 shall be conducted**.**	
C.0	**Chain Operated Hoist (Manual Hoist).**	
a)	Steel frame made out of steel plates to support all gears and ensuring alignment shall be provided. Rigid pressed steel covers for inspection and gear lubrication shall be provided. Graded cast iron trolley wheels having inbuilt gear teeth and medium steel pinion with Hob cut teeth shall be provided.	
b)	Alloy steel load chain conforming to IS: 6216 Grade T (8), hooks made out of forged steel having high ductility and toughness as per IS: 8610 Grade M & P shall be provided. Hook shall rotate through 360 deg. and shall be mounted through ball bearing to enable rotation of hooks at full load without twisting the load chain.	
c)	The automatic brake for the lifting gear shall always be in action. It shall be either of screw and friction disc type, self-actuating load pressure brake or of any other standard design. The brake shall offer no resistance during hoisting.	
d)	Load wheel, main arm holding upper hook and bottom hook holding block shall be of steel casting.	

	Hand chain shall be made out of standard quality steel and shall be provided with suitable guarding to prevent fouling of chain.
e)	All the gearing shall be generally enclosed type. Gears shall be cut from solid cast or forged steel blanks. Pinions shall be of forged carbon or heat-treated alloy steel. Proper lubricating arrangement shall be provided for bearings and pinions
D.0	**Manual Hoists , Electric Hoists shall be provided in line with Volume III, Chapter 28**

M-5	**Belt Vulcanizing Machine**	
1.1	The equipment furnished shall be suitable for vulcanizing N-N type Belt as specified for Belt Conveyor. The equipment shall be of reputed, proven & approved make.	
1.2	The heating element shall have adequate rating complete with temperature controller for efficient utilization. Size of platen shall be adequate for vulcanizing the belt width given in Technical Data below.	
1.3	The equipment shall be light in construction so that it can be transported easily to the desired location. One (1) set of complete repair kit shall be furnished along with each equipment.	
2.0	**Technical Data:**	
a)	**Designation no.**	**BVM-1**
b)	Type of belting to be vulcanized	Min. 650mm wide N-N belting
c)	Type	Hydro-mechanical type, pressure generated by Hydraulic pump
d)	Quantity	Two(2)
e)	Type temperature controller	Thermostat
f)	Operating pressure	8kgf/sq.cm./ to suit
g)	Operating temperature (approx. range)	145-155°C
h)	Method of heating	Electrically heated
i)	Power receiving plug, switch & cable	To be provided
j)	Cable length (Approx.)	Minimum 30m length between socket & temp. Control box & Minimum 6m between control box & platen
k)	Operating voltage	415V x 3-Ph. x 50 Hz. A-C. Supply
l)	Minimum Vulcanization accessories to be supplied.	
m)	Tool kit	One (1) set
n)	Measuring tool	One (1) set
o)	Belt Clamping device	Two (2) pair
p)	Roughing Machine	One(1) set
q)	Edge Bars	Two(2) pair
r)	Portable motorized Winch 5 tonne capacity complete with accessories	One(1) no. to be furnished

M-6	IN LINE MAGNETIC SEPERATOR [ILMS]	
1.1	In-line Magnetic Separator shall be of electromagnetic type, with oil-cooled design. All equipment shall be totally enclosed. Magnet circuit comprising of insulated Aluminum adequately impregnated with epoxy resin making it impervious to moisture shall be provided. One Electric Hoist with monorail beam shall be provided suitable for handling/ removal of magnetic separator for maintenance.	
1.2	The In-line Magnetic Separator unit shall be mounted from structural member from the top. The required turnbuckle arrangement to facilitate the necessary adjustments during operation shall be provided. The unit shall be complete in all respects including all electrical ancillaries, viz. Local Control Panel, ON/OFF control push buttons and indicating lamps etc.	
1.3	Magnetic pieces picked up by Magnetic Separator shall be discharged into tramp metal chute located suitably adjacent to main chute. Also another tramp metal cum floor cleaning chute shall be provided for disposal of Tramp Metal.	
1.4	The separator belt shall be designed to withstand high temperature at the bottom of the magnet and also to withstand impact of the sharp edges of the tramp iron pieces. The belt shall be provided with suitably spaced built in ribs.	
1.5	Each magnetic Separator shall be suitable to lift the following tramp iron piece from the given belt:- • MS cube of 20mm size. • 250mmX250mmx50kg MS plate. • MS round bar of 50 kg with L/D ratio not exceeding 5 • MS bolt of M20X100 Long. • Shovel teeth & spikes, Material-CS • Brake shoe of railway wagon (Cast Iron – 15kg)	
1.6	One (1) Tramp Metal Trolley shall be provided for each Inline Magnetic Separator (ILMS)	
1.7	**Technical Data:**	
a)	Type of Magnetic Separator	In Line Magnetic Separator, Oil cooled type electromagnet with self-cleaning arrangement.
b)	Equipment designation/ Location/ Qty.	Refer Flow Scheme
c)	Capacity/ belt width/ belt speed/ Troughing Angle	Refer Belt Conveyor specification
d)	Operating height	200 mm (Minimum)
e)	Flux density (Min.)	1000 Gauss at operating height specified above.
f)	Force Index	100000 Gauss (Minimum) at above operating height
g)	Degree of Protection	IP-65
h)	Magnet Core Material	Pure annealed iron/eq. having high magnetic permeability, IS-4491
i)	Coils	Aluminum wounded coils with class “H” insulation
j)	Rectifier	3ph, full wave bridge using Silicon diodes forming rectifier set
k)	Non-Magnetic Pulley	Non Magnetic Pulley as per Belt Conveyor specification shall be provided.
l)	Separator Belt	N-N Type of F.R. Grade complete with built- in ribs and zero speed switch.

		Geared motor drive shall be provided
m)	Wear plate of Stainless steel SS-304 shall be provided at electromagnet surface.	
M-7	**SUSPENDED ELECTROMAGNET [SEM]**	
1.1	Magnetic Separator shall be of electromagnetic type, with oil-cooled design. All equipment shall be totally enclosed. Magnet circuit comprising of insulated Aluminum adequately impregnated with epoxy resin making it impervious to moisture shall be provided.	
1.2	The Magnetic Separator unit shall be mounted from structural member from the top. The required turnbuckle arrangement to facilitate the necessary adjustments during operation shall be provided. The unit shall be complete in all respects including all electrical ancillaries, viz. Local Control Panel, ON/OFF control push buttons and indicating lamps etc.	
1.3	Monorail with manual Hoist & Electric trolley shall be provided for Suspended Electro Magnet (SEM). Monorail shall extend minimum 3m on both side of building housing the above magnet.	
1.4	Each magnetic Separator shall be suitable to lift the following tramp iron piece from the given belt:- • MS cube of 20mm size. • 250mmX250mmx50kg MS plate. • MS round bar of 50 kg with L/D ratio not exceeding 5 . • MS bolt of M20x100 Long • Shovel teeth & spikes, Material-CS • Brake shoe of railway wagon (Cast Iron-15kg)	
1.5	One (1) Tramp Metal Trolley shall be provided for each Suspended Electromagnet (SEM) to receive tramp metal.	
1.6	**Technical Data:**	
a)	Type of Magnetic Separator	Oil cooled type Electromagnet
b)	Equipment Designation	Refer Flow Scheme
c)	Location / Qty	Refer Flow Scheme
d)	Capacity of conveyor (TPH)	Ref. Belt Conveyor specification
e)	Belt speed (m/sec)	Ref. Belt Conveyor specification
f)	Belt width	650mm
g)	Troughing Angle	20°
h)	Operating height	200 mm (Minimum)
i)	Flux density (Min.)	1000 Gauss at operating height specified above.
j)	Force Index	100000 Gauss (Minimum) at above operating height
k)	Degree of Protection	IP-65
l)	Magnet Core Material	Pure annealed iron/eq. having high magnetic permeability, IS-4491
m)	Coils	Aluminium wounded coils with class “H” insulation
n)	Rectifier	3ph, full wave bridge using Silicon diodes forming rectifier set
o)	Non-Magnetic Idlers	Non-Magnetic Idlers of 4 mm thk. (min) Aluminum & lagged with 5mm thk. neoprene rubber shall be provided suitably on conveyor in the magnetic zone

p)	Wear plate of Stainless steel SS-304 shall be provided at electromagnet surface.

M-8	**METAL DETECTOR**	
1.0	**Constructional Features**	
1.1	Each metal Detector would comprise of: • 1 No. Search Coil, • 1 No. Electronic Cabinet, • 1 No. Signal Horn, • 1 No. Signal lamp	
1.2	Search Coil Unit houses an oscillator coil and a receiver coil, Oscillator coil sets up electromagnetic field which is concentrated in aperture of the search coil. In normal condition when there is no tramp metal the receiver coil is so arranged that the output from it is extremely small. When a tramp iron piece is passing through the coil, it disturbs the flux distribution and this induces a voltage in the receiver coil. This voltage is then processed in the electronic unit and a DC voltage proportional to the size and type of metal is obtained. This voltage is compared with a threshold setting voltage which is used to set sensitivity of detection. When a metal of required size passes through the coil a switching signal is available at the output of the above comparator, which drives a monostable ckt. This monostable ckt actuates the relay for a fixed time and returns back after that time. Thus a momentary change over contact is available for this relay. The contacts of this relay are rated 5-A/220-V-AC. Suitable spark suppression is also incorporated.	
1.3	The metal detector shall operate on a principle that tramp metal causes a reaction in the sensing device of the detector unit, in case, tramp metal passes through without being lifted, the metal detector on sensing the tramp metal will activate the signal light and operate the sand marker device to indicate location of metal piece. The hook of the sand bag marker is lowered by means of a relay contact. The sand bag is dropped on or near the approx. location of the metal piece.	
1.4	**Technical Data:**	
a)	Equipment designation / Location / Qty.	Refer Flow Scheme
b)	Capacity/ belt width/ belt speed	Refer Belt Conveyor specification
c)	Material to be examined	(-)20 mm Crushed Limestone
d)	Detector type & capacity	Electronic solid-state type, single channel suitable to detect 25 mm aluminium sphere & other metals Brass, Copper, Stainless steel, Manganese steel, Bars, Scraps etc. Each unit shall be complete with search coil, electronic cabinet, signal lamp, signal horn, sand bag marker, and provision for testing the unit.
e)	Annunciation/ Hooter provided	Yes
f)	Audible range of hooter	300 m
g)	Indication type	Audio and visual
h)	Power supply	230V ± 15%, 50 Hz ± 3%, Single phase, A C Supply

M-9	BELT WEIGHER	
1.1	The Belt Weigher shall consist of the carriage/ weighbridge assembly, belt speed sensor and the electronic cabinet (Totalizer or Integrator Unit). The weighbridge shall be of multi idler system. Frictionless pivots trunnion type suitably sealed / flexure plates shall be provided which shall be impervious to vibration, moisture and material deposits. The weighbridge shall be of rigid frame type having no moving parts and it shall maintain alignment permanently. It shall be of modular type for quick and easy installation in the field.	
1.2	The speed sensor mechanically connected to tail pulley / deflector roller / speed sensor arm between the belts shall provide pulses, proportional to belt speed. The Totalizer Package (Integrator Unit) shall provide the necessary intelligence to the system. The integrator receives the output signal from the weighbridge & the speed sensor and adds them to the total on the Master Counter. Flow rate is displayed by computation against a time base. The Integrator shall have feature such as automatic span and zero calibration and self-diagnostics facility.	
1.3	The digital speed sensor shall be packaged in rugged cast aluminum / S.S housing suitable for outdoor installation. The speed-sensing element shall employ a brushless pulse generator producing pulses, proportional to true belt speed. The pulse output is fed to the Integrator Unit.	
1.4	The Electronic Cabinet shall comprise of the Totalizer, Rate Indicator etc .having microprocessor based integrator. Total material weight, the material flow rate etc. shall be displayed on eight (8) digits LED. It shall have facility such as Run/Set up/Lamp test/Auto zero/Auto Span/Enter etc. The Electronic Unit shall have facility of digital processing, totalization of data etc., and shall have bright easy to read digital display of flow rate of material and total tonnage passed etc. Electronic cabinet shall be rugged design with IP-55 degree of protection. Belt Weigher system and main control room PLC communication interface to be provided. Minimum three signals (Flow rate, Pulse Totalizer & Reset) from Control room are required. Cabinet shall be suitable for modbus, Ethernet TCP/ IP communication protocol.	
1.5	High precision load cell of strain gauge type / transducer fully temperature compensated shall be provided.	
1.6	All electronic equipment used shall be suitable for service in dust-laden atmosphere and shall be actually tested, checked as per applicable standards to ensure continued reliability.	
2.0	**Technical Data:**	
a)	Type of Belt Weigher	Electronic Load Cell Type, Microprocessor based
b)	Equipment designation / Location / Qty.	Refer Flow Scheme
c)	Capacity / belt width / belt speed	Refer Belt Conveyor specification
d)	Weighing range	20% to 120%
e)	Accuracy over full weighing Range	Within ± 0.25%
f)	Totalizing Unit	To be Provided
g)	Type	Eight digits, digital totalizer
h)	Location of Electronic Cabinet	Control Room
i)	Rate indicator	Both Local as well as remote to be provided
j)	Type	Digital type
k)	Location of display	Control Room / Local
l)	Calibrating instruments as required	To be Provided

M-10	Fixed Tripper	
1.1	The fixed belt tripper shall be provided on Conveyor # BCN-2A/2B.	
1.2	Tripper head (discharge) pulley shall be identical to conveyor drive pulley for pulley dia, bearing size and bearing centers. Similarly bend pulley of fixed tripper shall also be identical to bend pulley of Conveyor.	
1.3	3.15 mm thk Deck Plate to suit shall be provided. Suitable tripper slope together with adequate radius of curvature (if required) shall be provided to avoid any lifting of carrying side belt.	
1.4	The tripper chute shall be provided with two-way chute.	
1.5	One primary cleaner (external type) shall be provided at tripper discharge pulley. One internal V-plow cleaner shall be provided on the lower return side bend pulley of fixed tripper.	
1.6	Necessary belt guide rollers for belt shall be provided near to the discharge pulley for carrying side belt.	
1.7	Belt cleaners, chutes, pulleys, rollers, and idlers shall comply with the requirements stated elsewhere in this specification. The tripper shall have provision for dropping limestone to one side of conveyor and also to conveyor itself.	
2.0	**Technical Data**	
a)	Type of Tripper	Fixed Type
b)	Qty/ Location	As per flow diagram
c)	Type of belt cleaner required	Primary cleaner at discharge pulley and V-plow cleaner at lower return side bend pulley.
d)	Belt width	650 mm x 20° Tr. X 3-Eq.Roll
e)	Hinged inspection door on the chute	To be provided (Dust Tight Design)
f)	Skirt board	Refer spec. for Belt Conveyors # M-1
g)	Type of operation	Local operation. However necessary indication on central control panel of flap gate position shall be incorporated.

M-11	Surface feeder / Bulk Receiving Unit
1.1	The feeder shall be of robust and proven design for above ground unloading from trucks or front end loaders
2.0	Construction features
a)	Pan: Pan shall be suitably designed to withstand the impact load of Limestone lumps having lump size of up to (-) 250mm. High strength pans to resist abrasion and to withstand heavy impact loads shall be provided. Pans shall be bolted to forged link chains supported on heavy-duty life lubricated rollers
b)	Chain link: Chain link shall be forged alloy steel. Pins and rollers shall be hardened steel. The chain shall be provided in two rows
c)	Frame: Feeder frame shall be manufactured out of rolled steel section (IS: 2062) and bolted together to form a rigid structure. The main two longitudinal members support the carrying rollers
d)	Bottom Rollers: To relieve radial load on the head and tail shaft bearings and also to provide support to the return side of the moving apron, return rollers- heavy-duty life lubricated rollers-

	shall be provided.	
e)	Head End: The head end will be of sturdy steel construction suitably stiffened and fitted with spherical roller bearing & 4 bolts, cast steel Plummer Blocks. The sprocket will be made of Cast alloy steel with case hardened teeth	
f)	Tail End: The tail end will be of sturdy steel construction suitably stiffened and fitted with traction wheels complete with traction wheel assembly bought from the chain supplier as per his standards. The traction wheel will be made of cast steel with hardened surface	
g)	Tensioning: Screw take up tensioning arrangement with Hydraulic jack for sufficient travel shall be provided for the tensioning of the chain.	
h)	Lubrication: Manual Centralized lubrication system shall be provided with grease pump fitted close to the machine for lubricating Plummer Blocks	
3.0	**Technical Data sheet**	
a)	Intake Hopper	To be provided
b)	Intake Hopper Grid size	400 mm x 400 mm
c)	Drive type	Mechanical drive with Toothed Sprocket & chain arrangement and bevel helical gear box
d)	Material conveying member	Apron pan fabricated from 10thk MS IS:2062 + 12thk SAILMA HI or superior material
e)	MOC of intake hopper, Chutes and Skirt board	6mm thk. M.S[IS:2062]
f)	Liners for Intake hopper, Chutes and Skirt board	Minimum 12 mm thick TISCRAL/ SAILHARD or superior wear resistant plate
g)	Carrying Roller	Forged Alloy Steel
h)	Head and Jack shafts	C-45/equivalent
i)	Hood above head sprocket Assembly	6mm thk. M.S [IS:2062]
j)	Clear width of skirtboard	Shall be 70% of belt width for feeder
k)	Skirtboard rubber strip	The gap between the skirt and the feeder shall be closed or controlled by exterior rubber strips of 50-60 degree durometer hardness on shore 'A' scale. Rubber strip shall be minimum 200 mm deep x 20 mm thk. The rubber strips shall be held in position by steel clamps spaced at maximum spacing of 400mm. The rubber strips shall be adjustable for minimum height of 20 mm.
l)	Intake ramp (RCC)	To be provided as per system requirement. Shall

		be designed for payloader/truck movement.
m)	Coupling guard	To be provided
n)	Outlet chute	To be provided
o)	Enclosure	To be provided all along the length of feeder
p)	Plough unit	To be provided
q)	Angle of inclination	20 degree
r)	Head Chute Level Detector	To be provided
s)	Head Chute High Level Switch	To be provided
t)	Rotation / Speed Monitor	To be provided
u)	Manual Stop / Start	To be provided
v)	Location	Outdoor
w)	Minimum Motor, kW	Minimum kW rating = 1.2 x Power required by driven equipment at motor shaft. Also the feeder shall be capable of starting fully loaded.
x)	Electrical and Control equipment	Shall be designed for outdoor application.
y)	Support structures and Foundation	To be provided

M-12	**Crusher**	
1.1	Crusher shall be designed to produce uniform granular product having high efficiency i.e max surface area produced with least possible power consumption. Machine shall be equipped with adequately rated drive unit to ensure trouble free operation of the machine while handing limestone.	
1.2	Machine shall be completely balanced statically and dynamically to minimize vibrations & noise. GERB make vibration isolation system and the necessary RCC deck shall be provided.	
1.3	The hammers of the impactor shall be fitted to the disc mounted on the rotor shaft and inner surface of impactor shall be provided with replaceable breaker plates made of high manganese steel as per IS:276, GR.3.	
1.4	Material for the beater heads & grinding gibs shall be annealed high chrome molly steel (42Cr.Mo)	
2.0	**Technical Data Sheet**	
a.	Type of Crusher	Hammer mill Type or equal
b.	Duty	24 hr/day, Continuous.
c.	Material to be crushed	Limestone

d.	Equipment Designation No.	CR-1A/ 1B
e.	Qty.	Two(2) no
f.	Crushing Capacity for each crusher	Min 100tph [guaranteed]
g.	Max. Lump Size of feed (Input to Crusher)	(-)250mm
h.	Crushed Limestone Size (Crusher Output) required	(-) 20 mm Not less than 95%.
i.	Output fines (-) 1mm size	Crusher shall be designed considering worst conditions and shall generate minimum of fines.
j.	Anti-Vibration GERB mounting arrangement	To be provided for each crusher
k.	Vibration & Temperature Monitoring System	To be Provided
l.	Type of crusher cleaning	Water jet type
m.	Type of Plummer block	Split Type
n.	Type of bearing	Heavy duty anti-friction bearing, L10 life of 60000hr [minimum]
o.	Type of sealing	Labyrinth, dust tight arrangement
p.	Product size adjustment	Suitable mechanism shall be incorporated.
q.	Tests	
1.	All tests as per relevant codes & standards.	
2.	All tests as per manufacturer's standards.	

M-13	**Vibrating Grizzly feeder**
1.1	The vibrating Grizzly feeder shall of mechanical type. Vibrating Grizzly Feeder shall be provided before each crusher so as to ensure uniform feeding of above 20 mm size of lime stone to crusher and remove below 20 mm size of lime stone from feed to crusher.
1.2	The grizzly feeder shall be capable to segregate (-) 20 mm size of lime stone, along with fines, lime stone dust and muck & muddy lime stone (which is likely to be encountered during rainy season) etc. The segregated material shall be directly fed on to the corresponding belt feeder provided under each grizzly feeder. Oversize lime stone shall be fed to lime stone crusher. The width of the Vibrating grizzly feeder shall be at least equal to the regular crusher feed opening dimension so as to feed the material uniformly over the entire length of crusher rotor without any deflection in the feeding chute. The screening area excluding solid deck area shall be min. 0.75m2 per 100mt/hr of incoming feed. Inclination of the grizzly pan shall not exceed 10 deg. from horizontal. The equipment shall be designed and installed in such a manner, that choking does not occur during operation, particularly during rainy season when the lime stone gets sticky
1.3	The deck of vibrating grizzly feeder shall have continuous solid deck section in the impact zone under direct lime stone fall and remaining deck shall be fitted with grizzly bars/perforated plate. The solid deck section shall be provided with replaceable abrasion resistant liner plate, preferably of TISCRAL /SAILHARD of adequate thickness. The grizzly bars shall be trapezoidal in section and made of abrasion resistant manganese steel. The bars shall be rigidly fixed with main frame along the length of grizzly deck.

1.4	The vibrating grizzly feeders shall be mounted on the floor with the help of helical springs made of alloy steel. No rubber/synthetic material for the support shall be acceptable. Vibrator bearings shall be grease lubricated double spherical roller type suitable for vibrating equipment. Selection of bearings and its calculations shall be subjected to the approval of Purchaser. The Bearing shall be sized to 8000 hours of operation. The drive unit shall be complete with mechanical type vibrator, suitable for adjustment for maximum performance.	
1.5	Suitable sealing arrangement shall be provided between the vibrating structure and chute work to avoid dust nuisance in the surrounding area.	
1.6	The grizzly feeder shall be of approved and proven design/make. Rubber impregnated canvas would be provided at inlet and outlet interface with fixed chute. Proper arrangement to avoid dust ingress into lubricant of eccentric shaft shall be provided. Necessary arrangements shall be provided for maintaining the complete vibrator assembly. Marker plate shall be mounted to indicate the stroke length and stroke angle.	
2.0	**Technical Data Sheet**	
a.	Type	Vibrating-Electro Mechanical
b.	Duty	24 hr/day, Continuous.
c.	Material to be crushed	Limestone
d.	Equipment Designation No.	VGF-1A/ 1B
e.	Qty.	Two(2) no
f.	Min Capacity for each screen	100tph [guaranteed]
g.	Max. Lump Size of feed	(-)250mm
h.	Grizzly Bars	Manganese Steel as per IS:276
i.	Output	Uniform feeding of (+) 20 mm lime stone to Crusher
j.	Shafts	Forged Steel
k.	Solid Deck	MS-2062
l.	Solid Deck Liner	TISCRAL/SAILHARD/Equivalent min.16 mm thick
m.	Support	Helical Springs
n.	Bearing	Double spherical roller ,grease
o.	lubricated, life	8000 running hours
p.	Inclination	10 deg. max from horizontal
q.	Grizzly	Size Suitable to pass (-) 22.5 mm lime stone
r.	Tests	

1.	All tests as per relevant codes & standards.
2.	All tests as per manufacturer's standards.

M-14	**Dust Extraction System**
1.1	Dry type Dust Extraction (DE) System shall be provided for complete LHS. The capacity of D.E System shall be worked out conforming to the requirement of American Conference of Governmental Hygienists [ACGH] (Industrial Ventilation-A manual of Recommended Practice). All material / items required for system completion are to be supplied and installed by the vendor.
1.2	**Dust Extraction System**
1.2.1	Dust Extraction System shall comprise of Bag Filter Unit, Centrifugal Fan Unit, Dust Extraction hood, duct work with supports necessary dampers, rotary air lock feeder, screw conveyor Air compressor with accessories and control components and panels. Protection against fire shall be provided. Necessary interlocks hardware and controls shall be provided to suit.
1.2.2	Bag Filter Unit:
a)	Pulse Jet Type bag Filter Unit having an efficiency of 99.9% down to 5 microns shall be provided. It shall be complete with supports, maintenance walkway, platform with hand railing and cage ladder etc. for access to bags & solenoid valve etc. Sheet metal rain protection hood / canopy shall be provided above bag filter unit, and also for drive unit components / motors of fan / screw conveyor / airlock feeder etc.
b)	The bags shall be made out of Membrane fabric having fireproof and antistatic properties to suit the application and having long working life. The air to cloth ratio of bag filter shall not exceed 100 $m^3/hr/m^2$. The fabric weight shall be minimum 550 gm per sq.m.
c)	The casing of the Bag Filter unit shall be made out of 5 mm thk M.S. and dust-collecting hopper shall be made out of 5mm thk SS-409M.Through rotary feeder /screw conveyor system dust collected in the hopper shall be fed back to the corresponding working conveyor.
d)	Bag cleaning system shall comprise of header for compressed air supply and distribution piping and electric operated diaphragm type solenoid valve with timer. Each row of bag shall be served by a solenoid valve and each bag shall have well designed venturi. Filter bag shall be secured to the housing by suitable clamps. The bags shall preferably be grouped in separate compartment to facilitate bag cleaning. The collector shall have air tight access door into each bag compartment and each hopper
e)	Motor of rotary airlock feeder and screw conveyor shall be suitably interlocked with fan motor. Manometer to measure pressure drop across the unit and D P switch for alarm annunciation /cleaning mode operation shall be provided. Necessary gauge and pressure switch shall be provided in the compressed air pipe.
f)	Non-lubricating type air compressor of Elgi / Ingersoll Rand / Atlas Copco / Chicago Pneumatic /

	Kirloskar Pneumatic shall be provided. To ensure clean & dry air, all accessories viz. suitable filter unit, moisture eliminator etc. shall be provided for air receiver / compressed air piping. GI piping shall be used for compressed air.
1.2.3	Fan Unit
a)	Adequately sized centrifugal fan with backward curved blade shall be provided for air movement. Fan shall be sized equal to 1.15 times the total dust collection system airflow rate. Fan casing shall be 5 mm thk M.S.
b)	Each Centrifugal fan unit shall be complete with electric drive motor, impeller, casing, supporting structure, pair of slide rails for motor and common base frame with foundation bolts, drive pulley, v-belts, belt guard, vibration isolators, dampers and flexible connection with matching flanges, sheet metal canopy over motor, butterfly damper at fan inlet, fan discharge side ducting with exhaust cowl and bird screen. The exhaust air after filtration through Bag filter shall be discharged at a height of 3 m above roof level of adjacent Building / Structure.
c)	Fan Drive -V-belts shall be sized considering minimum service factor of 1.5. There shall be minimum two belts per drive. -Drive Motor HP Rating (minimum) = 1.2 x (BHP of driven equipment + drive loss)
d)	Exhaust duct shall be made out of min. 3.15mm thk MS plate and shall be provided with clean out door at bottom. This duct shall be supported by steel members along wall of Crusher House.
e)	Material of Construction i) Impeller: Fe410W (IS:2062) ii) Fan Shaft: 45C8, IS:1570/equal iii) Fan Scrawl: Fe 410W (IS:2062) iv) Supports frame & structure: Fe 410W (IS:2062) v) Flexible connection for fan inlet & outlet: Rubber impregnated canvass with MS flange & cleats vi) V-pulleys: CI multi grooved (IS:210) vii) V-belts: Reinforced Rubber viii) Slide Rails: CI or MS ix) Bolts & Nuts: IS:1367 x) Vibration Isolation pads: Synthetic Rubber (hardness 40 deg. on shore A)
1.2.4	Dust Collecting Hood / Dampers / Ducting
a)	Centerline of the hood shall be located at the point of generation of maximum pressure. Each hood shall be adequately sized to collect all dusty air generated at dust generating point. Velocity in the hood shall be limited to about 1.8 m/sec. The hood shall be made of 3.15 mm thk M.S plate complete with rubber apron and manual damper.

b)	Manual Dampers fusible link type in the individual suction hood as per requirement shall be provided.	
c)	Velocity of air in ducting shall be about 18 to 21 m/sec to transport the suspended dust. Ducting & bends of circular cross section shall be made out of minimum 3.15 mm thk M.S. Plate	
d)	Ducting shall be supported at max. intervals of 2.5m (for duct dia. of 200mm & less) and at 3 m interval for duct dia. above 200mm. Radius of bend shall not be less than 1.5 times the dia. of ducting.	
e)	Minimum 5thk MS flange complete with gasket shall be provided for duct size of 500mm dia. and below. For duct dia. above 500mm, 6mm thk. (minimum) MS flange complete with gasket shall be provided. Type / thickness / material of gasket shall ensure air tightness at flange joints.	
f)	The duct work shall be properly reinforced to prevent sagging, buckling and vibrations. Duct support wherever required shall be provided.	
g)	Duct running on floor / roof shall be adequately fixed in position by MS angles / channels. Vertical duct passing through floor slab shall be supported by means of collars (MS fabricated) / brackets securely fastened about girth of duct and resting on floor slab. Suitable bitumastic filler compound shall be filled into the gap between outer surface of ductwork and edge of RCC floor / roof to make it water leak proof.	
h)	Non collapsible type or better flexible connection shall be provided at the duct connection to inlet & discharge of fan.	
i)	All hangers & supports & fixing arrangement for ductwork shall be approved by Owner / Desein.	
1.2.5	Electricals / Control & Instrumentation The scope of work includes supply and installation of all the necessary Electricals / Control & Instrumentation items required for successful operation.	
a)	Electric motors, power & control cables, cables trays, cabling accessories, MCC, Local control panel, Local push buttons complete with accessories, starter, switch fuse unit, start / stop push button necessary interlock hardware, indication lamps (LED type)-for remote indication of DE system “ON/OFF” shall be provided	
1.2.6	**Technical Data : Dust Extraction System**	
a)	Type	Dry Type having Pulse Air Jet Type bag Filter Unit, having “ONLINE” cleaning arrangement.
b)	Designation No.	• Dedicated DE system for each stream of conveyor. 1W+1S compressor shall be provided common for all DE systems. • System shall be designed such that both streams can be operated simultaneously
e.	Dust Content in clean air exhaust	Less than 30 mg/Nm^3 or as per stipulation of Pollution Control Board whichever is less.
M-15	**Weigh Bridge for Truck – Refer Volume III, Chapter 31.**	

M-16	**Bull Dozer**	
1.1.	Each dozer shall be fully assembled and ready for production when delivered, blade mounted; fuel tank full of fuel; coolant system filled with heater/ engine coolant; and crankcase, transmission, differential and final drives (each), hydraulic system and windshield washer reservoirs filled. Each Machine shall be provided with matching large Limestone Blade for stockpile management. Further one earth blade shall also be supplied for each machine.	
2.0.	**Technical data sheet**	
i.	Make & Model No.	Model No. # BD-80 of BEML or equal approved make
ii.	Nos. Required	Two [2]
iii.	Material Handled	Uncrushed Limestone, (-)250mm
iv.	Flywheel power (Net)	Not less than 134 Kw (180hp) @1850rpm
v.	Parts and Supplies: Spare parts shall be delivered (in addition to those installed on the machine) for 2,000 hrs operation of one machine	

M-17	**Front End Loader**	
1.1.	Each Front End Loader shall be fully assembled and ready for production when delivered, bucket mounted; fuel tank full of fuel; coolant system filled with heater/engine coolant; and crankcase, transmission, differential and final drives (each), hydraulic system, and windshield washer reservoirs filled.	
1.2.	Parts and Supplies: Spare parts shall be delivered (in addition to those installed on the machine) for 2,000 hrs operation of one machine	
2.0.	**Technical data sheet**	
i.	Make & Model No.	Model No. # JCB 456zx Wheel Loader or equal approved make
ii.	Nos. Required	Four (4)
iii.	Material Handled	Uncrushed Limestone, (-)250mm
iv.	Bucket Capacity-Struck	Not less than 2.5 m^3

M-18	**Sump Pump**
1.1	In each Sump Pit, two (2) no. (1W+1S) sump pump shall be provided The pump shall be of vertical submerged type, grease lubricated, single stage, above floor discharge, ball/ roller bearings fitted, and having non-over loading characteristics. The bearings shall be suitably housed and protected from contaminated water.
1.2	Each sump pump shall be provided with electrode type or equivalent high / low level switches for automatic starting and stopping of the pump. The electrode mechanism shall be adjustable over entire depth of the sump. Pump shall be started when the sump level starts rising above a predetermined level and shall continue to operate till water reaches low level in the sump, when it shall trip off automatically.

	Both the sump pumps shall be provided with suitable strainers at the inlet side of the impeller.	
1.3	The pumps shall be capable to pump limestone dust contaminated water of fairly high viscosity. The pump shall be lubricated through a built-in lubricator.	
1.4	The vertical motor driven pumps shall be driven by a suitable motor located at proper position for smooth, safe and efficient operation.	
1.5	The piping system shall be designed to suit simultaneous operation of both pumps (i.e. working pump + standby pump). Discharge pipe upto the nearest drain/ pond shall be provided.	
1.6	Local starter panels consisting of auto/ manual selector switch, isolating switch fuses, start stop push buttons timers level controller, auxiliary relay etc. shall be provided.	
1.7	Sump pump also provided in the crusher house & limestone shed. Sump pit and pumps shall be located in the crusher house to prevent any rain water from entering. The discharge from sump pumps shall be led to guard pond. Rain water shall be led to the storm water drain.	
2.0	**Technical Data**	
a)	Type	Vertical submersible non-clog type
b)	Equipment Designation / Location	SP-1A/1B/ 2A/2B Located in Sump Pit as per flow diagram.
c)	Quantity	4 No.
d)	Type of fluid handled	Limestone dust laden water
e)	Discharge Capacity (m^3/hr)	30
f)	Total head (mWC)	To suit
g)	Type of drive	Motor operated, flanged mounted motor
h)	Type of mechanism for automatic starting / stopping	Level switches
i)	Type of bearing	Antifriction
j)	Method of lubrication	Grease
k)	Strainer at the inlet side of impeller provided	Yes
l)	Piping valve and accessories	MS ERW pipe , conforming to IS: 1239 / IS: 3589
m)	Local start / stop control	From next higher floor or away from sump where water accumulation does not occur.
n)	Type of mechanism for automatic starting / stopping	Electrode type / eqvt.
o)	**Material of construction**	
i)	Casing	Ni-CI to IS:210 Gr. FG260

ii)	Impeller	Ni-CI to IS:210 Gr. FG260
iii)	Pump shaft	EN-8
iv)	Line Shaft	EN-8
v)	Support Pipe	MS
vi)	Cover Plate	MS
vii)	Strainer	MS with SS-304 wire mesh/ or equal

Attachment No.- 06

Online Coal Analyzer System

On line Coal analyzer system shall consist of online coal analyzers to measure coal characteristics and quality at various locations. The Online Coal Analyzers shall be radiation free and shall have no gamma-ray, neutron or x-ray radiations etc.

These Analyzers shall provide continuous real-time data of coal parameters and shall have capability to measure, minimum ash, moisture, sulphur, Gross calorific value (GCV) etc. of coal without sampling. The Analyzers shall also measure other constituents of coal like silicium, titan, iron, aluminium, etc. ,hence a proven principle of operation shall be implemented like Laser-based (LIBS) technology which has clear signal analytical lines of Carbon, ash constituents (Si, Al, Fe, Ti, K, Na, Ca, Mg, etc) and volatiles with high signal/background ratio and without interference. Averaged and accumulated chemical composition data can be updated every 30 seconds to 5 minutes and can be integrated with any type of automation system.

Features:

- Stable and accurate analysis of coal with high signal/noise ratio.
- Safe and environmentally friendly laser technology with no gamma-ray, neutron or X-ray radiation. The Analyzers shall be suitable for working at various plant locations, with ambient temperature up to 50 deg. C. The protection class of equipment shall be explosion proof shall be minimum IP 65. Further, each Analyzer shall have provision of providing soft link on OPC/Modbus/Ethernet.
- Meet ASTM D6543-00 (Online Coal Analyzer) measurement standard.
- Explosion Protection Certified design.
- Fully automatic 24/7 operation and PLC or or any other control system integration.
- Maintenance with remote support.

For on-line coal Analyzers, the expected range of parameters and corresponding accuracies for various parameters for coal are indicated as below:

Coal Quality Parameter	**Range of Values**	**Accuracy shall be equal to or better than following**
Ash	30-45%	2.5%
Moisture	0-20%	2.25%
GCV	2500-4500 kcal/kg	200 kcal/kg

Online coal analyzers shall be sourced from a party who had designed, manufactured, supplied and done erection and commissioning of at least one (1) number of online coal analyzer system of radiation free type offered for measuring the gross calorific value (GCV), ash, total moisture (as a minimum) on real time basis. The online Coal Analyzer system should have been in successful operation for at least one (1) year prior to the date of techno-commercial bid opening.

Control Philosophy: One set of online coal analyzers shall be located after crusher house, at conveyors for measuring the coal properties of incoming coal for the direct path. Another set of online coal analyzer shall be provided on yard conveyors.
The output from each analyzer shall be used to control the feed from apron feeder or paddle feeder and Stacker/Reclaimer.

There are following methods to feed coal in the bunker:

a) Coal From Direct Path :

Wagons shall transport domestic coal to the power plant. The coal received from wagon shall be unloaded using wagon tippler and discharge on to the conveyors by Apron feeder below wagon tippler hoppers. The feed rate of coal from Apron feeder shall be controlled using VVVF Controller to be interfaced with PLC. (Variable Voltage Variable frequency controller)

b) Coal from Reclaimed Path:

The coal received to plant shall be stacked in the stock pile. The coal fed from Stacker Reclaimer shall be monitored using online coal analyzers located on respective yard conveyors.

Coal Management System

The coal management system shall mainly comprise of online coal analyzers with complete software interfaces, VVVF speed control devices and a programmable logic controller (PLC) for coal management.

All coal Parameters and real time Feedback by each online coal Analyzer shall be given to PLC.

For accuracies to be indicated by Bidder for the offered coal Analyzers, the compliance to specified accuracies for indicated range of parameters shall be furnished in the form of published technical catalogs or declaration by manufacturer on their letter-head, along with the bid. Further, test certificates indicating specified range of parameters and corresponding accuracy figures shall be provided from reputed test laboratory or tested at manufacturer's works, prior to dispatch of Analyzers.

The Contractor shall follow all guidelines of regulatory agencies, if required for proper installation/operation of Online coal Analyzers.

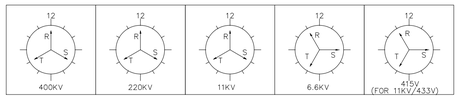
Attachment No. – 7

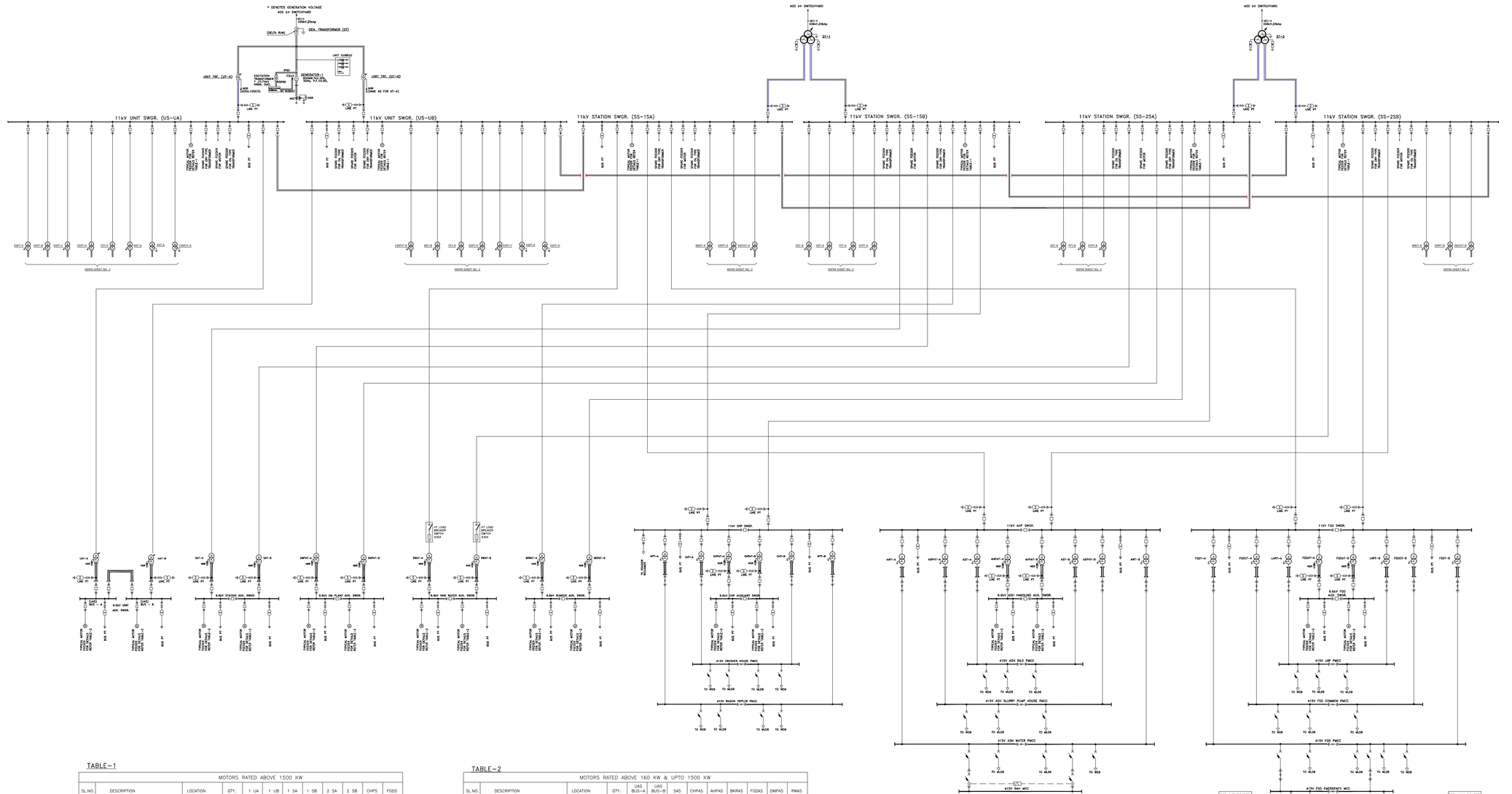
ULTRA FILTRATION SYSTEM

Three (3) stage Filtration system in series comprising of Dual media (1st Stage) filters, Ultra Filtration filters (2nd Stage) and Cartridge type (3rd Stage) filters, associated, piping, valves etc. shall be provided.

Commercially proven hollow-fiber, high volume pressurized type UF membranes of Polysulfone, Poly Vinylidene Di Fluoride (PVDF) or Poly Ether Sulfone (PES) with spiral glass outer wraps shall be supplied. Gross maximum design flux rate shall not be more than 60 l/m2/h. Filtration direction may be either Out-to-In or In-to-Out. Minimum design UF recovery shall be at least 92% of the influent with a colloidal silica rejection of not less than 99.5%. Maximum Membrane pore size shall be 10000 Dalton MWCO (Molecular weight cut off).

Attachment-8





NOTES:–

1. ALL BREAKER RATINGS WILL BE CONTINOUS RATING AT 50°C AMBIENT.
2. UNLESS OTHERWISE STATED THE TOLERANCE ON PARAMETERS SHALL BE AS PER SPECIFICATION/ BIS // INTERNATIONAL STANDARDS.
3. UNLESS OTHERWISE STATED BASE MVA IS THE HIGHEST RATED CAPACITY.
4. MINIMUM FAULT LEVEL WITHSTAND :–
   400KV ..... 63KA FOR 1 SEC. 6.6KV ..... 40KA FOR 1 SEC.
   220KV ..... 50KA FOR 1 SEC. 415V ..... 50KA FOR 1 SEC.
   11KV ..... 50KA FOR 1 SEC. 220V DC .... 15KA FOR 1 SEC.
5. RATINGS SHALL BE FINALISED AS PER REQUIRMENT.
6. NUMBER OF OUTGOING FEEDERS TO TO BE DECIDED BASED ON THE REQUIRMENT AS EXPLAINED IN THE TECHNICAL SPECIFICATIONS.
7. SPARE FEEDERS SHALL BE PROVIDED IN EACH BOARD AS PER TECHNICAL SPECIFICATION.
8. SPARE FEEDERS SHALL BE IDENTICAL TO THE MAIN FEEDERS.
9. VOLTAGE LEVEL OF MOTORS SHALL BE FOLLOWINGS :
   A) UP TO AND INCLUDING 160kW : 415V
   B) >160kW TO ≤ 1500kW : 6.6kV
   C) ABOVE 1500kW : 11kV
10. METERING & PROTECTIONS SHALL BE AS PER TECHNICAL SPECIFICATIONS.
11. MOTORS OF RATING UPTO 18.5kW SHALL BE PROVIDED WITH MPCB, CONTACTOR, INTELLIGENT CONTROLLER WITH CURRENT MEASURING MODULE.
12. MOTORS OF RATING ABOVE 18.5kW AND LESS THAN 90kW SHALL BE PROVIDED WITH MCB, CONTACTOR, INTELLIGENT CONTROLLER WITH CURRENT MEASURING MODULE AND DISPLAY MODULE.
13. MOTOR FEEDRS RATING 160kW SHALL HAVE ACB.
14. INCOMER, BUSCOUPLER AND OUTGOING FEEDERS RATED 630A & ABOVE SHALL BE ACB CONTROLLED.
15. INCOMER AND OUTGOING FEEDERS RATED BELOW 630A SHALL BE MCCB CONTROLLED.
16. 415V SYSTEM WILL BE 3 PHASE, 3 WIRE WITH NEUTRAL SOLIDLY EARTHED. 11kV AND 6.6kV SYSTEM NEUTRALS WILL BE RESISTANCE EARTHED LIMITING EARTH FAULT CURRENT TO 300A FOR 10 SEC.
17. 220V DC BATTERIES WILL BE RATED TO CATER THE DC LOADS OF UNIT AS WELL AS STATION LOAD DURING COMPLETE BLACKOUT CONDITION.
18. BATTERIES WILL BE UNGROUNDED HAVING FLOATING NEUTRAL.
19. GEN. BUSDUCTS WILL BE ISOLATED PHASE TYPE. 11kV & 6.6kV HV BUSDUCTS WILL BE SEGREGATED PHASE BUSDUCT AND 415V LT BUS DUCTS WILL BE NON SEGREGATED PHASE TYPE.
20. UNDER NORMAL OPERATION OF 415V PMCC/MCC/AMF FOR HAVING TWO INCOMING BREAKERS/ISOLATORS AND ONE BUS SECTION BREAKER/ISOLATOR. THE INCOMING BREAKERS/ISOLATORS WILL BE CLOSED AND BUS SECTION BREAKER/ISOLATOR WILL BE OPEN.
21. 11kV SYSTEM UNIT BUSES EMPLOY FAST BUS TRANSFER SCHEME FOR RESTORATION OF SUPPLY FROM STATION TRANSFORMER IN CASE OF SUPPLY FAILURE FROM THE RESPECTIVE UNIT TRANSFORMER. MANUAL LIVE CHANGEOVER WITH CHECK SYNCHRONISATION AND SLOW AUTO CHANGEOVER FACILITY AS A BACK-UP IS ALSO PROVIDED FOR THESE BUSES. 11kV SYSTEM STATION BUSES EMPLOY MANUAL LIVE CHANGEOVER.
22. 6.6kV/415V SYSTEM BUSES ARE PROVIDED WITH MANUAL LIVE CHANGEOVER WITH CHECK SYNCHRONISATION AS WELL AS AUTOMATIC SLOW CHANGEOVER.
23. ES PMCC 415V BUS SECTIONS ARE ADDITIONALLY PROVIDED WITH MANUAL LIVE CHANGEOVER FACILITY WITH CHECK SYNCHRONISATION AND AUTOMATIC CHANGEOVER, WITH THEIR RESPECTIVE DG BUS.
24. STANDBY BATTERY CHARGER SHALL HAVE PROVISION FOR RECEIVING 2 INPUT SUPPLIES ALONG WITH SUITABLE AUTOMATIC CHANGEOVER BETWEEN THE SOURCES.
25. * DENOTES GENERATION VOLTAGE.
26. $ DENOTES RATING OF LIGHTING/WELDING/ISOLATION TRANSFORMER SHALL BE EITHER 100 OR 50 kVA.
27. FOR 11kV AND 6.6kV MOTOR DETAILS PLEASE REFER TABLE–1 AND TABLE–2 RESPECTIVELY.
28. ALL PCC/PMCC/MCC SHALL BE INTELLIGENT, DRAWOUT TYPE EXCEPT IF SPECIALLY MENTIONED OTHERWISE.
29. * * DENOTES NON INTELLIGENT MCC
30. MVA RATING OF THE TRANSFORMER, AS INDICATED ABOVE, SHALL BE CONSIDERED AS THE MINIMUM REQUIREMENT FOR AN INDIGENOUS TRANSFORMER OFFERED BY THE INDIGENOUS MANUFACTURER. ADHERING TO THE MAXIMUM DEMAND CONSIDERING ALL THE NORMAL RUNNING LOADS IN SERVICE AND STARTING OF ONE NO. HIGHEST RATED MOTOR (WITH DRIVEN EQUIPMENT), NO LOAD VOLTAGE CORRECTION FACTOR 4% WHILE SIZING OF TRANSFORMER AT MOST STRINGENT POSITION PLUS MINIMUM 10% MARGIN.
31. BRUSHLESS EXCITATION SYSTEM IS ALSO ACCEPTABLE.
32. # DENOTES RATING TO BE FINALISED DURING DETAILED ENGINEERING.
33. DG AMF PANEL SHALL BE LOCATED INDOOR IN A NEARBY ROOM. DG BREAKER SHALL BE LOCATED IN THE DG ACOUSTIC ENCLOSURE.
34. HT LOAD BREAK SWITCH TO BE PROVIDED FOR 11/6.9 kV RAW WATER TRANSFORMERS.

TRANSFORMERS DETAILS

SL. NO.	DESCRIPTION	DESIGNATION	RATING & VOLTAGE (KV)	LOCATION OF TRANSFORMERS
1.	GENERATOR TRANSFORMER	GT	240A SINGLE PHASE 400/√3/24/√3 kV, 1ph+1, OLTC YZ	TRANSFORMER YARD
2.	STATION TRANSFORMER	ST–1 ST–2	36, 400/11.5/11.5kV 130/85/85MVA Dhdy1Dhd1, YNynd1n0, OLTC	TRANSFORMER YARD
3.	UNIT TRANSFORMER	UAT–A UAT–B	55MVA, 11/11.5kV, DNdy1YNd1,Dyn1, OLTC	TRANSFORMER YARD
4.	UNIT AUXILIARY TRANSFORMER	UAT–A UAT–B	# MVA, 11/6.9kV DNdy,Dyn1, OLTC	TRANSFORMER YARD
5.	STATION AUXILIARY TRANSFORMER	SAT–A SAT–B	# MVA, DNAN 11/6.9kV, Dyn1	TRANSFORMER YARD
6.	CHP AUXILIARY TRANSFORMER	CHPAT–A CHPAT–B	# MVA, DNAN 11/6.9kV, Dyn1	NEAR JT – 2
7.	AHP AUXILIARY TRANSFORMER	AHPAT–A AHPAT–B	# MVA, DNAN 11/6.9kV, Dyn1	NEAR ASH SLURRY PH
8.	DMP AUXILIARY TRANSFORMER	DMPAT–A DMPAT–B	# MVA, DNAN 11/6.9kV, Dyn1	DM PLANT
9.	RW AUXILIARY TRANSFORMER	RWAT–A RWAT–B	# MVA, DNAN 11/6.9kV, Dyn1	EXISTING PARTH NEAR RESERVOIR
10	BUNKER AUXILIARY TRANSFORMER	BNKAT–A BNKAT–B	# MVA, DNAN 11/6.9kV, Dyn1	NEAR JT – 4
11.	FGD AUXILIARY TRANSFORMER	FGDAT–A FGDAT–B	# MVA, DNAN 11/6.9kV, Dyn1	FGD AREA
12.	TURBINE SERVICE TRANSFORMER	TST–A TST–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	MPB LV SWGR ROOM NO. 1
13.	BOILER SERVICE TRANSFORMER	BST–A BST–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	MPB LV SWGR ROOM NO. 2
14.	STATION SERVICE TRANSFORMER	SST–A SST–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	MPB LV SWGR ROOM NO. 1
15.	EMERGENCY SERVICES TRANSFORMER	EST–A EST–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	MPB LV SWGR ROOM NO. 2
16.	ESP TRANSFORMER	ESPT–A, B, C, D, ESPT–E, F, G, H	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	ESP CONTROL ROOM
17.	DM PLANT TRANSFORMER	DMPT–A DMPT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	DM PLANT
18.	FIRE FIGHTING TRANSFORMER	FFT–A FFT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	FIRE PUMP HOUSE AREA
19.	ETP TRANSFORMER	ETPT–A ETPT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	ETP AREA
20.	CWPH TRANSFORMER	CWPHT–A CWPHT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	CW PUMP HOUSE
21.	SWITCHYARD TRANSFORMER	SWGT–A SWGT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	SWGI CONTROL ROOM
22.	BUNKER TRANSFORMER	BNKT–A BNKT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	NEAT JT – 4
23.	CRUSHER HOUSE TRANSFORMER	CHT–A CHT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	NEAT JT – 2
24.	WAGON TIPPLER TRANSFORMER	WTT–A WTT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	WT COMPLEX
25.	ASH SILO TRANSFORMER	AST–A AST–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	ASH SILO AREA
26.	ASH SLURRY PUMP HOUSE TRANSFORMER	ASPHT–A ASPHT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	ASH SLURRY PUMP HOUSE
27.	ASH WATER TRANSFORMER	AWT–A AWT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	ASH WATER PUMP HOUSE
28.	FGD TRANSFORMER	FGDT–A FGDT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	FGD AREA
29.	FGD COMMON TRANSFORMER	FGDCT–A FGDCT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	FGD AREA
30.	LIGHTE HANDLING PLANT TRANSFORMER	LHPT–A LHPT–B	# kVA, 11/0.433kV, AN, 3Ph, Dyn11	LHP AREA

LEGEND

GENERATOR; THREE WINDING POWER TRANSFORMER WITH ON LOAD TAP CHANGER (OLTC); TWO WINDING TRANSFORMER WITH OLTC; TWO WINDING TRANSFORMER WITH REF & STANDBY E/F PROTECTION; AIR CIRCUIT BREAKER; MOULDED CASE CIRCUIT BREAKER DRAWOUT TYPE (MCCB); NC NORMALLY CLOSED; NO NORMALLY OPEN; MOULDED CASE CIRCUIT BREAKER FIXED TYPE (MCCB); CABLE GLAND; ONAN OIL NATURAL AIR NATURAL; FCBC (FLOAT CUM BOOST CHARGER); INTERLOCK; CONTACTOR

DG SET; NON SEGREGATED PHASE BUSDUCT; SEGREGATED PHASE BUSDUCT; ISOLATED PHASE BUSDUCT; SANDWITCH BUSDUCT; VACUUM CIRCUIT BEARKER; FUSE SWITCH UNIT; MOTOR EARTH SWITCH; SURGE ARRESTOR; NEUTRAL GROUNDING RESISTOR (NGR); 220V DC BATTERY; SOLIDLY EARTHED; AN AIR NATURAL EPOXY ENCAPSULATE, DRY TYPE TRANSFORMER; DOUBLE THROW POLE SWITCH

TABLE–1

MOTORS RATED ABOVE 1500 KW

SL.NO.	DESCRIPTION	LOCATION	QTY.	1 UA	1 UB	1 SA	1 SB	2 SA	2 SB	CHPS	FGDS
1.	MD BFP MOTOR	TG HALL	1			1					
2.	ID FAN MOTOR	ID FAN AREA	2	1	1						
3.	FD FAN MOTOR	BOILER AREA	2	1	1						
4.	PA FAN MOTOR	BOILER AREA	2	1	1						
5.	CW PUMP MOTOR	CW PUMP HOUSE	3	1	1				1		
6.	CE PUMP MOTOR	TG HALL	3	1	1			1			
7.	BCW PUMP MOTOR	BOILER AREA	1	1							
8.	CRUSHER MOTOR	CHP	4							4	
9.	ABSORBER RECIRCULATION PUMP MOTOR	FGD	2								2

TABLE–2

MOTORS RATED ABOVE 160 KW & UPTO 1500 KW

SL.NO.	DESCRIPTION	LOCATION	QTY.	UAS BUS–A	UAS BUS–B	SAS	CHPAS	AHPAS	BKRAS	FGDAS	DMPAS	RWAS
1.	ACW PUMP MOTOR	CW PUMP HOUSE	2	1	1							
2.	DRIP PUMP	TG HALL	2	1	1							
3.	MILL MOTOR	AROUND FURNACE	8						8			
4.	TG DMCW PUMP MOTOR	TG HALL	3	2	1							
5.	SG DMCW PUMP MOTOR	TG HALL	2	1	1							
6.	IAC MOTOR	CUMP HOUSE	3			3						
7.	SAC MOTOR	COMP HOUSE	3			3						
8.	BOILER FILL PUMP MOTOR	NEAR CSD	2			2						
9.	BAHP WATER PUMP	AHP	2					2				
10.	ASH SLURRY DISPOSAL PUMP MOTOR	AW PUMP HOUSE	9					9				
11.	BUNKER FEEDING CONV. MOTOR	BUNKER AREA	6						6			
12.	AHP/ESP WASH PUMP MOTOR	WTP	2								2	
13.	CT MAKEUP PUMP MOTOR	WTP	2								2	
14.	RAW WATER INTAKE PUMP MOTOR	RESERVOIR (E)	2									2
15.	OXIDATION AIR BLOWER MOTOR	FGD	2							2		
16.	WET BALL MILL MOTOR	FGD	2							2		
17.	VACUUM PUMP MOTOR	FGD	2							2		
18.	AHP INSTRUMENT COMPRESSOR MOTOR	AHP	2					2				
19.	CONVEYHORS	CHP	9				9					

REFERENCE DRAWINGS.

NOTES

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ZONE	MARK	PARTICULARS	DATE	CIVIL	MECH.	ELEC.	C&I	H.O.D.
	7							
	6							
	5							
	4							
	3							
	2	REVISED AS MARKED (ZONE D4)	27.05.2023					
	1	UPDATED FOR TENDER PURPOSE	27.12.2022					
	0	FOR TENDER PURPOSE ONLY	17.10.2022					

REVISIONS — APPROVED

SR. No. PARTY
PRINT DISTRIBUTION

CLIENT: HPGCL — HARYANA POWER GENERATION CORPORATION LTD.

CONSULTANT: DESEIN — DESEIN PRIVATE LIMITED, CONSULTING ENGINEERS, NEW DELHI, INDIA

PROJECT: 1x800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR

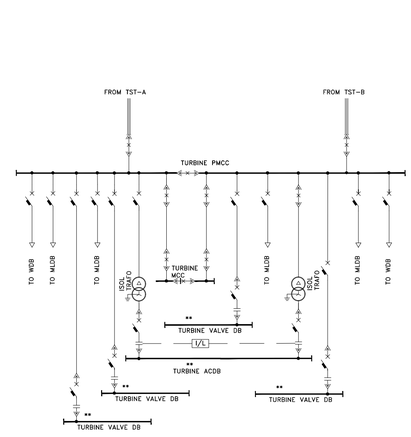
TITLE :– MAIN SINGLE LINE DIAGRAM

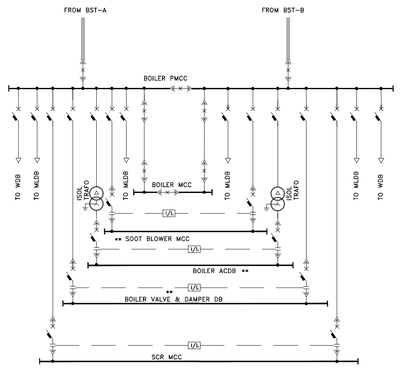
	NAME	SIGN.	DATE
CAD/DRAWN	MOTI RAM		17.10.2022
DESIGNED	VNG		17.10.2022
CHECKED	VNG		17.10.2022
SCALE	NTS		

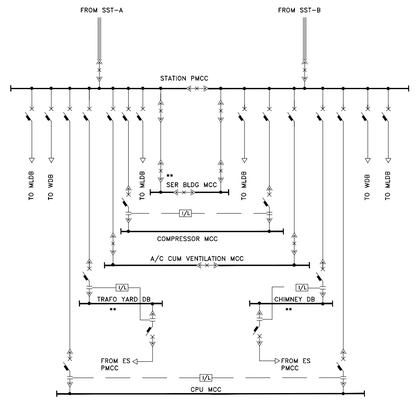
JOB. NO. D–04041

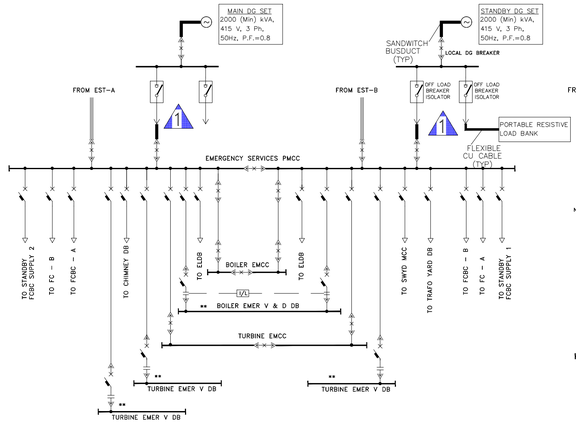
DWG. NO. 112–10–100 — REV. 1

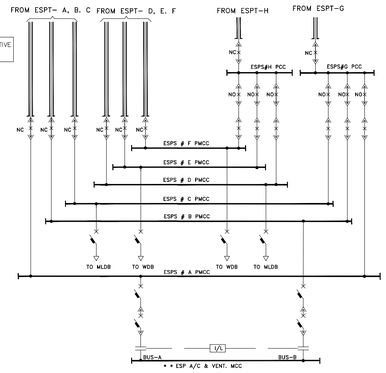
Sheet No. 01 OF 02

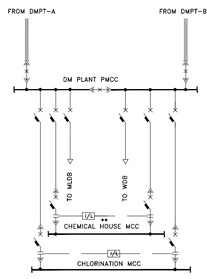


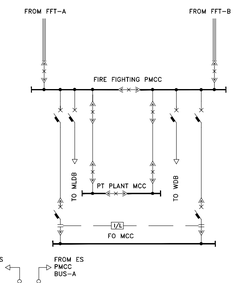


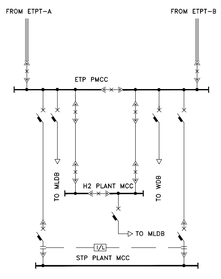


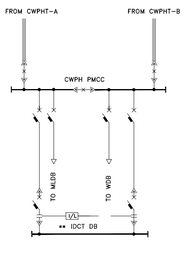


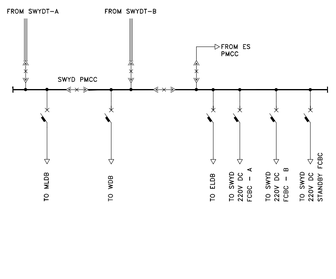


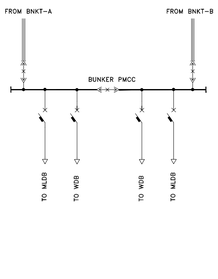


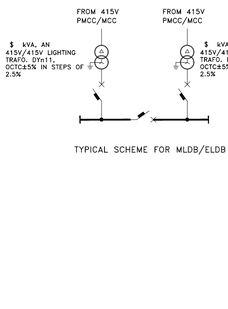












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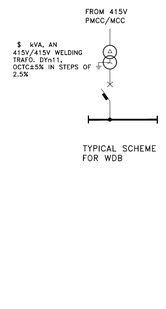

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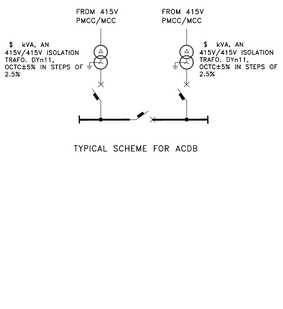

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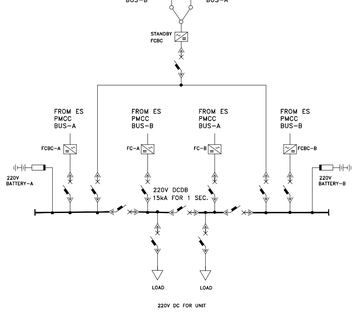

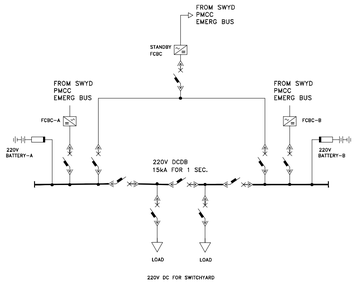

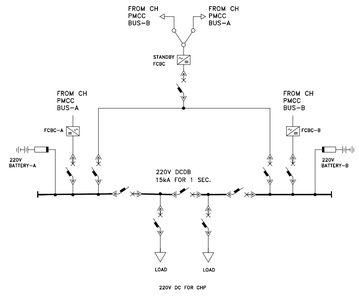

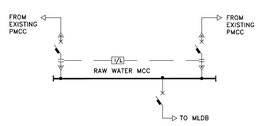

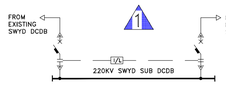

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	6							
	5							
	4							
	3							
	2	REVISED AS MARKED (ZONE G4, C3 & C4)	27.05.2023					
	1	UPDATED FOR TENDER PURPOSE	27.12.2022					
	0	FOR TENDER PURPOSE ONLY	17.10.2022					

APPROVED

CLIENT: HPGCL — HARYANA POWER GENERATION CORPORATION LTD.

CONSULTANT: DESEIN — DESEIN PRIVATE LIMITED
CONSULTING ENGINEERS, NEW DELHI, INDIA

PROJECT: 1x800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR

TITLE :- MAIN SINGLE LINE DIAGRAM

	NAME	SIGN.	DATE
CAD/DRAWN	MOTI RAM		17.10.2022
DESIGNED	VNG		17.10.2022
CHECKED	VNG		17.10.2022
SCALE	NTS		

JOB. NO. D-04041

DWG. NO. 112-10-100 — REV. 1

Sheet No. 02 OF 02

Attachment No. - 9

CONCRETE VOLUTE PUMPS

1.0 DESIGN AND CONSTRUCTION REQUIREMENTS

1.1 Design Criteria

1.1.1 The CW pumps shall be of concrete volute with concrete encasement, concrete draft tube, vertical shaft, constant speed, single entry, centrifugal or mixed flow design, with single stage impeller, suitable for continuous heavy duty.

1.1.2 The motor shall be mounted on the operating floor which is above maximum water level.

1.1.3 The pump shall have a flanged discharge connection. Further, the pumps shall be provided with the following parts as per the standard practice of the manufacturer:

Concrete Volute or metallic Volute, Concrete Draft tube or metallic draft tube embedded in concrete, A casing cover bolted to the upper part of the pump, A replaceable type sealing wearing ring bolted on to the suction part, Anchor bolts on the embedded parts, Steel set ring/ puddle flanges anchored in concrete and locked with reinforcements on the discharge side.

Embedded parts (cast or fabricated) in the concrete (i.e. cut water, suction part and upper part) shall be suitable for the quality of water being pumped.

1.2 Constructional Features

1.2.1 For concrete volute type design, the suction draft tube and pump volute casing shall be of cast-in-situ concrete construction. The draft tube and volute construction with prefabricated concrete elements are also permissible. For Metallic Volute type design, the Volute and the draft tube can either be cast steel/cast iron or fabricated carbon steel construction as per the standard practice of the manufacturer. The metallic draft tube shall be embedded on concrete.

1.2.2 The inner side of the pre-cast elements must be smooth & have a high degree of water tightness and shall confirm to following:

a) Reinforcing Steel Fe-415 conforming to IS: 1786.

b) Concrete Quality M30 conforming to IS: 456-2000.

c) Cement as per Civil Works Volume VI.

d) Concrete cover Minimum 50mm inner side and minimum 25mm outside.

e) Wall thickness According to structural calculation. Minimum 125 mm.

Cast iron trays of anchor bolts at suction side with steel anchors for suction wear ring and one steel foundation ring on discharge side for fixing the discharge wear ring must be integral part of the prefabricated elements.

1.2.3 Final finishing of the surface of the draft tube and volute shall be carried out by the bidder with epoxy paint/mortar so as to meet the surface finish as required by the pump manufacturer.

1.2.4 **Materials of Construction**

Material & construction of the pump & column shall be such as to resist corrosion & erosion and give a long and satisfactory life to the plant. The materials used in construction of the various components shall not be inferior to those given below:

a) Casing and draft tube: Cast in situ concrete/Pre-cast concrete elements for concrete volute type pumps

b) Impeller: Austenitic stainless-steel ASTM A743/CF 8M grade.

c) Wearing rings: Stainless steel of suitable grade as per manufacturer's proven practice.

d) Pump shaft: Hardened stainless steel conforming to ASTM A 276 Grade 410

e) Shaft sleeve Stainless steel ASTM A276 grade 410 hardened as per manufacturer's proven practice.

f) Cut water: Ni resist Cast Iron

g) Casing cover: Fabricated steel or 2% Ni cast Iron, D2 type

h) Shaft coupling: Stainless steel ASTM A 276 grade 410.

i) Bearing: Babbited with oil lubrication.

j) Bolts, nuts, and lock washers: Stainless steel AISI type 304 coming in contact with water and others of high-tension carbon steel.

k) Gland packing: Impregnated Teflon.

l) Stuffing box housing IS: 210 grade 260, 2% Ni Cast Iron.

1.2.5 **Wearing Rings & Shaft Sleeves**

Replaceable wearing rings/ liners shall be provided between impeller and casing. The suction wearing ring /liner shall be bolted in a holder which shall be grouted in concrete with non-shrinking mortar. During grouting of this ring, the top section shall be grouted with two pack moulding mass of synthetic resin, minimum layer thickness 3 mm to provide watertight finish.

The diametrical clearance between casing and impeller wearing ring(s) when the pump is new shall not be less than 1.2 mm.

Casing wearing ring at suction shall be held in a metallic carrier grouted in concrete and wearing rings shall be removable from the carrier. Suitable shaft sleeves shall be provided between the shaft and impeller to protect the shaft.

1.2.6 **Sealing Arrangement**

A mechanical seal or stuffing box with packing flushed with water shall be provided in line with the standard practice of the manufacturer. A seal flushing system shall be provided which will supply the glands with flushing water both during pump start-up/shutdown and while the pump is running.

The seal flushing water shall be filtered by the provision of 2x100% basket type strainers with isolation valves for each pump set. Bidder shall make necessary arrangement for proper drainage of the seal area by providing drainage pumps. Mechanical seal (if provided) of cartridge construction type, shall be of approved design. 2x100% capacity seal water pumps shall be provided for each CW pump.

1.2.7 **Journal Bearings**

The guide bearings for CW pump shall be of journal bearing type with babbitt lined bronze bearing sleeve located as close to the impeller as possible. The guide bearing & thrust bearing shall be protected against water splashes and gland packing leaks. The bearings housing shall be of axially split design and designed to exclude the ingress of dust and water and shall have suitable provision for breathing and be adequately sealed to prevent leakage of oil. It shall be out of water, cooled & lubricated by self-circulated oil. The bush bearings (if provided) shall be lubricated with filtered pump fluid.

1.2.8 **Pump Shaft**

The shaft shall be designed to transmit the maximum rated power at the pump operating speed and shall be of ample stiffness to minimize deflection of the shaft during starting conditions or any other operating condition. Where the pump shaft is exposed to water (i.e.) to effects of corrosion, it shall be adequately protected by replaceable sleeves.

1.2.9 **Lubrication System**

Material of construction of cooling coils if fitted shall be of Stainless steel. All associated pipe work shall be of stainless steel. Required level sensors shall be provided for measurement/interlock & alarm purpose.

1.2.10 **Gland Drainage**

Four (4) Drain pumps (draining for the gland area) shall be provided in the CW pump house. The minimum capacity of each pump shall be 50 m^3/hr & the corresponding head shall not be less than 20 MWC.

1.2.11 **Manhole**

Each pump shall be equipped with an inspection manhole (Minimum diameter of 1000 mm) with steel cover plate at discharge side. Suitable access provision shall be made for the manhole from the operating floor.

1.2.12 **Vibration limits**

The maximum vibration limits of the pumps set when measured at locations as indicated in HIS shall not exceed 25 microns.

2.0 TECHNICAL REQUIREMENTS OF ELECTRO-HYDRAULIC ACTUATORS

2.1 DESIGN CRITERIA

2.1.1 Each electro-hydraulic actuator shall be provided with its own power pack. Each actuator shall consist of a double acting cylinder, control cabinet and accessories to cater for following operational requirements.

2.1.2 In the closed position the valve shall be held closed by a substantial counterweight or by any other mechanical device. Valve shall remain open during normal running of the pump.

2.1.3 A limit switch be provided (set at about 3^0 from open position) to sense the creeping. Switch shall start the oil pump and return the valve to the fully open position.

2.1.4 When the valve is fully open and electric supply in the valve control system fails the butterfly valve shall remain open while the CW pump continues to deliver water.

2.1.5 In case of any fault causing pump motor trip the corresponding butterfly valve shall start closing at a fast rate initially and thereafter at a slow rate. The emergency closing facilities shall be duplicated each with its own solenoid valve in the hydraulic circuit.

2.1.6 Provision for local manual operation shall be made. A locking device shall be provided.

2.1.7 The hydraulic controls for each valve shall be housed in independent cabinet located on an operating floor near the valve. This shall consist of pumping unit, oil tank, and accumulator of adequate capacity to hold the valve disc at any position and to prevent any surge including disc flutter during valve travel and to fully open position.

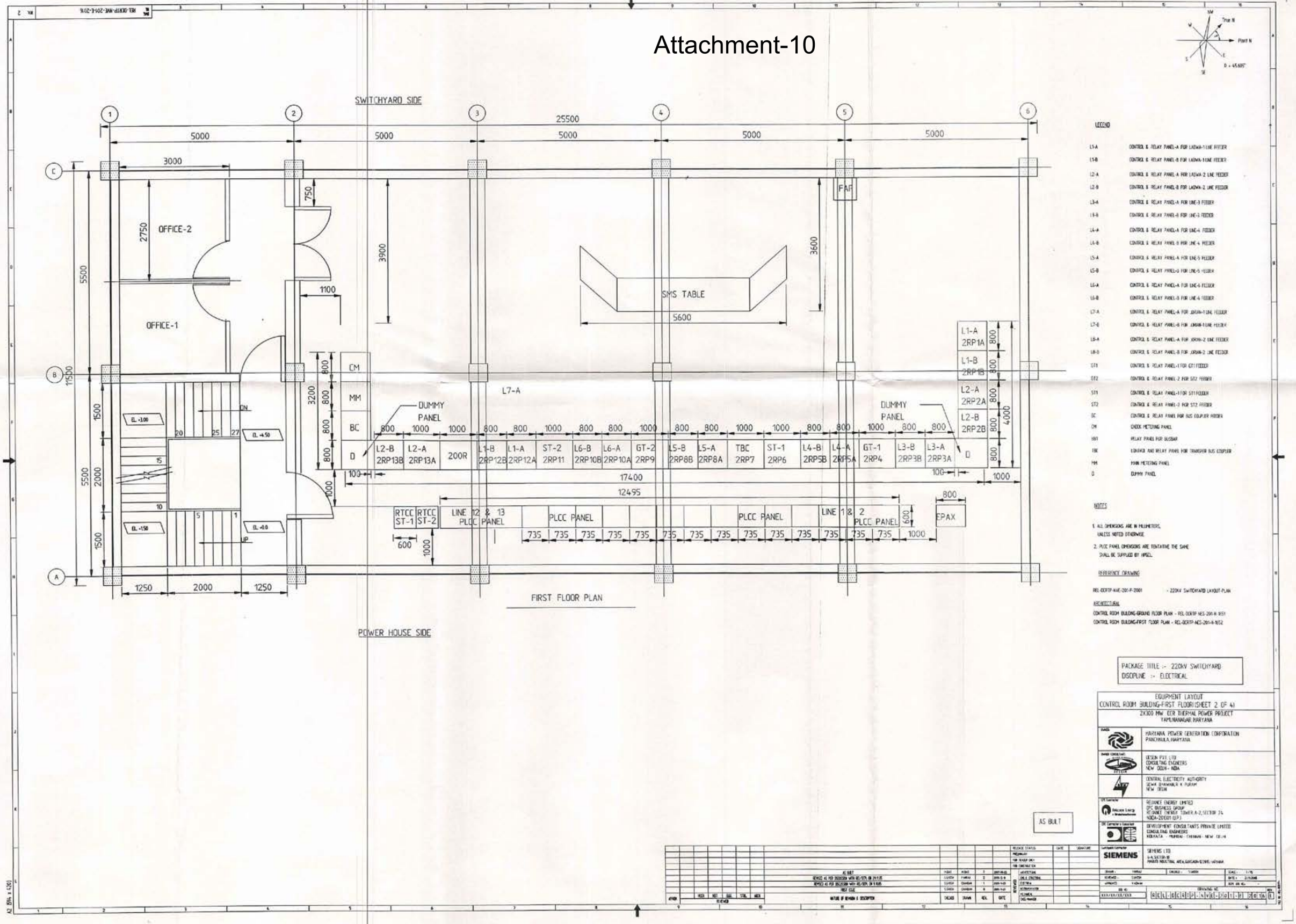
Accumulator will also have enough capacity for one cycle (open & close operation) of operation without external electric AC power. The hydraulic power pack will consist of all its associated equipment/system.

2.1.8 The electrical controls shall be housed in the common control panel (local) for CW pumps or in a separate panel. Reversible starters for the valves shall also be provided.

2.1.9 Each butterfly valve shall have four limit switches, each capable of being set of at any point between full open to full close position. In addition, one more extra limit switch to be set at an intermediate position shall be provided. Each limit switch shall have 2 NO and 2 NC contacts. Limit switch enclosure shall conform to NEMA 4 x standard.

2.1.10 Each butterfly valve shall have two nos. non-contact type 24 V DC 4-20 mA output.

Attachment-10



LEGEND

L1-A	CONTROL & RELAY PANEL-A FOR LADWA-1 LINE FEEDER
L1-B	CONTROL & RELAY PANEL-B FOR LADWA-1 LINE FEEDER
L2-A	CONTROL & RELAY PANEL-A FOR LADWA-2 LINE FEEDER
L2-B	CONTROL & RELAY PANEL-B FOR LADWA-2 LINE FEEDER
L3-A	CONTROL & RELAY PANEL-A FOR LINE-3 FEEDER
L3-B	CONTROL & RELAY PANEL-B FOR LINE-3 FEEDER
L4-A	CONTROL & RELAY PANEL-A FOR LINE-4 FEEDER
L4-B	CONTROL & RELAY PANEL-B FOR LINE-4 FEEDER
L5-A	CONTROL & RELAY PANEL-A FOR LINE-5 FEEDER
L5-B	CONTROL & RELAY PANEL-B FOR LINE-5 FEEDER
L6-A	CONTROL & RELAY PANEL-A FOR LINE-6 FEEDER
L6-B	CONTROL & RELAY PANEL-B FOR LINE-6 FEEDER
L7-A	CONTROL & RELAY PANEL-A FOR JORAN-1 LINE FEEDER
L7-B	CONTROL & RELAY PANEL-B FOR JORAN-1 LINE FEEDER
L8-A	CONTROL & RELAY PANEL-A FOR JORAN-2 LINE FEEDER
L8-B	CONTROL & RELAY PANEL-B FOR JORAN-2 LINE FEEDER
GT1	CONTROL & RELAY PANEL-1 FOR GT1 FEEDER
GT2	CONTROL & RELAY PANEL-2 FOR GT2 FEEDER
ST1	CONTROL & RELAY PANEL-1 FOR ST1 FEEDER
ST2	CONTROL & RELAY PANEL-2 FOR ST2 FEEDER
BC	CONTROL & RELAY PANEL FOR BUS COUPLER FEEDER
CM	CHECK METERING PANEL
MBB	RELAY PANEL FOR BUSBAR
TBC	LOCKING AND RELAY PANEL FOR TRANSFER BUS COUPLER
MM	MAIN METERING PANEL
D	DUMMY PANEL

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.
2. PLCC PANEL DIMENSIONS ARE TENTATIVE THE SAME SHALL BE SUPPLIED BY HPGCL.

REFERENCE DRAWING

REL-DCRTP-MVE-201-F-2001 - 220KV SWITCHYARD LAYOUT PLAN

ARCHITECTURAL

CONTROL ROOM BUILDING-GROUND FLOOR PLAN - REL-DCRTP-MES-201-A-1051
CONTROL ROOM BUILDING-FIRST FLOOR PLAN - REL-DCRTP-MES-201-A-1052

PACKAGE TITLE :- 220kV SWITCHYARD
DISCIPLINE :- ELECTRICAL

EQUIPMENT LAYOUT
CONTROL ROOM BUILDING-FIRST FLOOR (SHEET 2 OF 4)
2X300 MW IGR THERMAL POWER PROJECT
YAMUNANAGAR HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA

OWNER CONSULTANT: DESIN (P) LTD CONSULTING ENGINEERS NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN R.K. PURAM NEW DELHI

EPC CONTRACTOR: RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)

EPC CONTRACTOR'S CONSULTANT: DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI

EQUIPMENT SUPPLIER: SIEMENS LTD B-4, SECTOR-57 PARWO INDUSTRIAL AREA, GURGAON-122015, HARYANA

AS BUILT

RELEASE STATUS	DATE	SIGNATURE
PRELIMINARY		
FOR TENDER ONLY		
FOR CONSTRUCTION		
AS BUILT		

REVISED	CHECKED	APPROVED
DESIGN		
ELECTRICAL		
CIVIL & STRUCTURAL		
MECHANICAL		
PIPING		
C&I		

SCALE	DATE
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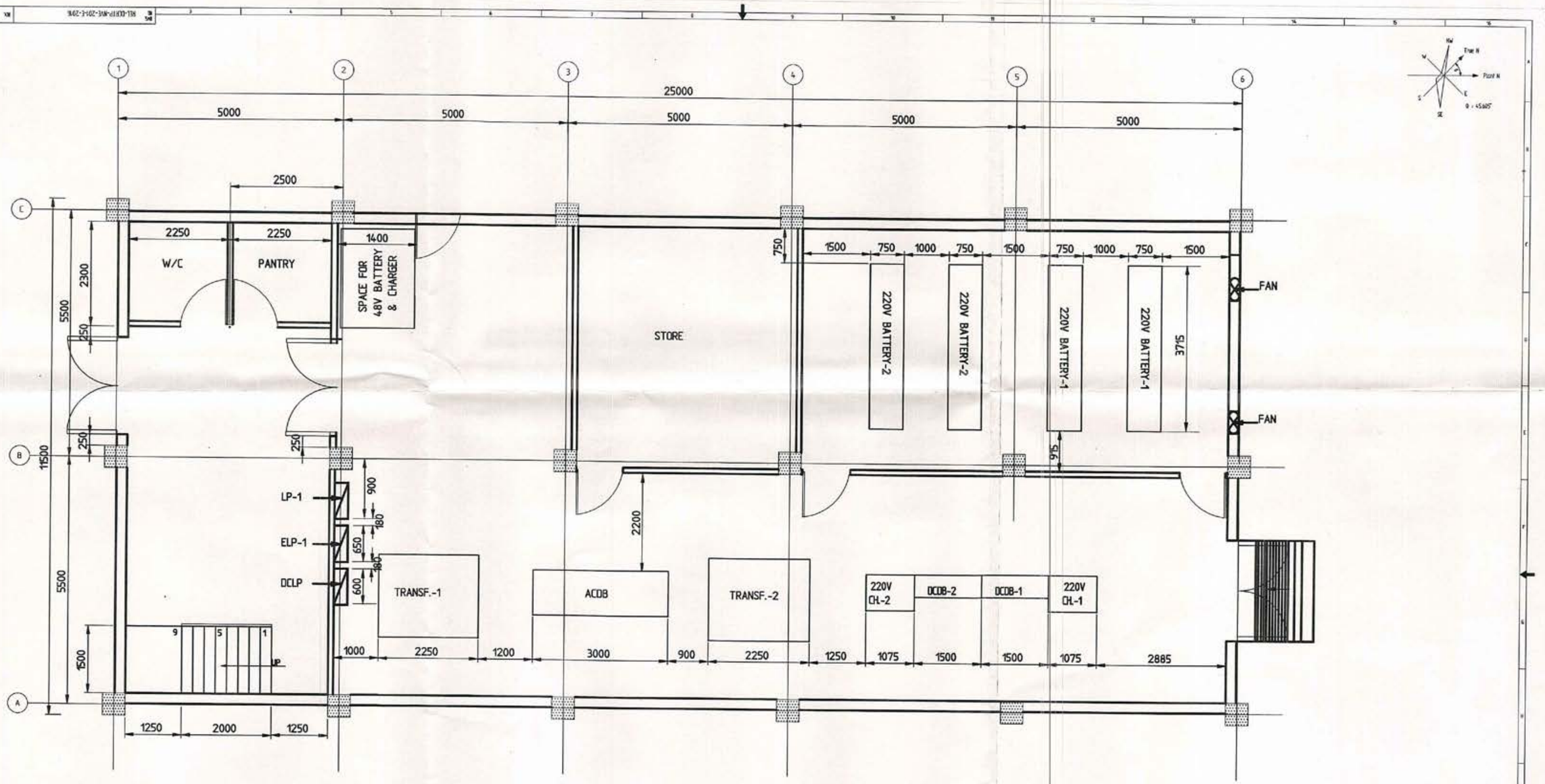
DRAWING NO.: REL-DCRTP-MVE-201-F-2001 (0)



POWERHOUSE SIDE

GROUND FLOOR PLAN

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.
2. PLANT GRADE LEVEL= 270.00M. AND CONTROL ROOM BLD. FFL.=270.50M IN GROUND FLOOR.
3. 48V BATTERY & BATTERY CHARGER PANEL DIMENSIONS HAVE BEEN SUPPLIED BY HPGCL.

REFERENCE DRAWING

1. REL-DCRTP-NVE-201-F-2001 - 220KV SWITCHYARD LAYOUT-PLAN
2. ARCHITECTURAL
   CONTROL ROOM BUILDING-GROUND FLOOR PLAN - REL-DCRTP-NVS-201-C-2032
   CONTROL ROOM BUILDING-FIRST FLOOR PLAN - REL-DCRTP-NVS-201-C-2033

LEGEND

ACDB	- AC DISTRIBUTION BOARD
DCDB	- DC DISTRIBUTION BOARD
TRAFO	- DRY TYPE TRANSFORMER
CH	- BATTERY CHARGER

AS BUILT

PACKAGE TITLE :- 220kV SWITCHYARD
DISCIPLINE :- ELECTRICAL

CONTROL ROOM BUILDING
EQUIPMENT LAYOUT- GROUND FLOOR (SHEET 1 OF 4)
2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
BHEL CONSULTANT	DESEN PVT. LTD. CONSULTING ENGINEERS NEW DELHI - INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R. K. PURAM NEW DELHI
EPC Contractor	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
EPC Contractor's Consultant	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
Turbine Generator	SIEMENS LTD. 6-A, SECTOR-18 MAHATMA INDUSTRIAL AREA, GURGAON-122015, HARYANA

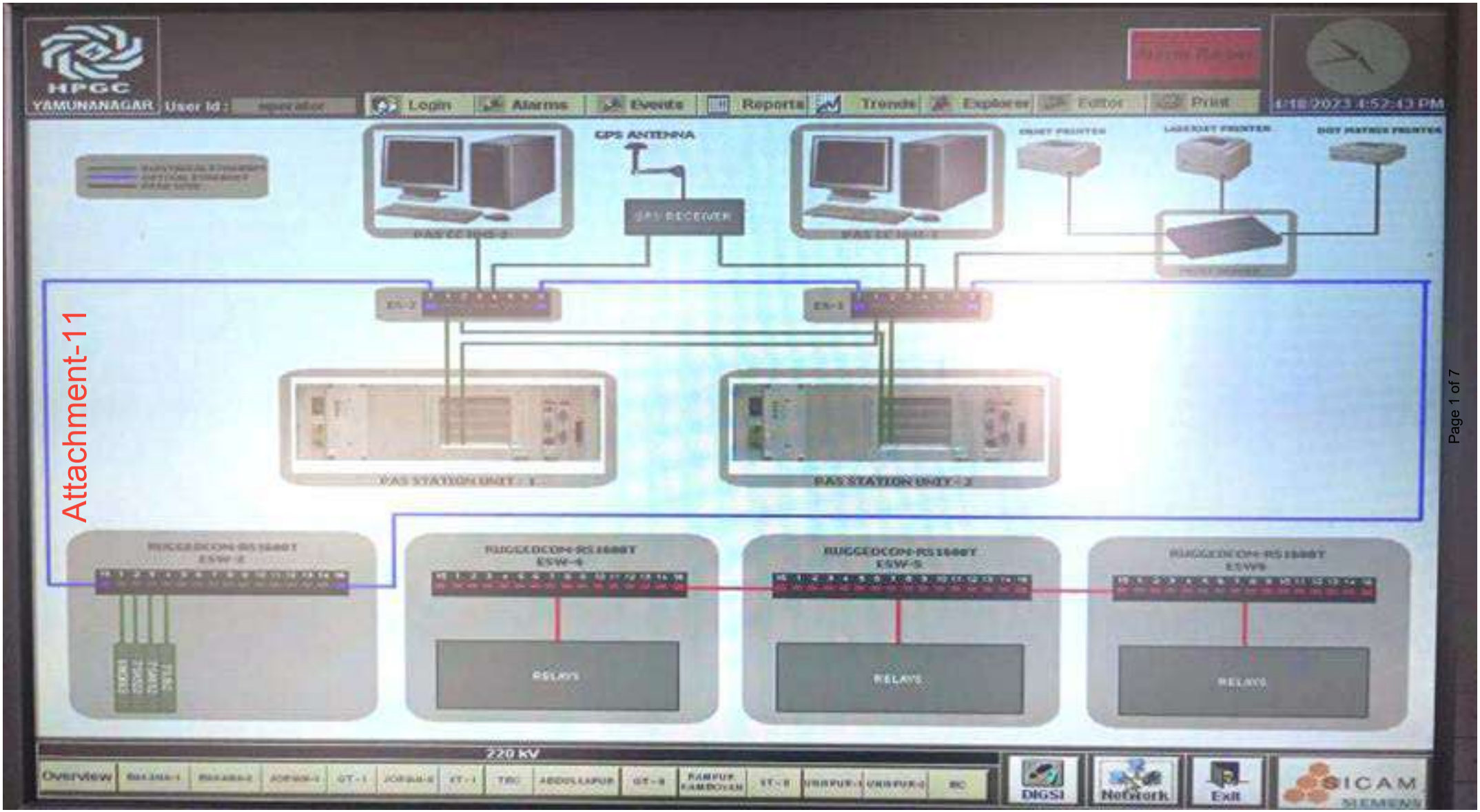
DESIGN : DESIGN	CHECKED : CHECK	SCALE : 1:75
REVIEWED : SUPER		DATE : 2005-04-25
APPROVED : MANAGER		DOCU. NO. NO. : -
JOB NO. XXX/XX/XX/XXX	DRAWING NO. BEL-DCRTP-NVE-201-E-2016	REV. 1

REV	DATE	NATURE OF REVISION & DESCRIPTION	DESIGN	DRAWN	CHECKED	APPROVED
0	2005-10-03	FIRST ISSUE	DESIGN	DRAWN	CHECK	MANAGER
1	2006-01-06	ORIGINALLY APPROVED	DESIGN	DRAWN	CHECK	MANAGER
2	2006-06-05	REVISED AS PER HPGCL COMMENTS VIDE LETTER NO.26/67 DT. 21.04.2006	DESIGN	DRAWN	CHECK	MANAGER
3	2007-01-12	AS BUILT	DESIGN	DRAWN	CHECK	MANAGER

RELEASE STATUS: PRELIMINARY / FOR TENDER ONLY / FOR CONSTRUCTION / AS BUILT — DATE: 12/04/2007

REVISED: ARCHITECTURAL, CIVIL & STRUCTURAL, ELECTRICAL, INSTRUMENTATION, MECHANICAL, OTHERS

A2 (594 x 420)



Attachment-11

PORT1
PORT2
PORT3
PORT4
PORT5
PORT6
PORT7
PORT8
POWER
RESET
PORT1
PORT2
PORT3
PORT4
PORT5
PORT6
PORT7
PORT8

RUGGEDCOM
INDUSTRIAL STRENGTH NETWORKS™

- Protection IED'S using IEC 61850, IEC 60870-5-103 protocol
- Established standard communication (Master)

High Availability:

- Robust and immune to electrical disturbances, proven in various type tests
- Fast and convenient diagnosis using integrated tools ensuring shortened repair times
- Long life cycle by virtue of high integration density and modern production technologies

Optimised Operation Management:

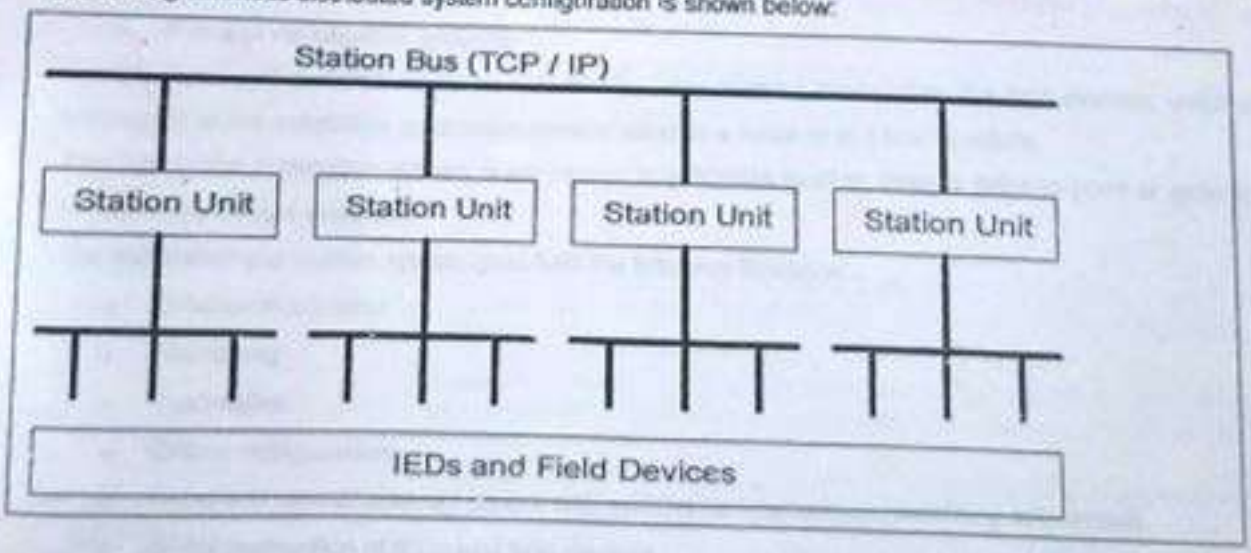
- Real time process information
- Processing functions dedicated to the power automation tasks
- High speed and efficient communication
- Simple and secure operation due to intuitive user interface

Convenient Design:

- User can use own staff for system configuration
- Various configuration options of the different system components
- Large control systems can be engineered in a step by step fashion (bottom-up configuration)
- Data import functionality means reduction of parameterisation
- Data import functionality ensures data consistency

1.1.1 Architecture

The substation automation system itself must be a distributed system, so that it will fit a distributed plant design. It must be ensured that the substation automation system will be able to "grow" according to future expansions or requirements. It must therefore have a scalable software and hardware structure. A typical diagrammatic distributed system configuration is shown below:



The monitoring and control functions (HMI) must be part of the substation automation system.

The specific functions of the substation automation system must be combined with those of a programmable logic controller system and equipped with the communication possibilities of the information technology world of today.

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2.3 Redundant Connection of Bay Devices

SICAM PAS supports the redundant connection of bay devices and substations.

Bay devices which communicate via PROFIBUS FMS or via the IEC 61850 protocol can be connected simultaneously to two SICAM PAS Station Units. This also refers to substations with two telecontrol interfaces based on the IEC 60870-5-101 protocol.

SICAM PAS CC can also be designed as a redundant control and display system.

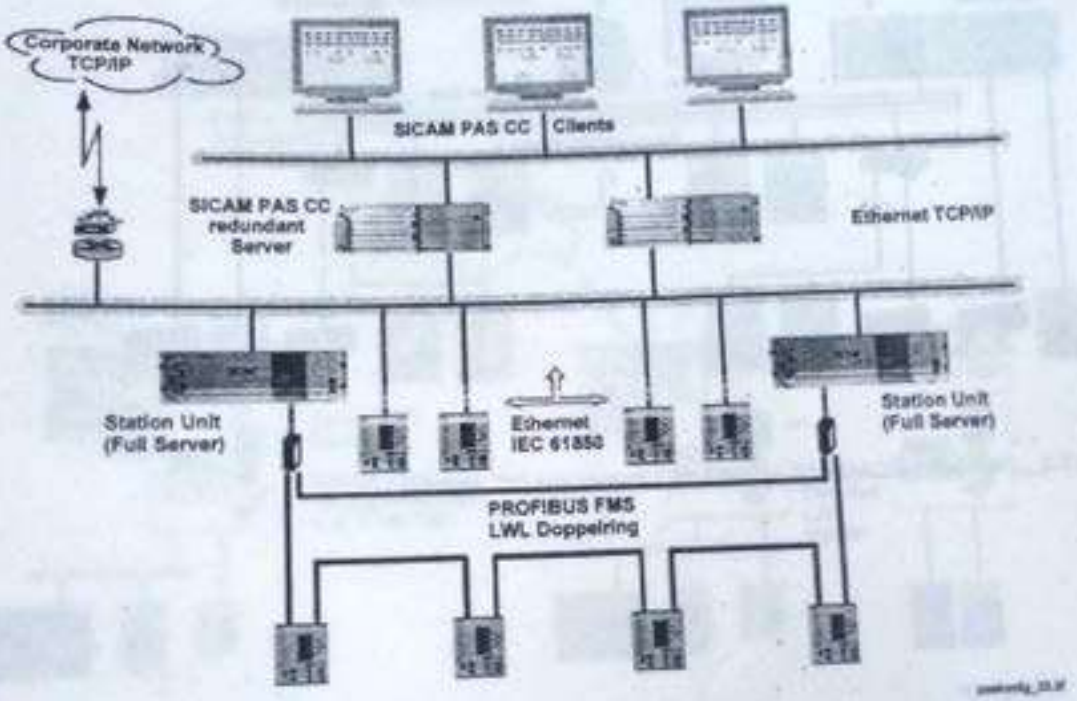


Figure 2-3 SICAM PAS station bus configuration with a redundant connection of the bay devices via OLM and the redundant SICAM PAS CC

Sub: - Revival of GPS clock and communication of 220 KV Switchyard data between Switchyard and Unit-1 & 2 control room.

Ref: Your office Memo No. Ch-400/C&I-102/Vol-VI Dated 06.08.2015

With reference to above, it is requested to maintain the original system to make functionally of GPS slave clock installed at 220 KV Switchyard.

The following information supplied by M/s Siemens regarding communication of switchyard data to Unit-1 & 2 is as under-

1. Protocol- IEC 60870-5-101
2. Port- Com 2
3. Baud Rate- 600 bps
4. Link Address-1
5. ASDU Address- 1
6. Transmission Mode- Unbalanced
7. Length of Link Address- 2 octet
8. Length of IO Address- 2 octet
9. Originator Address-1 octet
10. Max Telegram Address- 255
11. Single Character Ack- No

9/9/15
XEN/EMD-II
DCRTPP, HPGCL
Yamuna Nagar

9/9/15

CC:

1. SE/O&M-I DCRTPP, HPGCL, Yamuna Nagar
2. SE/O&M-II, DCRTPP, HPGCL, Yamuna Nagar

SIEMENS

FRONT VIEW FOR 220KV BUS BAR PROTECTION PANEL PANEL REF: 200R

Attachment-12

	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE
	SITE CORRECTED	MS	MS	KM	C	22.06.07
	QT CORRECTED	RSU	MS	VS	B	14.03.07
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06

ELEC.
APPROV.

RELEASE STATUS
PRELIMINARY
FOR APPROVAL
FOR CONSTRUCTION
SIGNATURE
REVISED
ELECTRICAL
ENGG. MANAGER

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PRIVATE LTD.
CONSULTING ENGINEERS
NEW DELHI – INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

Reliance Energy: RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

DCL: DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

SIEMENS: 220kV Switchyard Contractor
SIEMENS LTD, Plot-6A, Sector-18
Maruti Industrial Area, GURGAON

SIEMENS: SIEMENS LTD, Plot-6A, Sector-18
Maruti Industrial Area, GURGAON

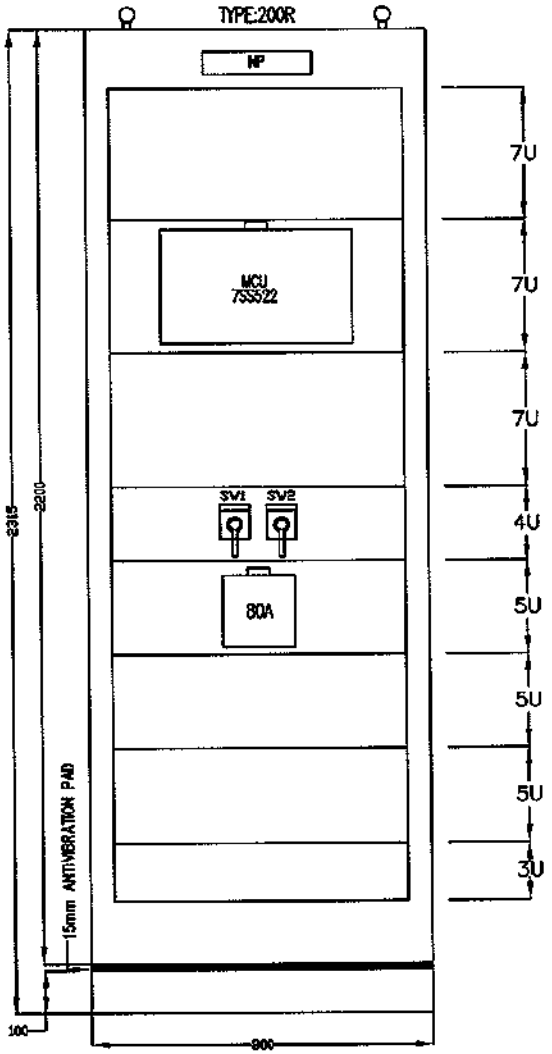
SALES REF: 5000420692

SCALE: NTS

DRG NO.
K4J-G719EA-UG911-F200

REV. C

FUNC. REF.	DESCRIPTION	TYEP
MCU	MASTER CONTROL UNIT	7SS522
80A	DC SUPERVISION RELAY	AR121T
SW1	BUSBAR–I IN–OUT SWITCH	SWITCH
SW2	BUSBAR–II IN–OUT SWITCH	SWITCH



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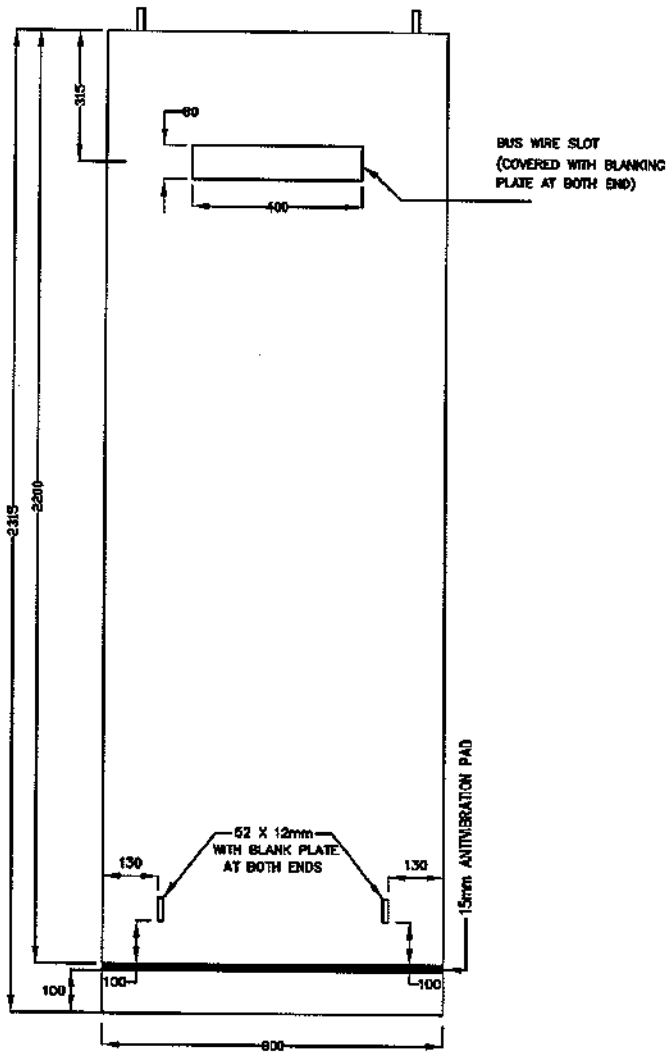
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL / ENGG. MANAGER	

TITLE	FRONT VIEW OF BUSBAR NP
CIRCUIT	220KV BUSBAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
ENGG CONSULTANTS	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
Reliance Energy	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot–6A, Sector–18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot–6A, Sector–18 Maruti Industrial Area, GURGAON
SALES REF: 9000420692	SCALE:NTS
DRG NO. (14)-G719EA-UG011-F203	SHT 01
REV. C	CONT 02



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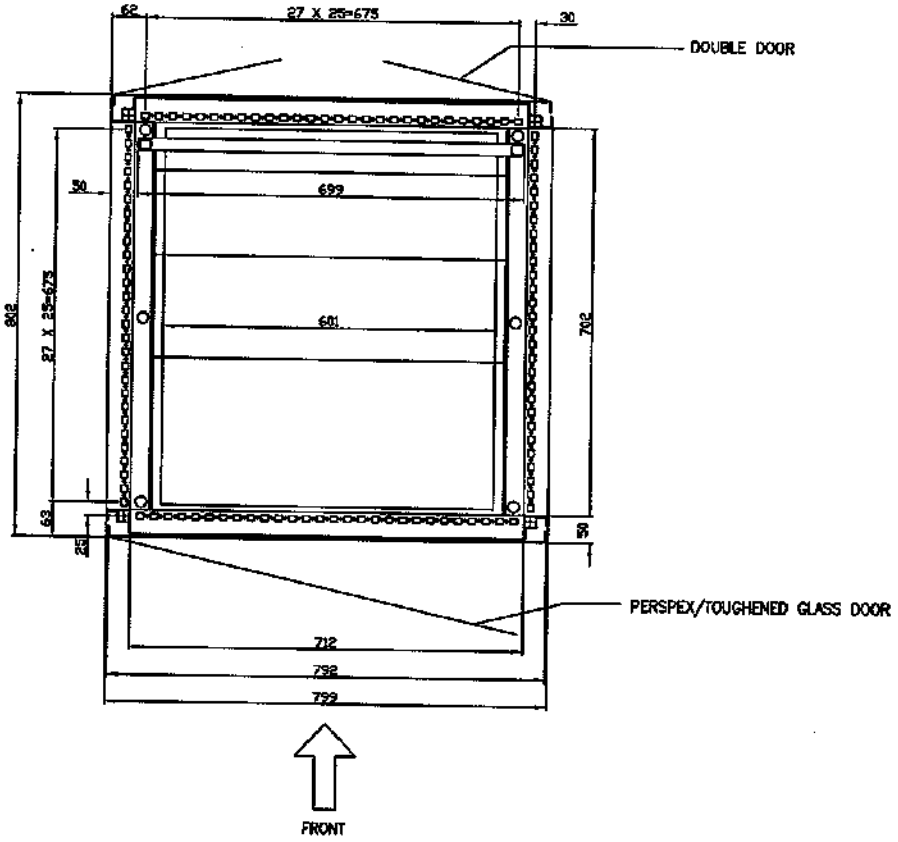
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL; ENGG. MANAGER	

TITLE	SIDE VIEW
CIRCUIT	220KV BUS BAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
OWNER'S CONSULTANT	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI - INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
Reliance Energy	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SALES REF.	5000420692 SCALE: NTS
DRG NO.	(4)-G719EA-UG911-F20C SHT 02
REV.	C CONT 03



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	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL / ENGG. MANAGER	

TITLE	PANEL FIXING PLAN
CIRCUIT	220KV BUS BAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
Reliance Energy	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot-8A, Sector-18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot-8A, Sector-18 Maruti Industrial Area, GURGAON
SALES REF:	S0004206892
DRG NO.	(4)-G719EA-UG911-F200
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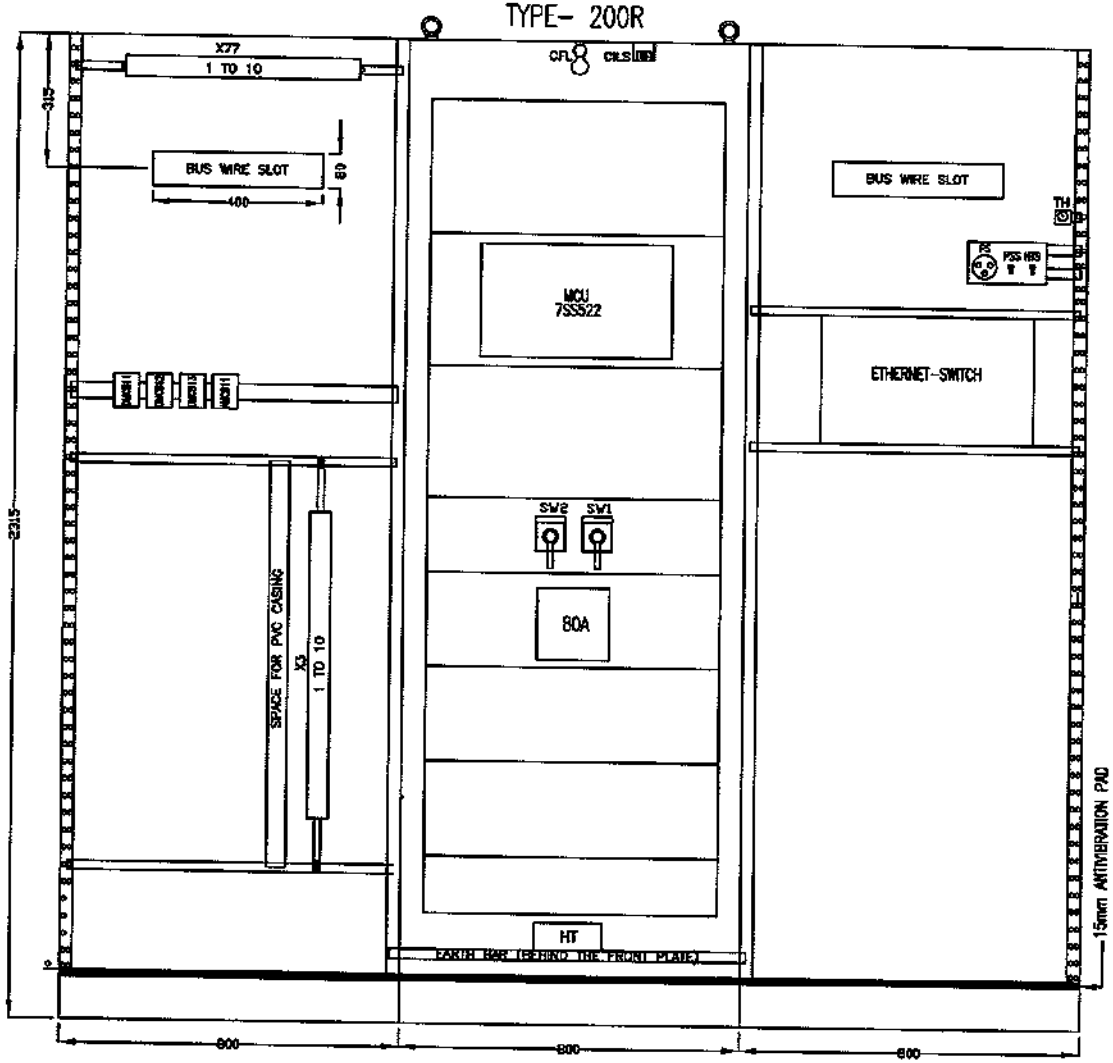
SHT 03	CONT –



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ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL; ENGG. MANAGER	

TITLE	INTERNAL VIEW OF BUSBAR RP
CIRCUIT	220KV BUSBAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SALES REP: 8000420692	SCALE: NTS
DRG NO. (4)-C719EA-UG911NT200	SHT 01
REV. C	CONT 00

SIEMENS

EQUIPMENT LIST FOR 220KV BUS BAR PROTECTION PANEL PANEL REF: 200R

	SITE CORRECTED	MS	MS	KM	C	22.08.07	RELEASE STATUS	SIGNATURE
	QT CORRECTED	RSU	MS	VS	B	14.03.07	PRELIMINARY	
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL	
APPROV.							ENGG. MANAGER	

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

DESEIN PRIVATE LTD.
CONSULTING ENGINEERS
NEW DELHI – INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

SIEMENS — 220kV Switchyard Contractor
SIEMENS LTD, Plot-6A, Sector-18
Maruti Industrial Area, GURGAON

SIEMENS — SIEMENS LTD, Plot-6A, Sector-18
Maruti Industrial Area, GURGAON

SALES REF: S000420692 — SCALE: NTS

DRG NO.
(4)-G719EA-UG911-E200

REV. C

SIEMENS

EQUIPMENT LIST 220KV BUSBAR RP (Panel Type : 200R)

Tune Ref	Brief Description	Specification	Make	DM	Type	Qty/Set
		FRONT MOUNTED EQUIPMENTS				
MCU	MASTER CONTROL UNIT Bay unit with built in LBB protection	Distributed BusBar Protection Master Unit Auxiliary voltage: 220V DC Size: 1/1 19" IEC 61850 MLFB-7SS5220-5AB92-1BA0-FF/LOR suitable for panel flush mounting	SIEMENS	3	7SS522	1
80A	DC CIRCUIT SUPERVISION RELAY	ELEMENT ONE: 220V DC,2M2B,S/R REVERSE FLAG,TIME SLAG ELEMENT TWO: 220V DC,2M2B,S/R REVERSE FLAG,TIME SLAG CASE: 2/3V W.D : 8112W00009	EASUN REYROLLE	3	AR121T3X2	1
SW1	Bus Bar-I ' in-out' selector switch	Handle: PISTOL GRIP Position: IN/OUT, Stayput (4 BAYS IN POSITION + 4 BAYS OUT POSITION)	SWITRON	3	SPC32P	1
SW2	Bus Bar-II ' in-out' selector switch	Handle: PISTOL GRIP Position: IN/OUT, Stayput (4 BAYS IN POSITION + 4 BAYS OUT POSITION)	SWITRON	3	SPC32P	1
		INTERNALLY MOUNTED EQUIPMENTS				
HT	Space heater	100W,240V AC	APT	1		1
HTS	ON/OFF switch	15 A	CONTROL			
PS	Power socket	5/15A, 3Pin	Anchor	1		1
TH	Thermostat	25-75 deg cent	Anchor	1		1
PSS	ON/OFF switch	15 A	APT	1		1
CFL	COMPACT FLUORESCENT LAMP	240V AC	Anchor	1		1
			PHILIPS	1		1
CILS	Cubicle door operated switch	Limit Switch(1No+2NC) -3SE30230A	SIEMENS	1		1

Dis: 1- W Stock, 2- W non stock, 3- W non stock others, 4- Project Supply, 5- Loose Supply

Client : **RELIANCE ENERGY LIMITED**
Project : **2X300MW DCR THERMAL POWER PROJECT YAMUNA NAGAR,HARYANA**
Contractor : **SIEMENS**

Sales Ref : 3000420692

Item No : | **Qty :** 1

Description :- Equipment List

Circuit: 220 kV BUSBAR PROTECTION

				Date : 15.01.06
C	SITE CORRECTED	22.08.07	KM	Prep : PKA
B	QT CORRECTED	0	VS	Ckd : MS
A	AS PER CLIENT COMMENTS	11.07.06	BS	App: RSU
Issue	Remarks	Date	Name	SIEMENS

Original/Replacement for/

Replaced by :-

(4)-G1719EA-UG911-E200-C

SIEMENS

EQUIPMENT LIST 220KV BUSBAR RP (Panel Type : 200R)

Equip Ref	Description	Specification	Make	Dis	Type	Qty/Panel
DMCB11	DC MCB DOUBLE POLE AUX.CONTACT:1NC	16A	LEGRAND	3		1
DMCB12/13	DC MCB DOUBLE POLE AUX.CONTACT:1NC	4A	LEGRAND	3		2
AMCB11	AC MCB SINGLE POLE & NEUTRAL AUX.CONTACT:1NC	16A	LEGRAND	3		1
ES	ETHERNET SWITCH	RS1600	RUGGEDCOM	3		1

Dis: 1- W Stock, 2- W non stock, 3- W non stock others, 4- Project Supply, 5- Loose Supply

Client : RELIANCE ENERGY LIMITED
Project : 2X300MW DCR THERMAL POWER PROJECT YAMUNA NAGAR,HARYANA
Contractor : SIEMENS

Issue	Remarks	Date	Name	
C	SITE CORRECTED	22.08.07	KM	Date : 15.01.06
B	QT CORRECTED	14.03.07	VS	Prep : PKA
A	AS PER CLIENT COMMENTS	11.07.06	BS	Ckd : MS
				App: RSU

SIEMENS

Original/Replacement for/
Replaced by :-

Sales Ref : 3000420692

Item No : | **Qty : 1**

Description :- Equipment List

Circuit: 220 kV BUSBAR PROTECTION

(4)-G1719EA-UG911-E200-C

SIEMENS

SCHEMATIC DRAWINGS FOR 220KV BUS BAR PROTECTION PANEL PANEL REF: 200R

	SITE CORRECTED	MS	MS	KM	C	22.08.07	RELEASE STATUS	SIGNATURE
	QT CORRECTED	RSU	MS	VS	B	14.03.07	PRELIMINARY	
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL / ENGG. MANAGER	

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

DESEIN PRIVATE LTD.
CONSULTING ENGINEERS
NEW DELHI – INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

SIEMENS — 220kV Switchyard Contractor
SIEMENS LTD, Plot-6A, Sector-18
Maruti Industrial Area, GURGAON

SIEMENS — SIEMENS LTD, Plot-6A, Sector-18
Maruti Industrial Area, GURGAON

SALES REF: 3000420692

SCALE: NTS

DRG NO.
(4)-G719EA-UG911-W200

REV. C

LIST OF DRAWINGS

00 LIST OF DRAWINGS
01 LEGEND
02 SYSTEM SINGLE LINE DIAGRAM
02A SYSTEM SINGLE LINE DIAGRAM
03 DC SUPPLY–1 CIRCUIT
04 AC SUPPLY DISTRIBUTION
05 DC SUPPLY SUPERVISION
06 CENTRAL UNIT CONTACT DISTRIBUTION.
07 FIBRE OPTIC CABLE DISTRIBUTION.
08 FIBRE OPTIC CABLE DISTRIBUTION.
09 SELECTOR SWITCH CONTACT DISTRIBUTION
10 COMMUNICATION TO PAS

	SITE CORRECTED	NS	MS	KM	C	22.06.07	RELEASE STATUS	SIGNATURE
	GT CORRECTED	RSU	MS	VS	B	14.03.07	PRELIMINARY	
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL / ENGG. MANAGER	

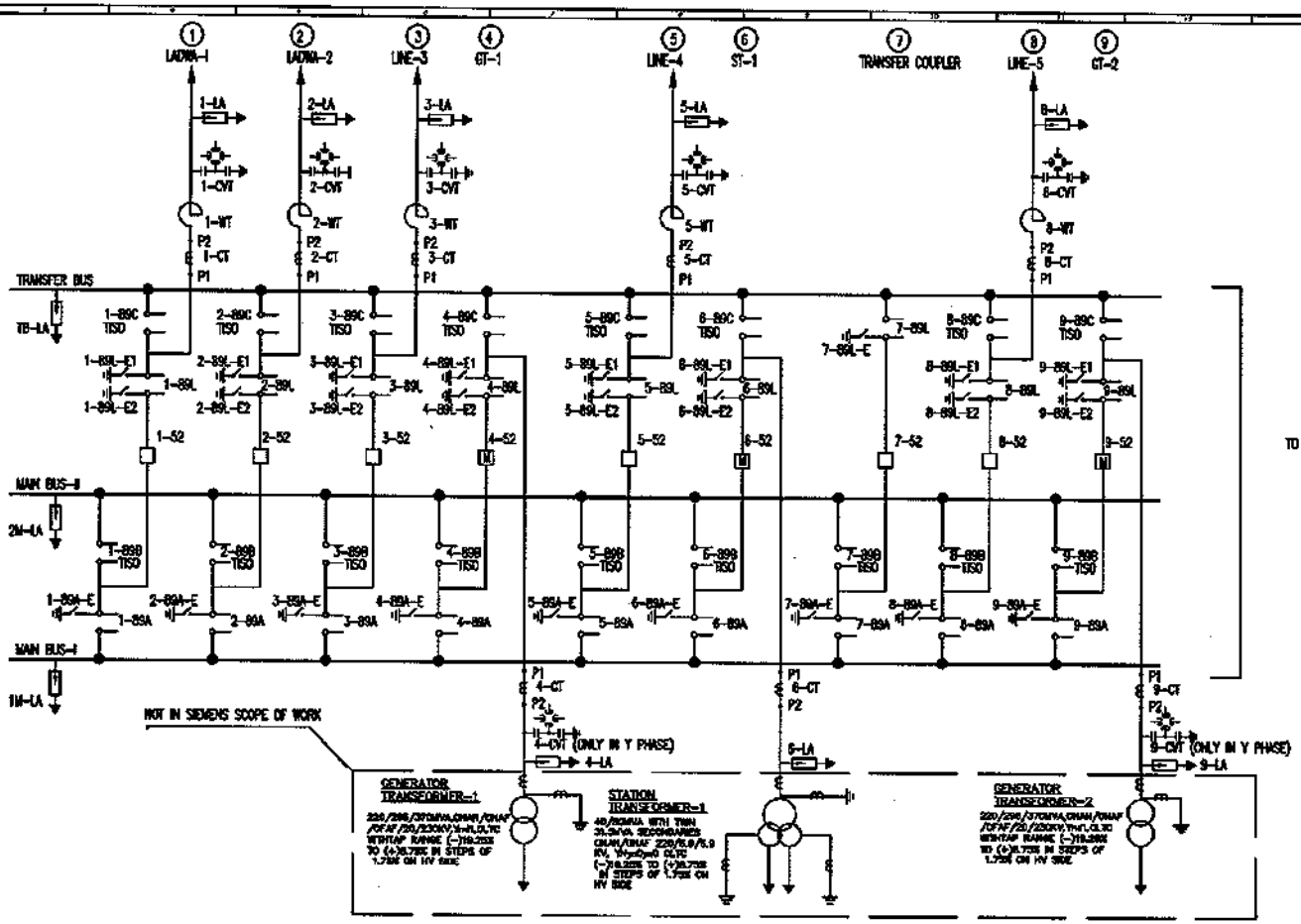
TITLE	LIST OF DRAWINGS
CIRCUIT	220 KV BUS BAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
OWNER CONSULTANTS	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
Reliance Energy	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD. Plot–6A, Sector–18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD. Plot–6A, Sector–18 Maruti Industrial Area, GURGAON
SALES REF: 3000420682	SCALE:NTS
DRG NO. (4)-G715EA-UG011-W20	SHT 00
REV. C	CONT 01

SYMBOLS	DESCRIPTOIN
○	CT TERMINATIONS
◎	PT TERMINATIONS
⊠	CB TERMINATIONS
⌗	ISOLATOR TERMINATIONS
⊗	BAY MARSHALLING BOX TERMINATIONS
⌀—⌀	DISCONNECTING TERMINAL BLOCK
⌀	C & R PANEL TERMINAL BLOCK
●	OTHER SUPPLIER'S PANEL TB

TERMINAL STRIP	DESCRIPTOIN–200R
X3	DC SUPPLY–1
X77	BUS WIRING

	SITE CORRECTED	MS	MS	KM	C	22.08.07	RELEASE STATUS	SIGNATURE
	QC CORRECTED	RSU	MS	VS	B	14.03.07	PRELIMINARY	
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL / ENGG. MANAGER	

TITLE	LEGEND
CIRCUIT	220KV BUS SWR
2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA	
OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
OWNER CONSULTANT	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A–2, SECTOR 24 NOIDA–201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot–6A, Sector–18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot–6A, Sector–18 Maruti Industrial Area, GURGAON
SALES REF: 5000420692	SCALE:NTS
DRG NO. (4)-HG719EA-UG911-T200	SHT 01
REV. C	CONT 02



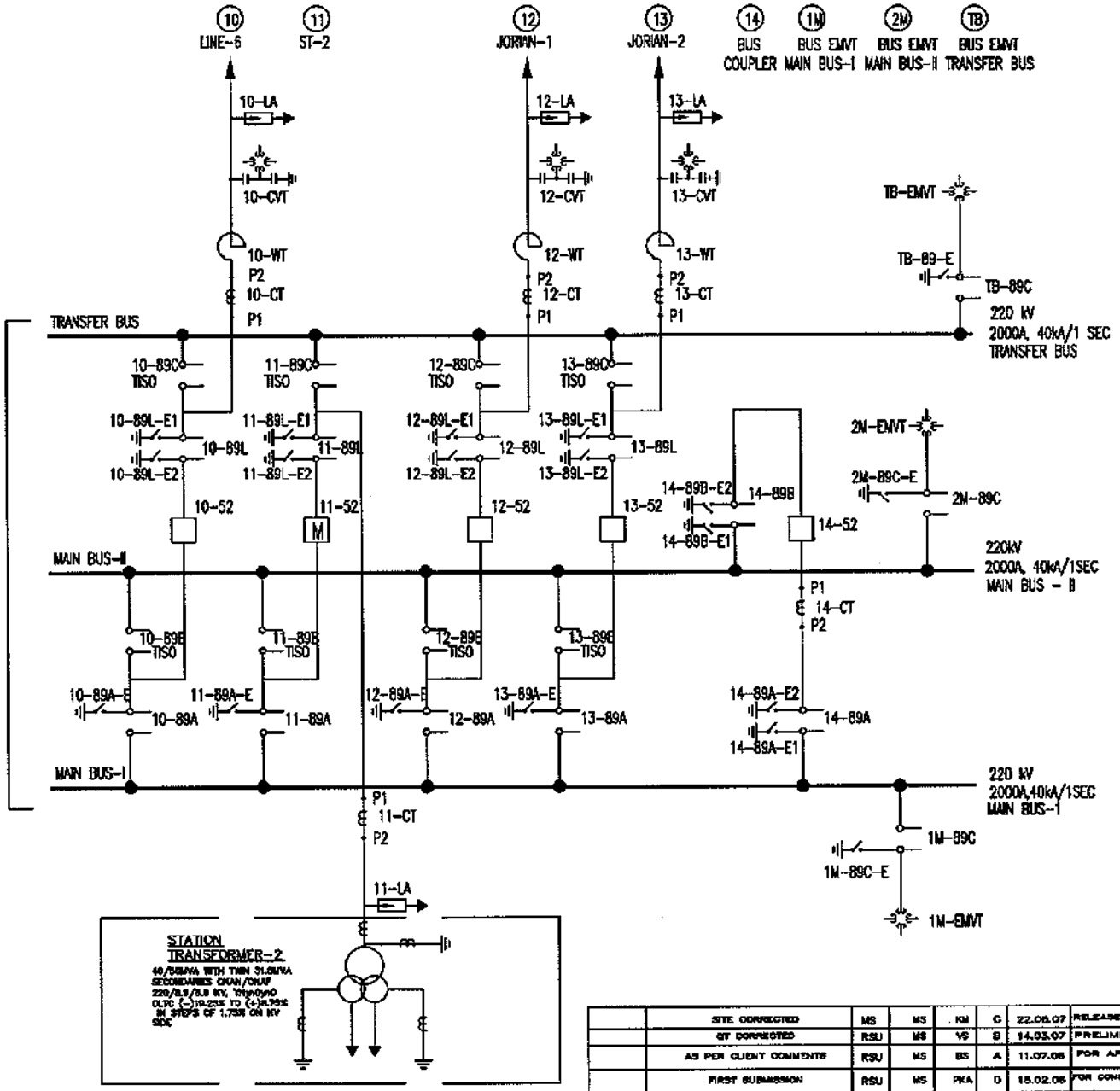
SYMBOL	DESCRIPTION (220KV SWITCHYARD EQUIP.)
	CIRCUIT BREAKER (ELECTRICALLY GANGED) 2000A, 40kA 1Sec.
	CIRCUIT BREAKER (MECHANICALLY GANGED) 2000A, 40kA 1Sec.
	CURRENT TRANSFORMER (FOR ALL LINE BAYS) 2000-1000-500/1A, 5 CORE
	CURRENT TRANSFORMER (FOR ST BAYS) 2000-1000-500/1A, 5 CORE
	CURRENT TRANSFORMER (4 CT, 9 CT & 14 CT) 2000-1000/1A, 5 CORE
	HCB TANDEM ISOLATOR (MECHANICALLY GANGED) 2000A. (WITHOUT EARTH-SWITCH)
	HCB ISOLATOR (MECHANICALLY GANGED) 2000A. (WITH ONE EARTH-SWITCH)
	HCB ISOLATOR (MECHANICALLY GANGED) 2000A. (WITH TWO EARTH-SWITCH)
	CAPACITOR VOLTAGE TRANSFORMER 6600pF, 220KV/110V/110V/110V √3 √3 √3 √3
	LIGHTNING, ARRESTOR, GAPLESS 198KV,10kA.

SYMBOL	DESCRIPTION (220KV SWITCHYARD EQUIP.)
	WAVE TRAP 2000A,0.5mH,40KA 1Sec.
	ELECTROMAGNETIC VOLTAGE TRANSFORMER (EMVT) 220KV/110V/110V/110V √3 √3 √3 √3

SYSTEM DESIGN PARAMETERS :

	SITE CORRECTED	MS	MS	KM	C	22.08.07	RELEASE STATUS	SIGNATURE
	QT CORRECTED	RSU	MS	VS	B	14.03.07	PRELIMINARY	
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL / ENGG. MANAGER	

TITLE	SINGLE LINE DIAGRAM OF 220kV SWITCHYARD
CIRCUIT	220 KV BUS BAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI - INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot-6A, Sector-16 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot-6A, Sector-16 Maruti Industrial Area, GURGAON
SALES REF:	3000420692
DRG NO.	(4)-G719EA-UG911-W200
SCALE:	N.T.S
SHT	02
REV.	C
CONT	02A



TO SHT. 02

	SITE CORRECTED	MS	MS	KM	C	22.06.07	RELEASE STATUS	SIGNATURE
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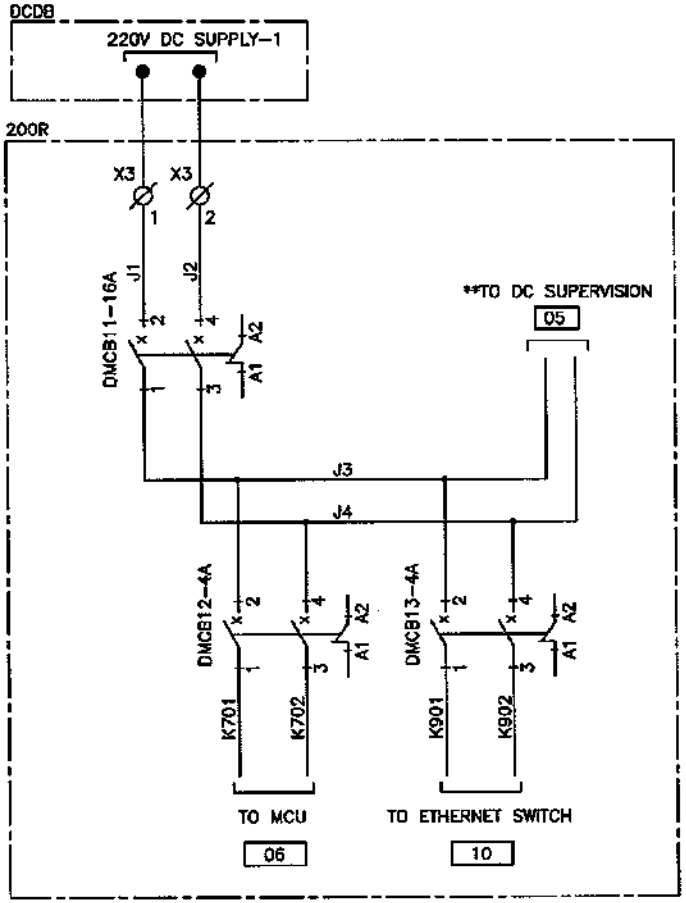
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL / ENGG. MANAGER	

TITLE	SINGLE LINE DIAGRAM OF 220KV SWITCHYARD
CIRCUIT	220 KV BUS BAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
OWNER'S CONSULTANT	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot–6A, Sector–18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot–6A, Sector–18 Maruti Industrial Area, GURGAON
SALES REF: 5000420692	SCALE: N.T.S
DRG NO. (4)-G719EA-UG911-W206	REV 02A
REV. C	CONT 03



**SHALL BE CONNECTED TO THE LAST LOOP OF THE WIRING

	SITE CORRECTED	MS	NS	KM	C	22.06.07	RELEASE STATUS	SIGNATURE
	QY CORRECTED	RSU	MS	VS	B	14.03.07	PRELIMINARY	
	AS PER CLIENT COMMENTS	RSU	MS	SS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL; ENGG. MANAGER	

TITLE: DC SUPPLY-1 CKT.
CIRCUIT: 220V BUS BAR

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

DESEIN PRIVATE LTD.
CONSULTING ENGINEERS
NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA - MUMBAI - CHENNAI - NEW DELHI

SIEMENS — 220kV Switchyard Contractor
SIEMENS LTD, Plot-6A, Sector-18
Maruti Industrial Area, GURGAON

SIEMENS — SIEMENS LTD, Plot-6A, Sector-18
Maruti Industrial Area, GURGAON

SALES REF: 3000420692

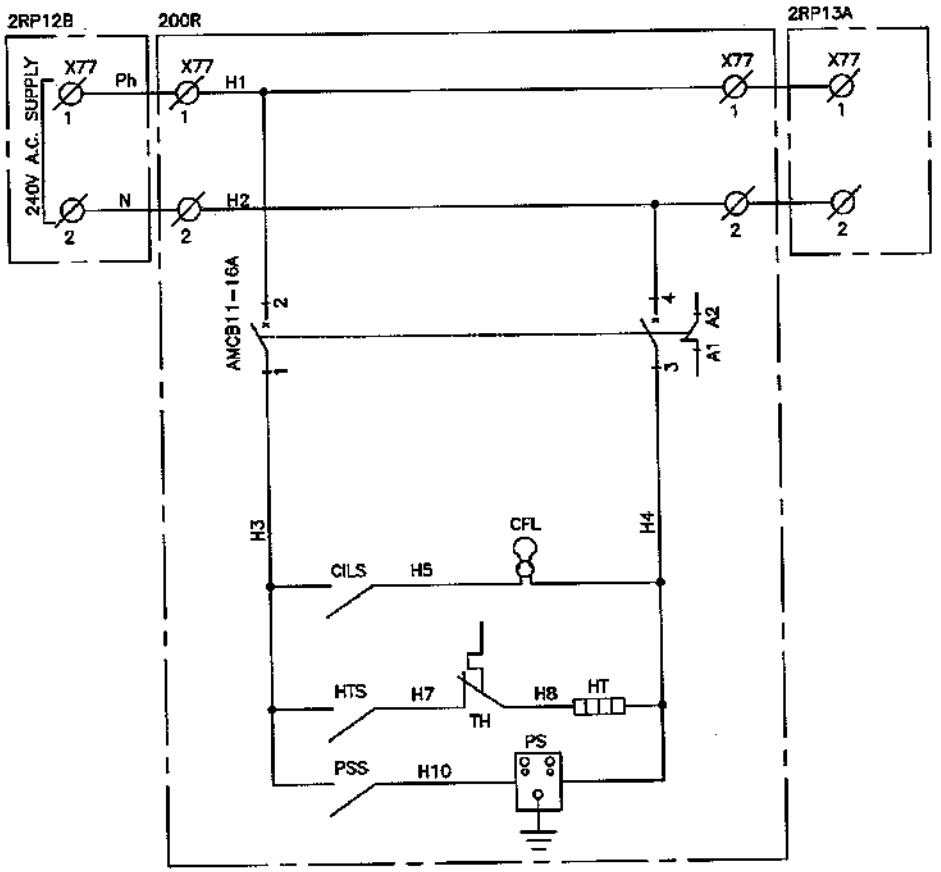
SCALE: NTS

DRG NO. (4)-G719EA-UG011-W206

SHT 03

REV. C

CONT 04



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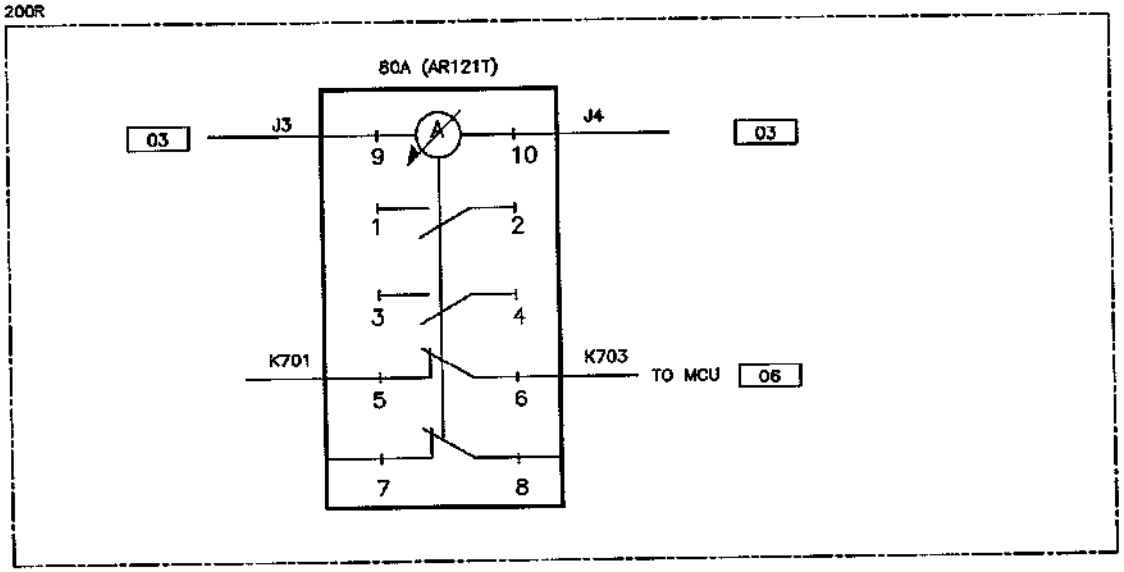
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL; ENGG. MANAGER	

TITLE	AC SUPPLY DISTRIBUTION
CKT	220kV BUS BAR
2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA	
OWNER: HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA	
DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA	
CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI	
RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)	
DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI	
SIEMENS: 220kV Switchyard Contractor SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON	
SIEMENS: SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON	
SALES REF: 3000420602	SCALE: NTS
DRG NO. (4)-G719EA-UG011-W201	SHT 04
REV. C	CONT 05



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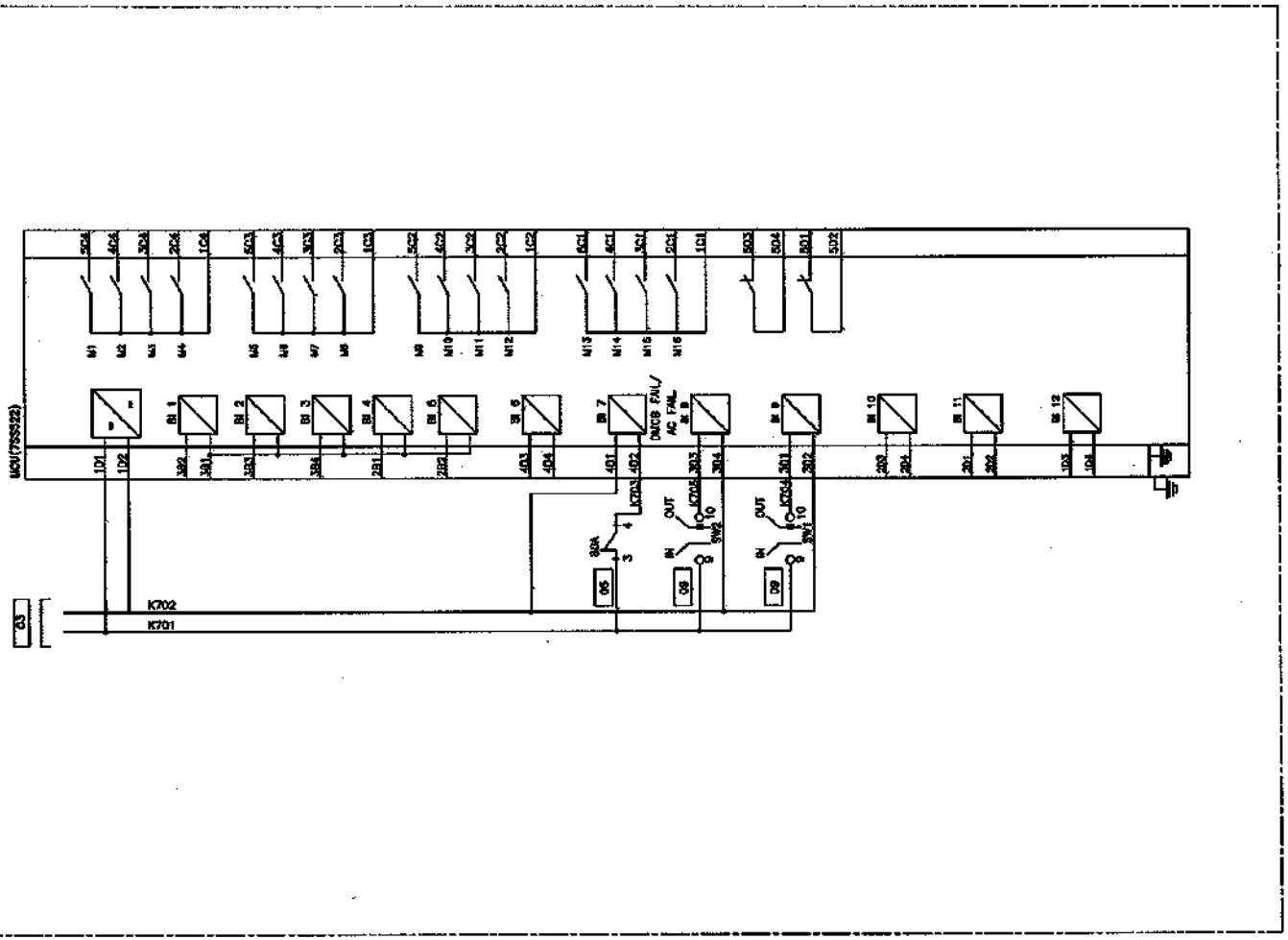
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL; ENGG. MANAGER	

TITLE	DC SUPPLY SUPERVISION.
CKT/IT	220KV BUS BAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
CONSULTANT	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
Reliance Energy	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SALES REF:	50004206092
DRG NO.	(4)-G719EA-UG911-V200
SCALE: NTS	SHT 05
REV. C	CONT 06



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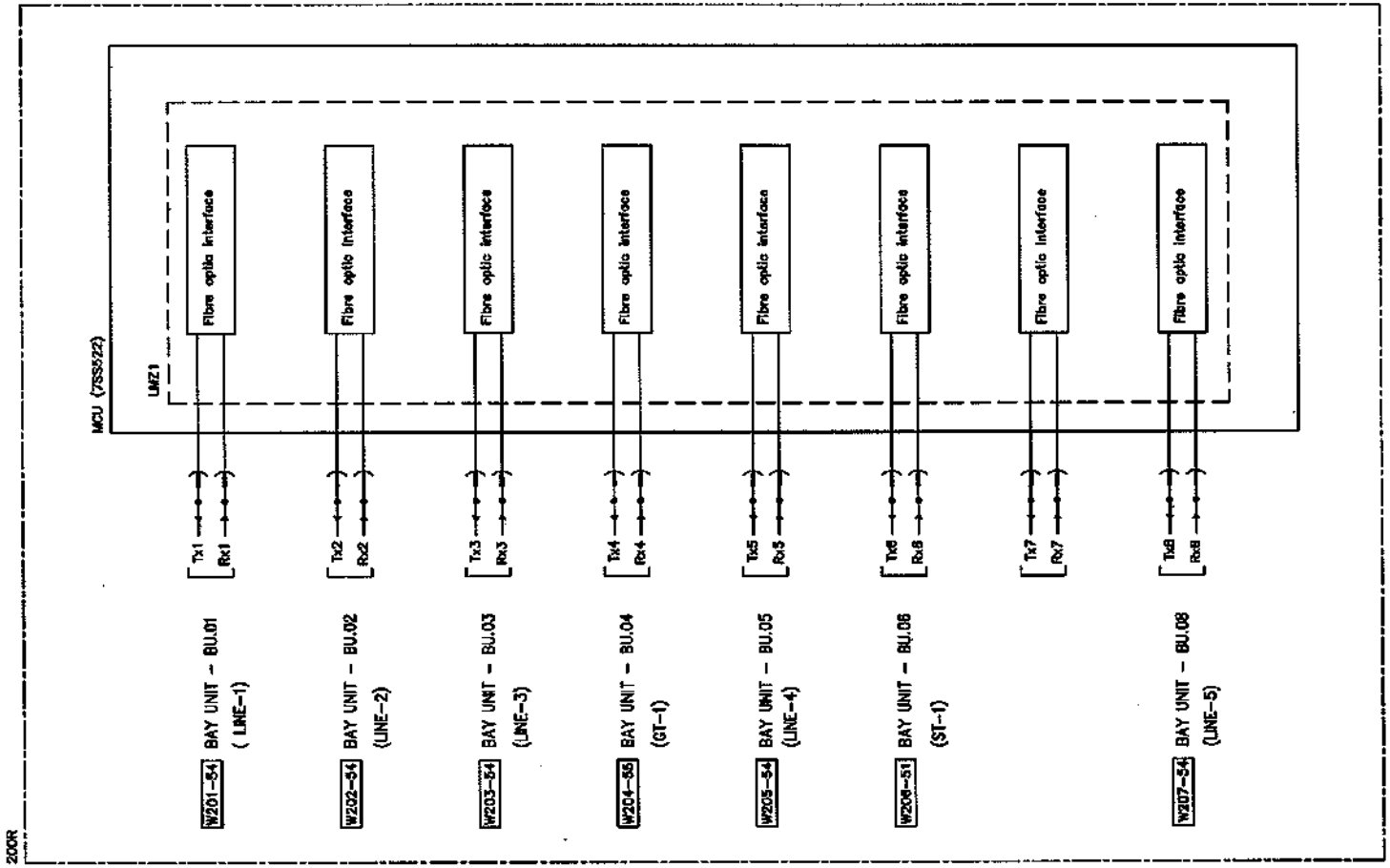
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL; ENGG. MANAGER	

TITLE	CENTRAL UNIT CONTACT DISTRIBUTION
CIRCUIT	220KV BUS BAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
OWNER CONSULTANT	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-3, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD. Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD. Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SALES REF: 3000420692	SCALE: NTS
DRG NO. (4)HG719EA-UG9111-W200	SHT 06
REV. C	CONT 07



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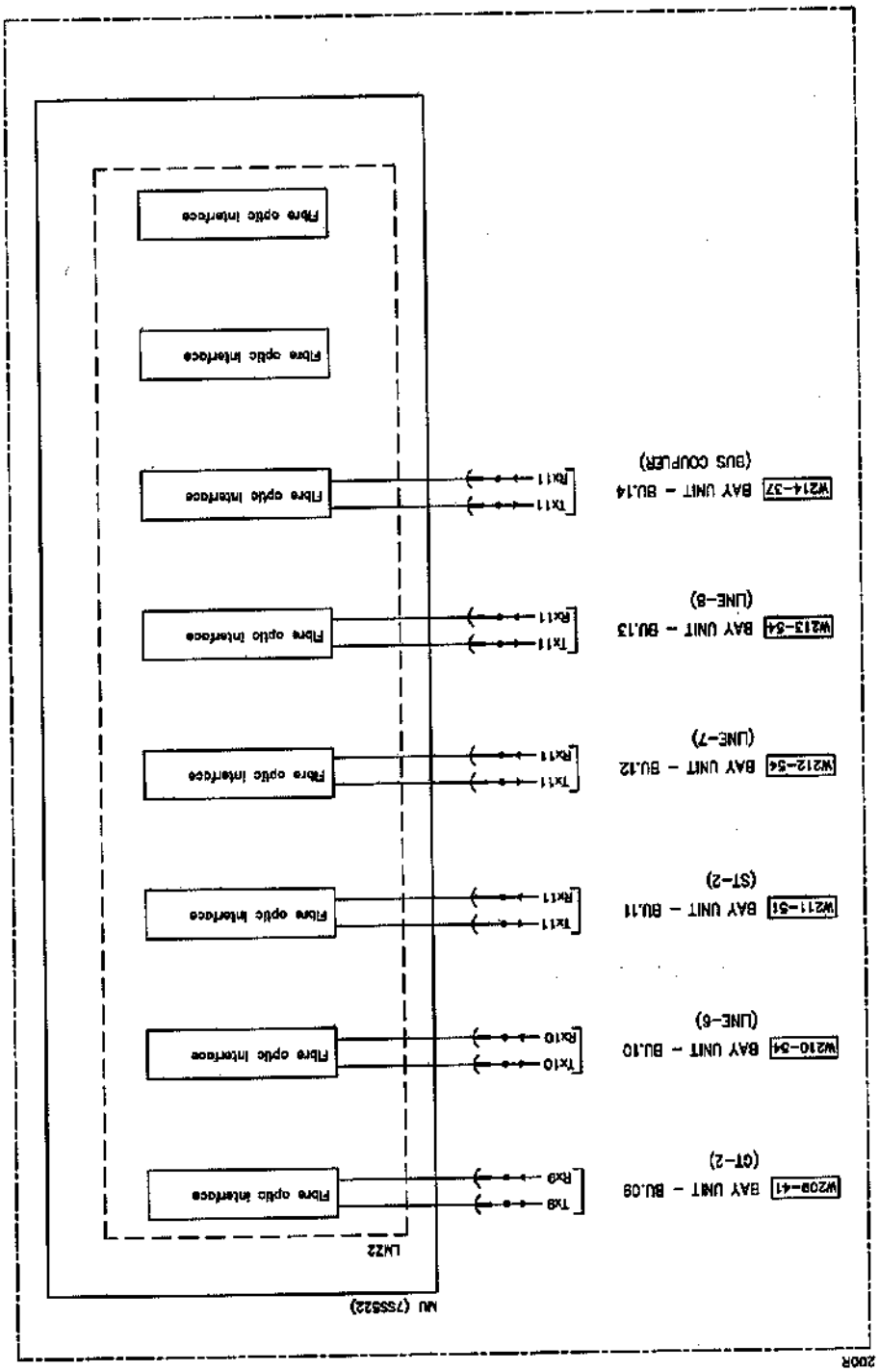
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL	
APPROV.							ENGG. MANAGER	

TITLE	FIBRE OPTIC CABLE DISTRIBUTION
CIRCUIT	220KV BUS BAR
	2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA
	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI - INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot-6A, Sector-15 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot-6A, Sector-15 Maruti Industrial Area, GURGAON
SALES REF:	S0004206892
DRG NO.	(4)-G719EA-UG911-W200
REV.	C
SCALE: NTS	
SHT	07
CONT	08



	SITE CORRECTED	MS	MS	MS	KM	C	23.08.07	RELEASE STATUS	SIGNATURE	SIEMENS					
	QT CORRECTED	RSU	MS	VS	B	14.03.07	PRELIMINARY								
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL			SIEMENS					
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION			SAIPEM REF: 5000/4200/0025				SCALE:NTS	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL ENGG. MANAGER			DRG NO. (41)-G7109EA-UG0111-W2100				SHT 05 REV. C	CONT 09

TITLE: FIBRE OPTIC CABLE DISTRIBUTION
CIRCUIT: 2X500 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA

HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA

DESIGN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI - INDIA

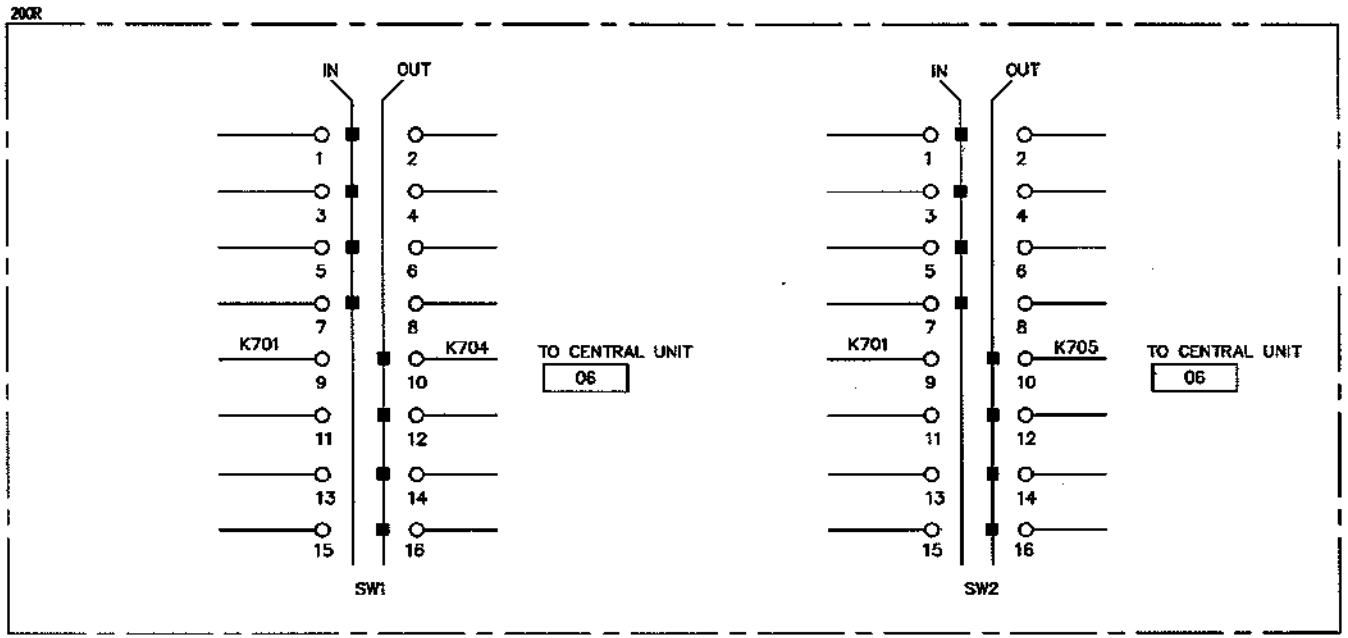
CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI

RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWERS, A-6, SECTOR 24 NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI

SIEMENS
220kV Switchyard Contractor
SIEMENS Ltd, Plot-64, Sector-18
Maruti Industrial Area, GURGAON

SIEMENS
SIEMENS Ltd, Plot-64, Sector-18
Maruti Industrial Area, GURGAON



	SITE CORRECTED	MS	MS	KM	C	22.08.07	RELEASE STATUS	SIGNATURE
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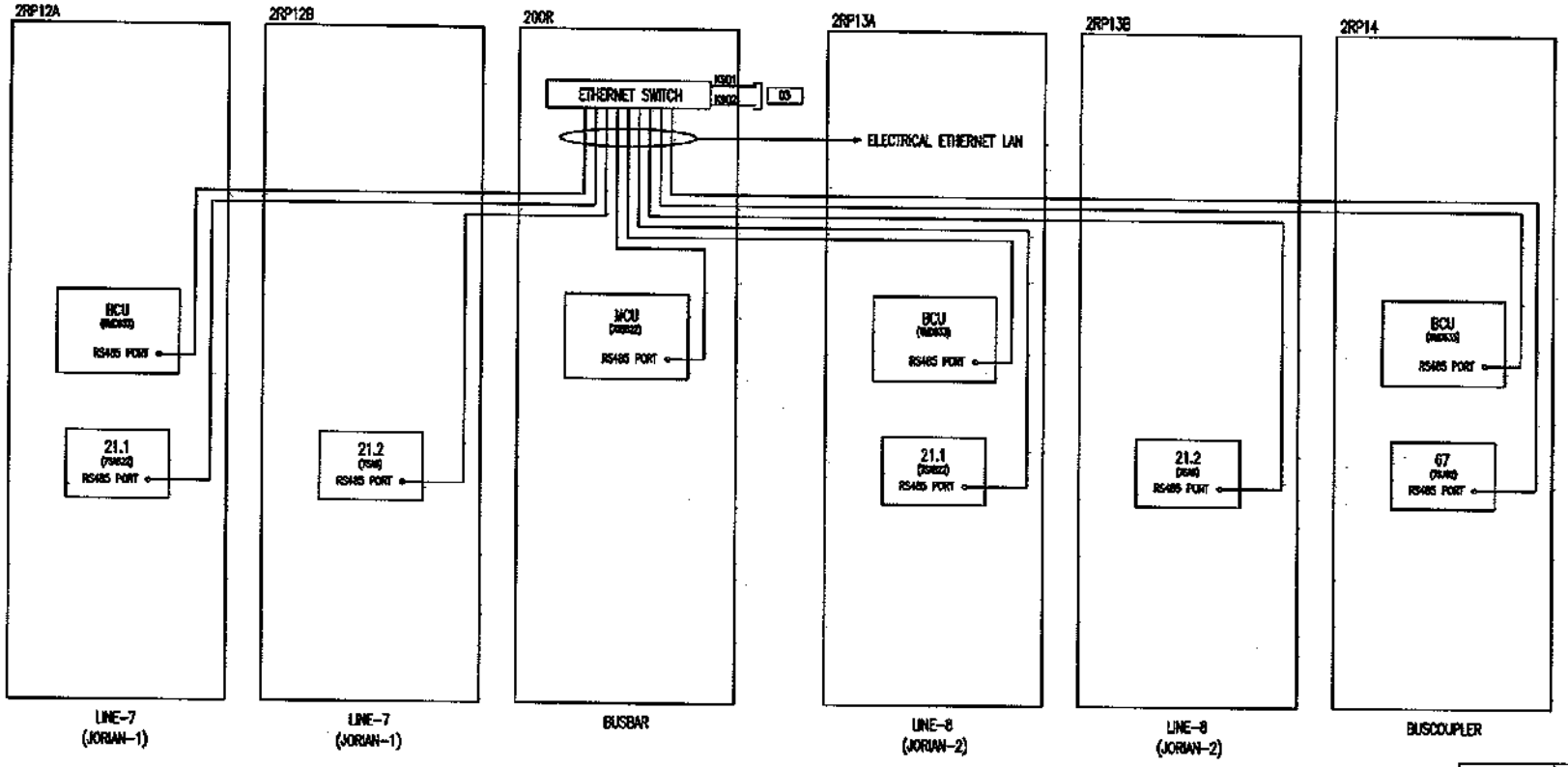
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL / ENGG. MANAGER	

TITLE	SELECTOR SWITCH CONTACT DISTRIBUTION
CIRCUIT	220KV BUS BAR
2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA	
	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
	DESEN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SALES REF: S000420692	SCALE: NTS
DRG NO. (4)-G719EA-UG911-W200	SHT 09
REV. C	CONT 10



	SITE CORRECTED	MS	MS	KM	C	22.08.07	RELEASE STATUS	SIGNATURE
	QT CORRECTED	RSU	MS	VS	B	14.03.07	PRELIMINARY	
	AS PER CLIENT COMMENTS	RSU	MS	BS	A	11.07.06	FOR APPROVAL	
	FIRST SUBMISSION	RSU	MS	PKA	0	15.02.06	FOR CONSTRUCTION	
ELEC. APPROV.	NATURE OF REVISION & DESCRIPTION	APPD	CHECKED	DRAWN	REV.	DATE	REVIEWED: ELECTRICAL / ENGG. MANAGER	

TITLE	COMMUNICATION TO PAS
CIRCUIT	220KV BUS BAR
2X300 MW DCR THERMAL POWER PROJECT YAMUNANAGAR, HARYANA	
	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
	DESEIN PRIVATE LTD. CONSULTING ENGINEERS NEW DELHI – INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
Reliance Energy	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI
SIEMENS	220kV Switchyard Contractor SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SIEMENS	SIEMENS LTD, Plot-6A, Sector-18 Maruti Industrial Area, GURGAON
SALES REF: S000420692	SCALE: NTS
DRG NO. (4)-G719EA-UG811-W201	SHT 10
REV. C	CONT –

ATTACHMENT-13

BIOMASS CO-FIRING IN THE STEAM GENERATOR

It is envisaged to co-fire minimum 10 % torrefied biomass (w.r.t. heat input of the total BMCR capacity) along with coal in the steam generator. The same is to be achieved by way of mixing the prepared biomass as a co-firing fuel in the pulverisers through coal feed bunkers. Biomass feeding arrangement is envisaged through the bunkers & pulverisers hence each of the equipment shall be provisioned for handling & grinding the above specified quantity. The biomass shall be fed through the ERH provided near the coal stockpile with the help of dozers.

Due to presence of high volatile matter in biomass pellets, the mill and associated pulverised fuel piping (PF) systems shall be equipped with suitable & adequate fire detection system and all the PF pipes shall be provided with RTDs and temperature of coal pipes to be hooked up to UCB. Mill inerting system with auto operated valves (motorised or pneumatic) operable from Control room at mill inlet along with pressure gauge after valve shall be provided.

Provisions for continuous monitoring of mill inlet air temperature (Mix air temperature), Mill outlet temperature, mill current, Mill DP is to be made. Provision of view glass in mill feeder with adequate illumination to view presence of biomass pellets is to be made.

The scope shall include the unloading, storage, transportation & feeding to coal bunkers (through ERH) along with all the associated systems. The storage area shall be provided with suitable firefighting system like fire hydrants and water monitors. The entire feeding system shall be provided with firefighting system including conveyors, storage silo, bunkers etc.

The boiler & auxiliaries like pulverisers, ducting etc. including electrostatic precipitator system and all the associated system for handling the torrefied biomass (as a fuel feed) and flue gas (as a combustion product) shall be compatible to the physio-chemical properties and composition of the specified biomass. These equipment & systems shall

be designed and engineered accordingly based on the nature and behaviour of the biomass pellets.

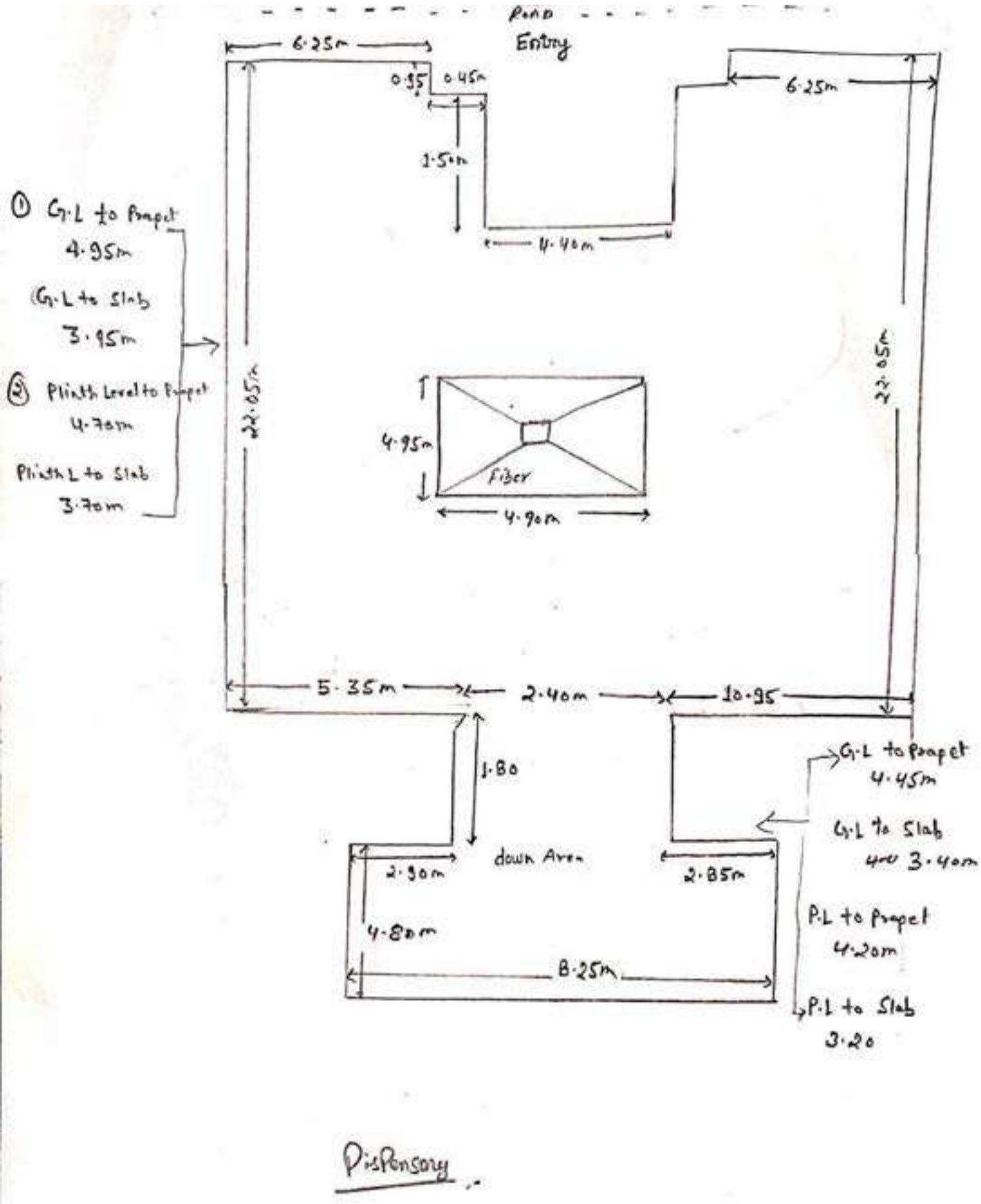
It should be ensured that the specified steam outlet parameters are maintained with the biomass co-firing for the entire control range. Additional pressure drops, if any, shall be factored in the PA fan sizing as also any additional soot blowers shall be provided on account of deposition while biomass co-firing. The milling system internals like classifier, mill throat for maintaining the correct velocities including any internal baffling to maintain the mill throughput shall be ensured. Burners shall ensure well anchored flames and good flame detector signals to factor-in the impacts of such co-firing for effective results.

The feeders shall be suitable to take care of biomass feeding, calibration requirements. The flame scanning should factor-in the impacts of such co-firing for trouble free scanning. Contractor shall provide a detailed write-up regarding the measures and features which have been adopted in heat transfer surfaces, milling system, burners and air supply system for NOx control including that in ducting & ESP/FGD design. The operating procedure for the mill with biomass co-firing shall be submitted for employer's approval.

All the necessary civil, electrical & instrumentation on account of above co-firing shall also be included in the scope. Further, the related special monitoring & analytical instruments on account of bio-mass co-firing towards satisfactorily performance of the boiler & auxiliaries are also included. Control requirements for maintaining the mill inlet and outlet temperatures shall be provided.

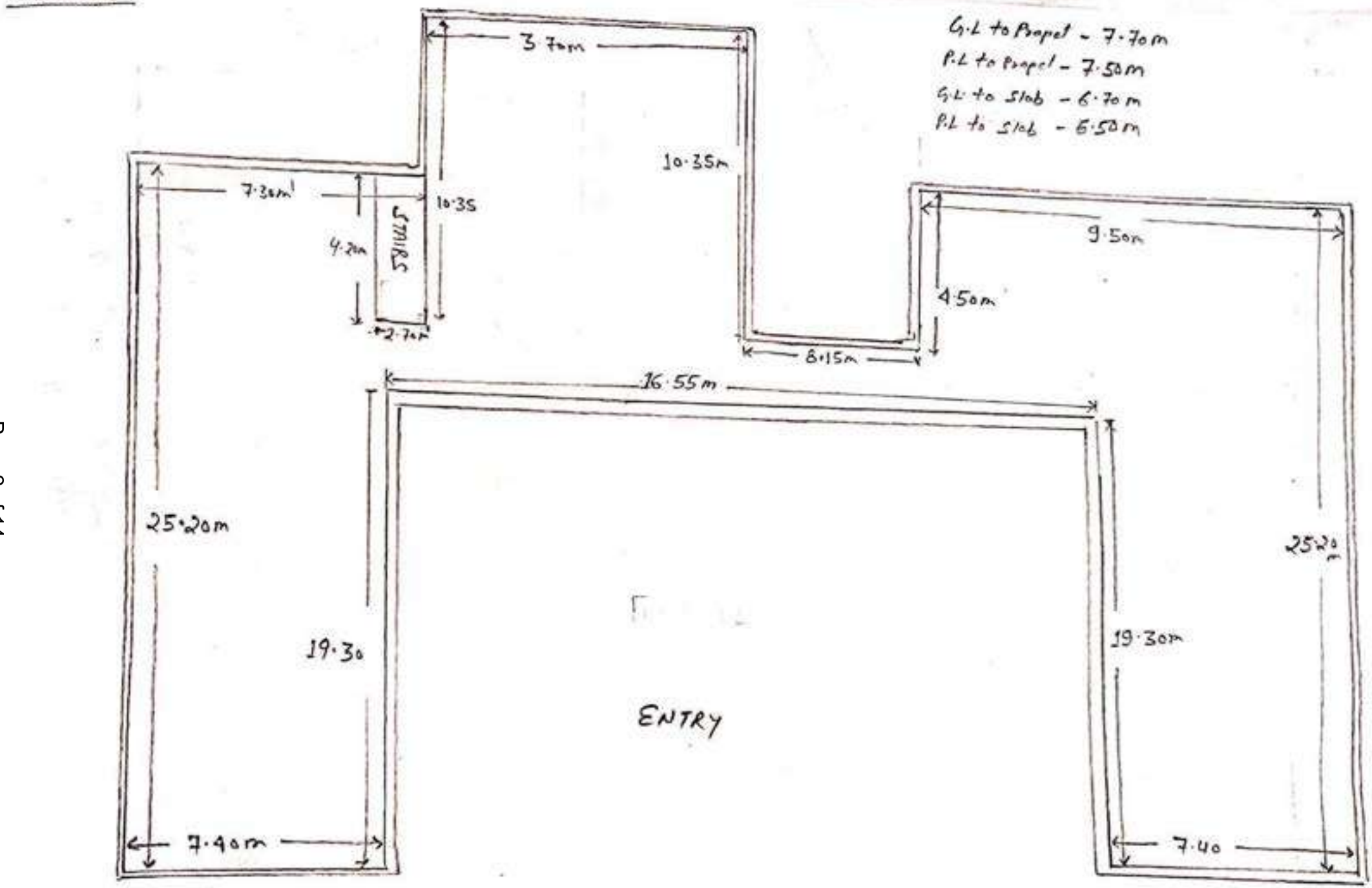
Details of Biomass are as follows:Base material : Agro residue/crop residue pellets

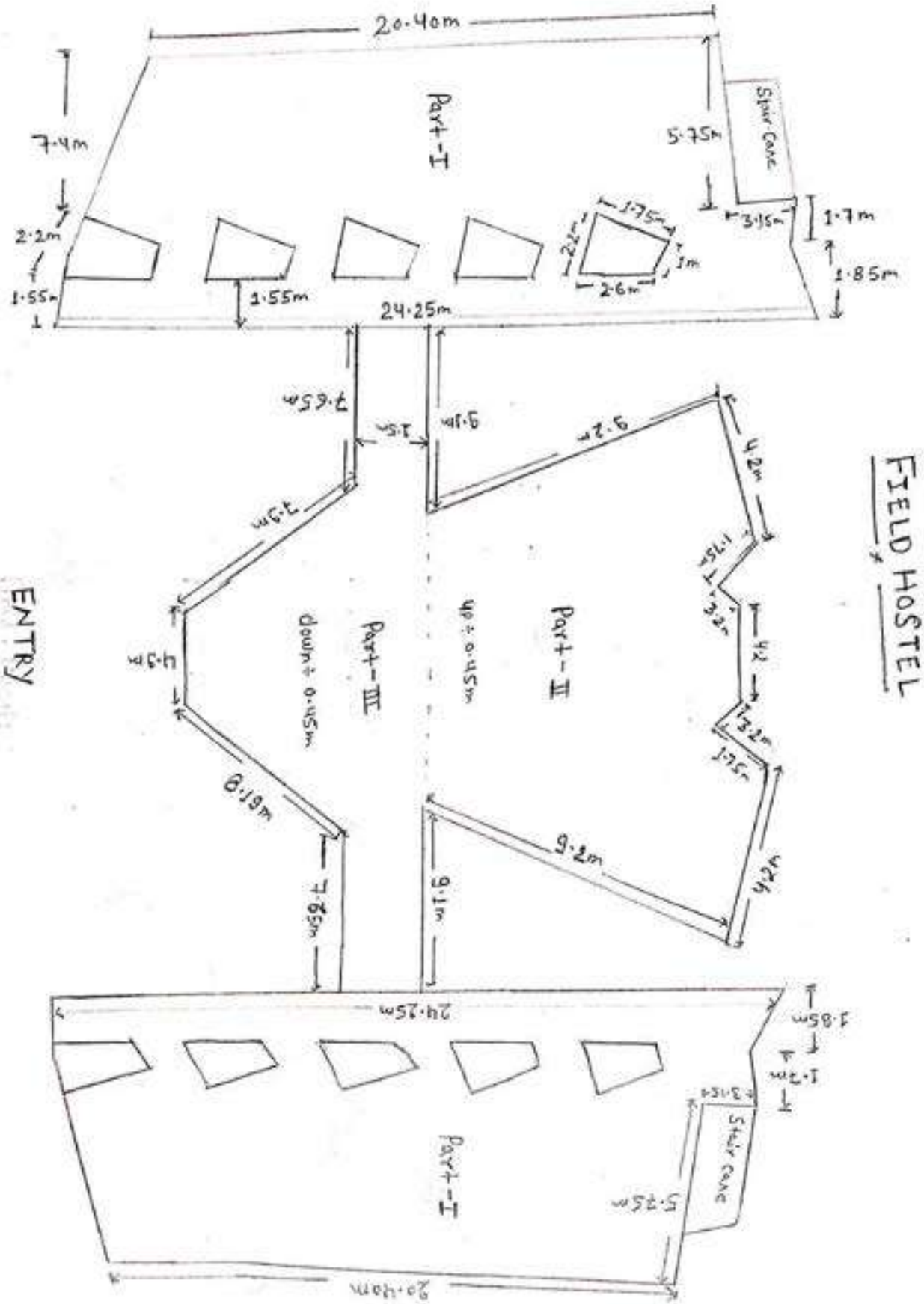
Diameter	:	25-35 mm
Bulk Density	:	600 kg/M^3
Fines	:	Length < 3 mm; <=5%
Moisture	:	Not less than 14% (as received basis)
Gross Calorific Value	:	3400-5000 Kcal/kg
Hard Groove Index (HGI)	:	Not less than 50
Volatile Content	:	< 22%



ATTACHMENT 14

Rest House


G.L to Propel - 7.70m
P.L to Propel - 7.50m
G.L to Slab - 6.70m
P.L to Slab - 6.50m
3.7om
10.35m
7.30m
10.35
4.2m
STAIRS
2.7m
9.50m
4.50m
8.15m
16.55m
25.20m
19.30
ENTRY
19.30m
25.20m
7.40m
7.40
ROAD


FIELD HOSTEL
ENTRY
Part-I
Part-II
Part-III
Stair Case
20.40m
24.25m
7.4m
5.75m
3.15m
1.7m
1.85m
2.2m
1.55m
1.75m
2.6m
1m
7.65m
9.1m
9.2m
4.2m
3.2m
1.75m
4.2
8.19m
6.2m
7.65m
9.1m
24.25m
1.85m
1.7m
3.15m
5.75m
20.40m

Field Hostel

① Height for Part-I

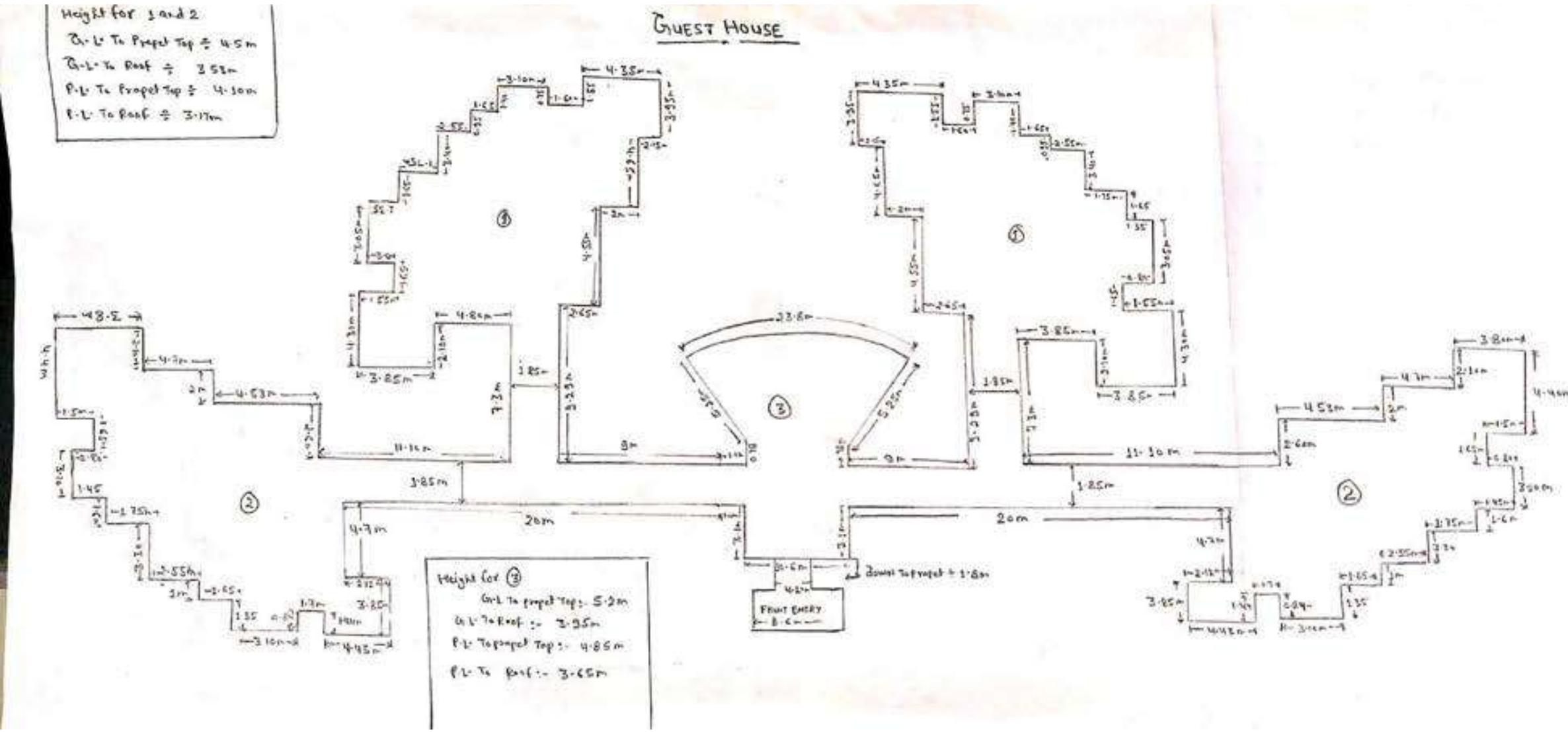
G.L. to Prapet top ÷ 7.8m
G.L. to Roof Top = 6.8m
P.L. to Prapet top = 7.5m
P.L. to Roof = 6.5m

Height for Part-II

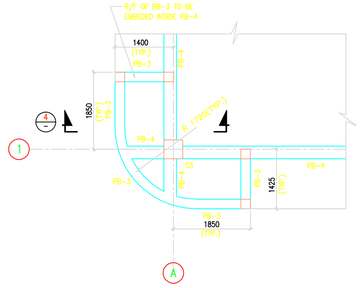
G.L. to Prapet Top = 4.95m
G.L. to Roof Top = 3.80m
P.L. to Prapet top = 4.75m
P.L. to Roof Top = 3.5m

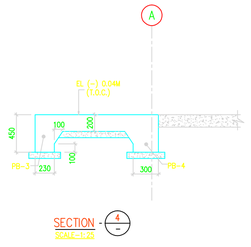
Height for Part-III

G.L. to Prapet Top :- 4.55m
G.L. to Roof Top :- 3.40m
P.L. to Prapet Top :- 4.25m
P.L. to Roof Top :- 3.1m


Height for 1 and 2
G·L To Propel Top ≑ 4·5m
G·L To Roof ≑ 3·52m
P·L To Propel Top ≑ 4·10m
P·L To Roof ≑ 3·17m
GUEST HOUSE
Height for (3)
G·L To propel Top :- 5·2m
G·L To Roof :- 3·95m
P·L To propel Top :- 4·85m
P·L To Roof :- 3·65m
FRONT ENTRY
Dowel To propel = 1·8m

DWG. NO. REL-DCRTP-CES-308-B-201 REV. Z

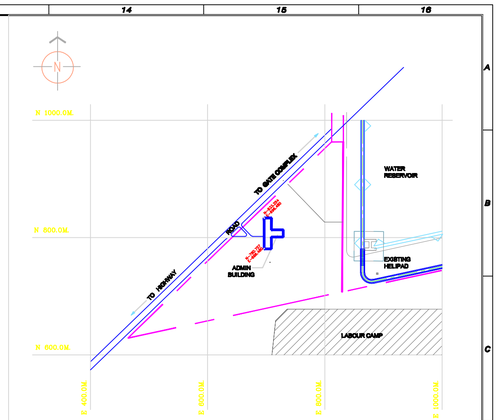




SECTION - 4 / SCALE-1:25

PLAN AT PLINTH BEAM & STUB COL.LEVEL AT EL.(–)0.040M. (T.O.C.) (DETAIL–A)

SCALE-1:50



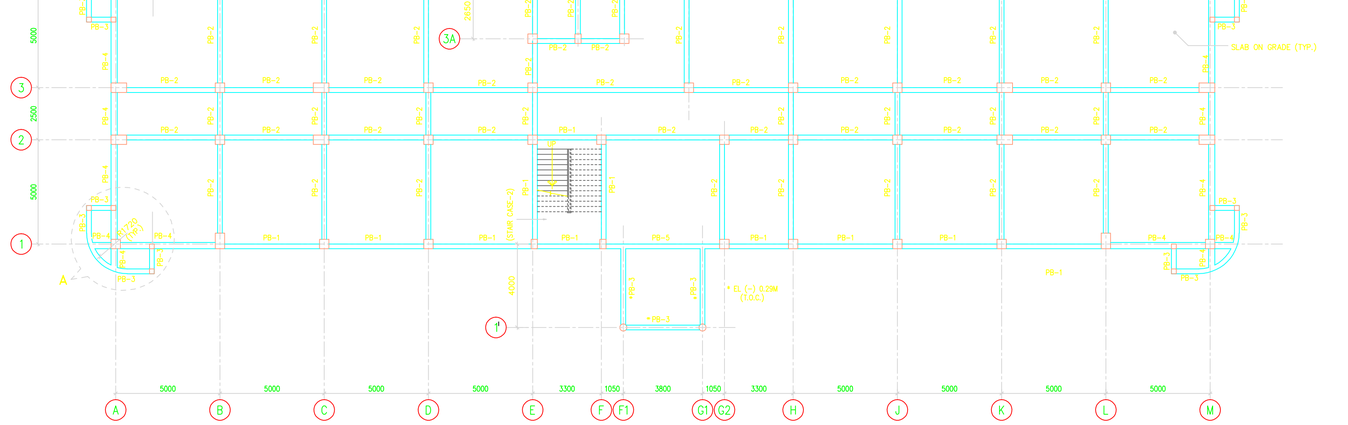
KEY PLAN

PLINTH BEAM SIZE

BEAM MKD.	BEAM SIZE
PB–1	230X450
PB–2	230X450
PB–3	230X450
PB–4	300X450
PB–5	230X1000

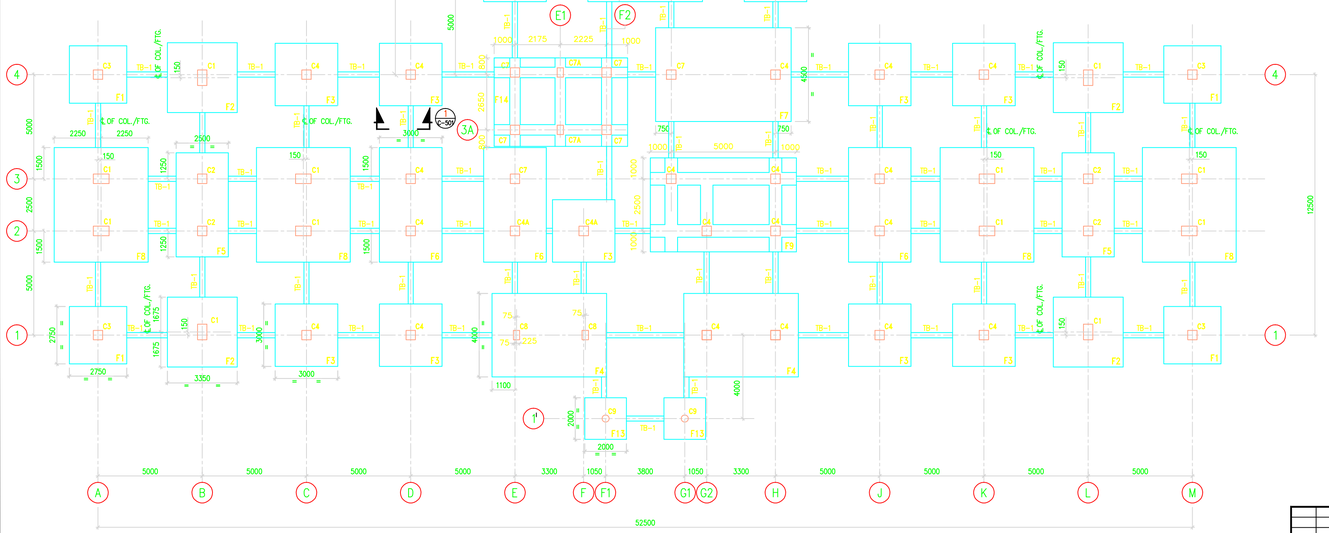
COLUMN SIZES

COLUMN MKD.	COLUMN SIZE
C1	450x750
C2	450x450
C3	450x450
C4	450x450
C4A	450x450
C5	450x450
C6	450x450
C6A	450x450
C7	450x450
C7A	300x450
C8	300x450
C9	350 DIA.
SC	230x230



PLAN AT PLINTH BEAM LEVEL AT EL.(–)0.020M. (T.O.C.) UNLESS OTHERWISE MENTIONED

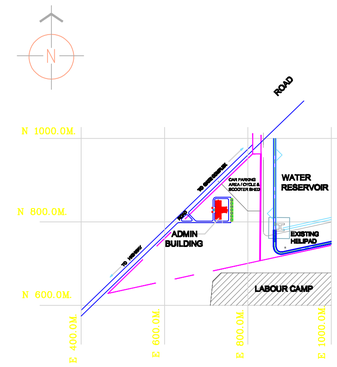
SCALE-1:100


SC
SC
SC

DWG. NO. REL-DCRTP-CES-308-B-202 REV. Z

COLUMN LAYOUT PLAN

COLUMN SCHEDULE	
COLUMN MKD.	COLUMN SIZE
C1	450 X 750
C2	450 X 450
C3	450 X 450
C4	450 X 450
C5	450 X 450
C6	450 X 450
C7	450 X 450
C8	300 X 450
C9	350 DIA.
C4A	450 X 450
C6A	450 X 450
C7A	300 X 450



KEY PLAN
SCALE 1:2500

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS & LEVELS ARE IN METRES UNLESS STATED OTHERWISE.
2. ALL STRUCTURAL CONCRETE WORK SHALL BE OF M25 GRADE CONTEROLLED CONCRETE AND SHALL BE IN ACCORDANCE WITH IS: 456-2000.
3. ALL LEAN CONC. SHALL BE OF M15 GRADE IN ACCORDANCE WITH IS: 456-2000.
4. ALL ELEVATIONS ARE REFERRED TO THE FINISHED GROUND FLOOR LEVEL OF POWER HOUSE BUILDING AS EL. 0.00 M. WHICH CORRESPONDS TO R.L. 270.5M.
5. FOR GENERAL NOTES REFER DRAWING NO. REL-DCRTP-CES-E10-B-501.
6. T.O.C. = TOP OF CONCRETE.
7. THIS BUILDING HAS BEEN DESIGNED WITH ONE STORY EXTRA (G+1+1) AS FUTURE PROVISION, AS PER HPGCL MEMO NO. 2477 DATED 14.03.06

REF. DWG.:-

1. REL-DCRTP-CES-308-C-201: ADMINISTRATIVE BUILDING GENERAL ARRGT. OF FDN., TIE BEAM & PLINTH BEAM
2. REL-DCRTP-CES-308-B-202: ADMINISTRATIVE BUILDING G.A. PLAN OF COLUMNS & GROUND FL. LINTEL BEAMS
3. REL-DCRTP-CES-308-C-202: ADMINISTRATIVE BUILDING COL. SCHEDULE & R.C. DET. OF GR. FL. LINTEL BEAMS
4. REL-DCRTP-CES-308-B-205: ADMINISTRATIVE BUILDING G.A. PLAN OF STAIRCASES 1 & 2 .
5. REL-DCRTP-CES-308-C-205: ADMINISTRATIVE BUILDING R.C. DETAILS OF STAIRCASES 1 & 2.
6. REL-DCRTP-CES-308-H-201: ADMINISTRATIVE BUILDING GROUND FLOOR PLAN & LOCATION MAP.
7. REL-DCRTP-CES-308-H-202: ADMINISTRATIVE BUILDING FIRST FLOOR PLAN & ROOF PLAN.
8. REL-DCRTP-CES-308-H-203: ADMINISTRATIVE BUILDING SECTIONS
9. REL-DCRTP-CES-308-H-204: ADMINISTRATIVE BUILDING ELEVATIONS.
10. REL-DCRTP-CEE-308-F545: ADMINISTRATIVE BUILDING ELECTRICAL EQUIPMENT LAYOUT & CABLE ROUTING.

AS BUILT

ADMINISTRATIVE BUILDING
COLUMN LAYOUT

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PVT. LTD.
CONSULTING ENGINEERS
NEW DELHI – INDIA

CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

														RELEASE STATUS	DATE	SIGNATURE
														PRELIMINARY		
														FOR TENDER ONLY		
														FOR CONSTRUCTION		
														ARCHITECTURAL		
														CIVIL & STRUCTURAL		
														ELECTRICAL		
														INSTRUMENTATION		
														MECHANICAL		
														ENGG MNGR		

APPROV.	HOD	MECH.	INST.	ELEC.	STRL.	ARCH.	REVIEWED

NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE
AS BUILT			Z	

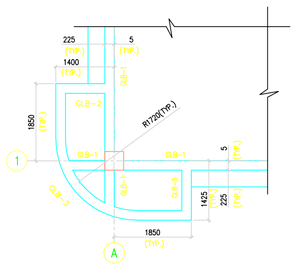
DRAWN : NC	CHECKED : AR
REVIEWED : AB	DATE : 23.06.2005
APPROVED : AB	DOPL JOB NO.: K4A12

DRAWING NO. REL-DCRTP-CES-308-B-202 REV. Z

A1 (841 x 594)

SCHEDULE OF GROUND FLOOR LINTEL BEAM

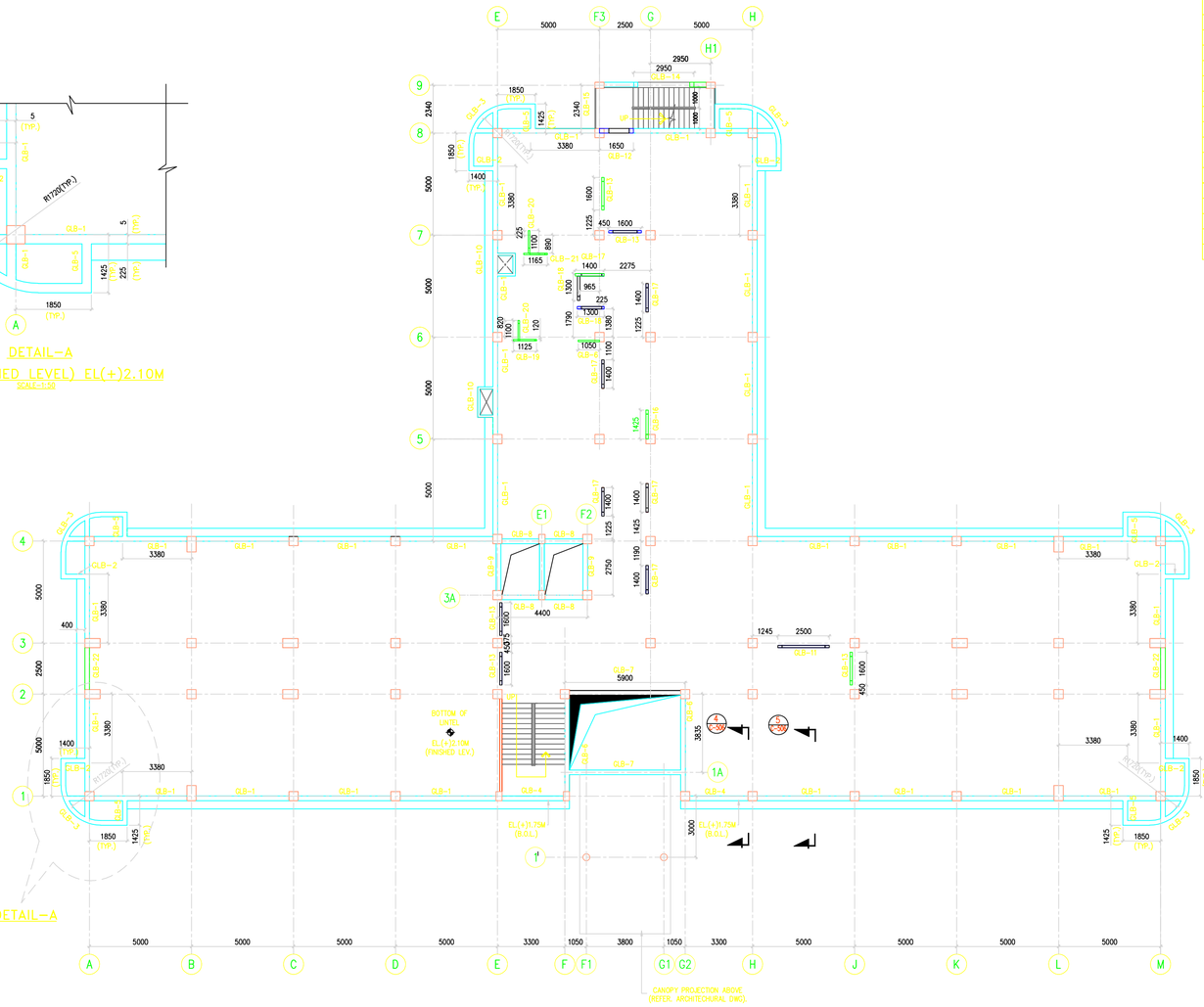
LINTEL BEAM MKD.	OPENING WIDTH	SECTION		LENGTH	B.O.L.(M)	REMARKS
		BRIDTH-B	DEPTH-D			
GLB-1	4.550M	230	300	CONTINUOUS BEAM	(+)2.10	———
GLB-2	–	230	300	1.400M	-DO-	———
GLB-3	–	230	300	CURVED BEAM	-DO-	R.C.BAND SUPPORTED OVER WALL
GLB-4	2.850M	230	300	CONTINUOUS BEAM	(+)1.75	———
GLB-5	–	230	300	1.420M	(+)2.10	———
GLB-6	4.550M	230	300	5.000M	-DO-	———
GLB-7	5.450M	230	400	5.900M	-DO-	———
GLB-8	1.850M	230	300	4.400M CONTINUOUS BEAM	-DO-	ACTUAL SPAN DEPEND ON LIFT OPENING
GLB-9	2.300M	230	300	2.750M	-DO-	———
GLB-10	–	115	200	SURROUNDING THE DUCT	-DO-	R.C.BAND SUPPORTED OVER WALL
GLB-11	2.115M	115	200	2.500M	-DO-	———
GLB-12	1.000M	230	300	1.650M	-DO-	———
GLB-13	1.200M	115	200	1.600M	-DO-	———
GLB-14	2.550M	230	300	2.950M	-DO-	———
GLB-15	1.965M	230	300	2.340M	-DO-	———
GLB-16	1.000M	115	200	1.425M	-DO-	———
GLB-17	1.000M	115	200	1.400M	-DO-	———
GLB-18	1.000M	115	200	1.300M	-DO-	———
GLB-19	0.750M	75	200	1.125M	-DO-	———
GLB-20	0.750M	75	200	1.100M	-DO-	———
GLB-21	0.750M	75	200	1.165M	-DO-	———
GLB-22	2.050M	230	300	CONTINUOUS BEAM	-DO-	———



DETAIL-A

B.O.L.(FINISHED LEVEL) EL(+)2.10M

SCALE-1:50



G. A. OF GROUND FLOOR LINTEL PLAN

B.O.L.(FINISHED LEVEL) EL(+)2.10M

UNLESS OTHERWISE NOTED

SCALE-1:100

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS & LEVELS ARE IN METRES UNLESS STATED OTHERWISE.
2. ALL STRUCTURAL CONCRETE WORK SHALL BE OF M25 GRADE CONTEROLLED CONCRETE AND SHALL BE IN ACCORDANCE WITH IS: 456-2000.
3. ALL LEAN CONC. SHALL BE OF M15 GRADE IN ACCORDANCE WITH IS: 456-2000.
4. ALL ELEVATIONS ARE REFERRED TO THE FINISHED GROUND FLOOR LEVEL OF POWER HOUSE BUILDING AS EL. 0.00 M. WHICH CORRESPONDS TO R.L. 270.5M.
5. FOR GENERAL NOTES REFER DRAWING NO. REL-DCRTP-CES-E10-B-501.
6. B.O.L. = BOTTOM OF LINTEL, T.O.C. = TOP OF CONCRETE.
7. UNLESS NOTED OTHERWISE THE MINIMUM CLEAR COVER SHALL BE AS FOLLOWS :-

	TOP	BOTTOM	SIDE
a) COLUMN, TIE BEAM, PLINTH BEAM ----	40	40	40
b) SLAB, BEAM ----------	25	25	25

8. ALL REINFORCEMENTS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS (HYSD) OR THERMO MECHANICALLY TREATED BARS (TMT) CONFORMING IN IS: 1786 CORRESPONDING TO GRADE Fe415 AND DESIGNATED AS ₹ IN THE DRAWING.
9. THIS BUILDING HAS BEEN DESIGNED WITH ONE STORY EXTRA (G+1+1) AS FUTURE PROVISION, AS PER HPGCL MEMO NO. 2477 DATED 1.4.03.06
10. THE EXACT DIMENSIONS AND LOCATIONS OF DUCTS SHALL BE VERIFIED AND LOCATIONS OF DUCTS SHALL BE VERIFIED AND CONFIRMED FROM ARCHTL DWGS.

REF. DWG.:-

1. REL-DCRTP-CES-312-B-501: ADMINISTRATIVE BUILDING GENERAL ARRGT. OF FOUNDATION, TIE BEAM & PLINTH BEAM
2. REL-DCRTP-CES-312-C-501: ADMINISTRATIVE BUILDING FDN., TIE BEAM & PLINTH BEAM DETAILS
3. REL-DCRTP-CES-312-B-502: ADMINISTRATIVE BUILDING COLUMN LAYOUT
4. REL-DCRTP-CES-312-C-502: ADMINISTRATIVE BUILDING COLUMN SCHEDULE
5. REL-DCRTP-CES-312-B-503: ADMINISTRATIVE BUILDING G. A. OF GROUND FLOOR LINTEL PLAN
6. REL-DCRTP-CES-312-C-503: ADMINISTRATIVE BUILDING FIRST FLOOR BEAM REINFORCEMENT AND GROUND FLOOR LINTEL BEAM DETAILS
7. REL-DCRTP-CES-312-B-504: ADMINISTRATIVE BUILDING G. A. OF ROOF PLAN & G. A. OF FIRST FLOOR LINTEL PLAN
8. REL-DCRTP-CES-312-C-504: ADMINISTRATIVE BUILDING ROOF BEAM REINFORCMENT AND FIRST FLOOR LINTEL BEAM DETAILS
9. REL-DCRTP-CES-312-B-505: ADMINISTRATIVE BUILDING G.A. PLAN OF STAIRCASES 1 & 2, AND G. A. OF LIFT MACHINE ROOM FLOOR AND ROOF
10. REL-DCRTP-CES-312-C-505: ADMINISTRATIVE BUILDING R.C. DETAILS OF STAIRCASES 1 & 2, LIFT MACHINE ROOM FLOOR AND ROOF
11. REL-DCRTP-CES-312-B-506: ADMINISTRATIVE BUILDING G. A. OF CANOPY AND MISC. STRUCTURES
12. REL-DCRTP-CES-312-C-506: ADMINISTRATIVE BUILDING CANOPY, LIFT WELL AND MISC. DETAILS
13. REL-DCRTP-CES-312-B-507: ADMINISTRATIVE BUILDING G. A. OF FIRST FLOOR BEAM PLAN
14. REL-DCRTP-CES-312-C-821: ADMINISTRATIVE BUILDING GROUND FLOOR PLAN & LOCATION MAP.
15. REL-DCRTP-CES-312-C-822: ADMINISTRATIVE BUILDING FIRST FLOOR PLAN & ROOF PLAN.
16. REL-DCRTP-CES-312-C-823: ADMINISTRATIVE BUILDING SECTIONS.
17. REL-DCRTP-CES-312-C-824: ADMINISTRATIVE BUILDING ELEVATIONS.
18. REL-DCRTP-CEE-312-F545: ADMINISTRATIVE BUILDING ELECTRICAL EQUIPMENT LAYOUT & CABLE ROUTING.

AS BUILT

ADMINISTRATIVE BUILDING
G. A. OF GROUND FLOOR LINTEL PLAN

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION, PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PVT. LTD., CONSULTING ENGINEERS, NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY, SEWA BHAWAN, R K PURAM, NEW DELHI

RELIANCE ENERGY LIMITED, EPC BUSINESS GROUP, RELIANCE ENERGY TOWER, A-2, SECTOR 24, NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED, CONSULTING ENGINEERS, KOLKATA - MUMBAI - CHENNAI - NEW DELHI

APPROV.	HOD	MECH.	INST.	ELEC.	STRL.	ARCH.
REVIEWED						

NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE
AS BUILT			0	

RELEASE STATUS	DATE	SIGNATURE
PRELIMINARY		
FOR TENDER ONLY		
FOR CONSTRUCTION		
ARCHITECTURAL		
CIVIL & STRUCTURAL		
ELECTRICAL		
INSTRUMENTATION		
MECHANICAL		
ENGG MNGR		

REVIEWED

DRAWN : NC | CHECKED : AR | SCALE : 1:100 ,1:50, 1:25.
REVIEWED : AR | DATE : 24.04.2009
APPROVED : AB | DCPL JOB NO.: K4A12
JOB NO. | DRAWING NO. REL-DCRTP-CES-308-B-203 | REV. Z

A4 (210×297) [189 x 841]

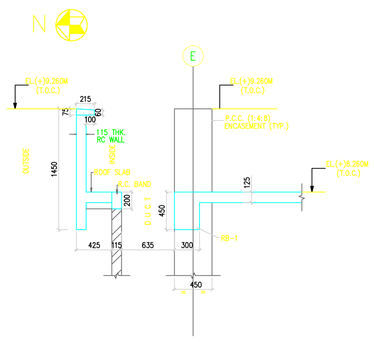
DWG. NO.: REL-DCRTP-CES-308-B-204, REV. Z

FLOOR BEAM SIZES

BEAM MKD	BEAM SIZE
RB1	300X450
RB2	300X450
RB3	230X450
RB4	400X800
RB5	230X450
RB6	230X450
RB7	150X300
RB8	300X300

SCHEDULE OF FIRST FLOOR LINTEL BEAM

LINTEL BEAM MKD.	OPENING WIDTH	SECTION BRIDTH-B	SECTION DEPTH-D	LENGTH	B.O.L.(M)	REMARKS
FLB-1	4.550M	230	300	CONTINUOUS BEAM	(+)6.25	——
FLB-2	–	230	300	1.400M	–DO–	——
FLB-3	–	230	300	CURVED BEAM	–DO–	R.C.BAND SUPPORTED ON WALL
FLB-4	0.75M	115	200	1.050M	–DO–	——
FLB-5	–	230	300	1.420M	–DO–	R.C.BAND SUPPORTED ON WALL
FLB-6	4.550M	230	300	5.000M	–DO–	——
FLB-7	5.450M	230	400	5.900M	–DO–	——
FLB-8	1.850M	230	300	4.400M CONTINUOUS BEAM	–DO–	ACTUAL SPAN DEPEND ON LIFT OPENING
FLB-9	2.300M	230	300	2.750M	–DO–	——
FLB-10	DUCT	115	200	SURROUNDING THE DUCT	–DO–	R.C.BAND SUPPORTED ON WALL
FLB-11	2.115M	115	200	2.500M	–DO–	——
FLB-12	1.000M	230	300	1.650M	–DO–	——
FLB-13	1.200M	115	200	1.600M	–DO–	——
FLB-14	2.550M	230	300	2.950M	–DO–	——
FLB-15	1.965M	230	300	2.340M	–DO–	——
FLB-16	1.000M	115	200	1.425M	–DO–	——
FLB-17	1.000M	115	200	1.400M	–DO–	——
FLB-18	1.000M	115	200	1.300M	–DO–	——
FLB-19	0.750M	75	200	1.125M	–DO–	——
FLB-20	0.750M	75	200	1.100M	–DO–	——
FLB-21	0.750M	75	200	1.165M	–DO–	——
FLB-22	2.050M	230	300	CONTINUOUS BEAM	–DO–	——
FLB-23	2.850M	230	300	CONTINUOUS BEAM	(T.O.C) 6.51M	——



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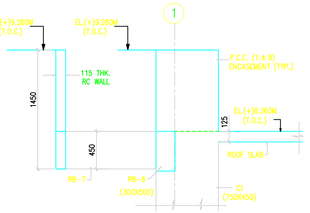

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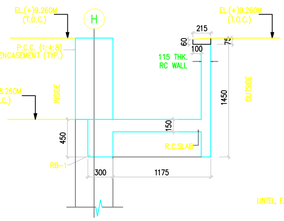

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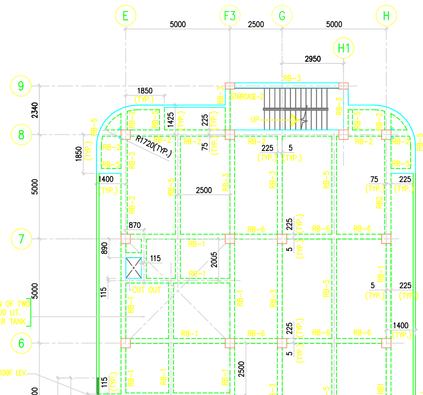
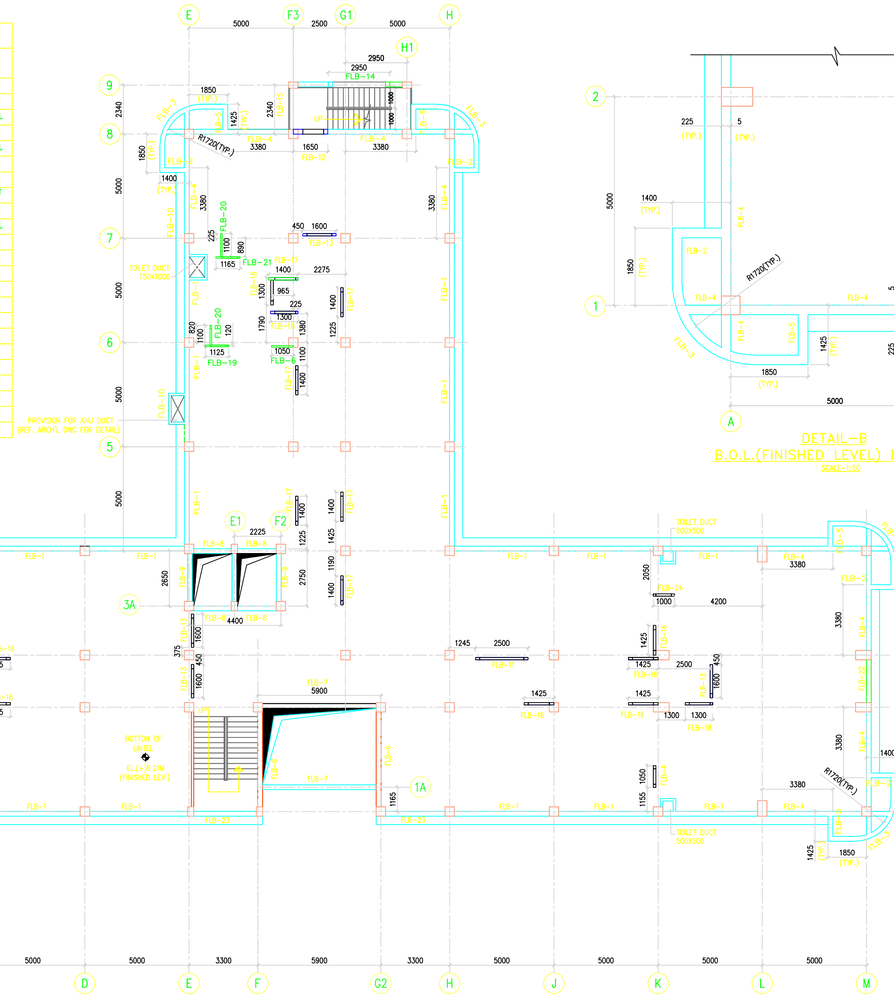
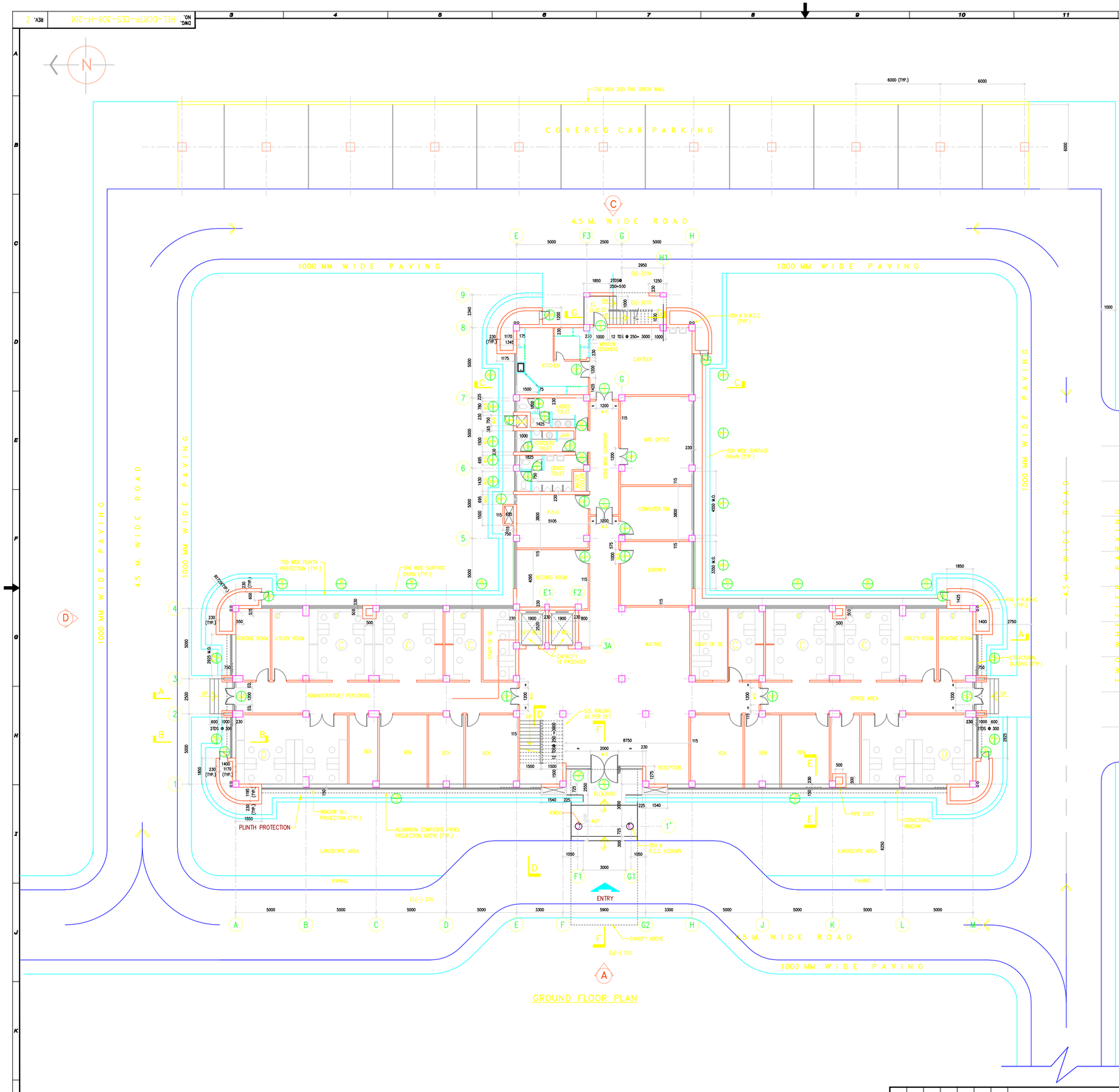
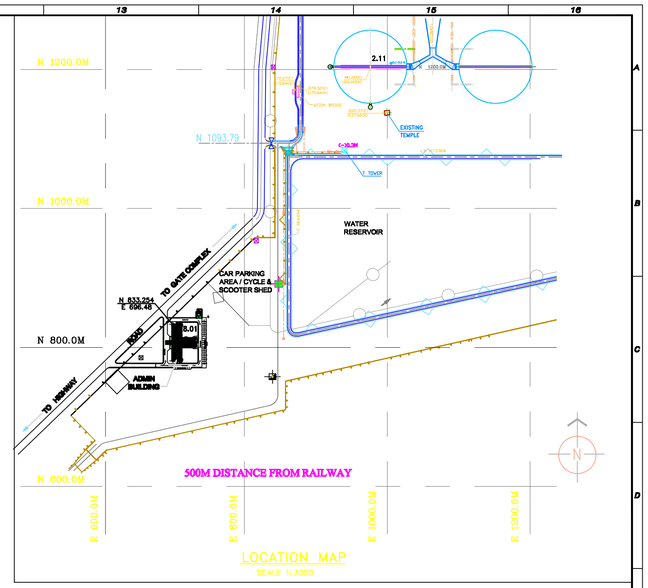


DETAIL–B



DWG. NO. REL-DCRTP-CES-308-H-201 REV. Z





NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS NOTED OTHERWISE.
2. ALL EXTERNAL WALLS ARE FULL BRICK THICK & ALL INTERNAL WALLS ARE HALF BRICK THICK UNLESS NOTED OTHERWISE.
3. THE DRAWINGS SHALL BE READ IN CONJUNCTION WITH MASTER PLAN, SCHEDULE OF ITEMS & TECHNICAL SPECIFICATION.
4. EXTERNAL PLASTER SHALL BE 19 MM THICK, INTERNAL PLASTER SHALL BE 12 MM THICK & CEILING PLASTER SHALL BE 6MM THICK.
5. EL (±) 0.00 CORRESPONDS TO FINISH FLOOR LEVEL i.e. 270.50
6. ALL FINISHES SHALL BE AS PER ARCH. DBR/ NIT.

REF. DWGS.–

1. REL–DCRTP–CES–308–H–202 ADMINISTRATIVE BUILDING – FIRST FLOOR PLAN, DOOR & WINDOW SCHEDULES
2. REL–DCRTP–CES–308–H–203 ADMINISTRATIVE BUILDING – ROOF PLAN, FINISH SCHEDULE
3. REL–DCRTP–CES–308–H–204 ADMINISTRATIVE BUILDING – ELEVATIONS
4. REL–DCRTP–CES–308–H–205 ADMINISTRATIVE BUILDING – SECTIONS

AS BUILT

ADMINISTRATIVE BUILDING
GROUND FLOOR PLAN & LOCATION MAP

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: **HARYANA POWER GENERATION CORPORATION**
PANCHKULA, HARYANA

OWNER CONSULTANT: **DESEIN PVT. LTD.**
CONSULTING ENGINEERS
NEW DELHI – INDIA

CENTRAL ELECTRICAL AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A–2, SECTOR 24
NOIDA–201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

APPROV.	H.O.D	MECH.	INST.	ELEC.	STRL.	ARCH.
REVIEWED						

NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE
AS BUILT			Z	

RELEASE STATUS	DATE	SIGNATURE
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CIVIL & STRUCTURAL		
ELECTRICAL		
INSTRUMENTATION		
MECHANICAL		
ENGG. MANAGER		

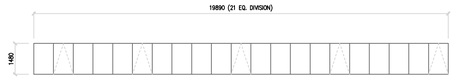
REVIEWED

DRAWN :	MAJU	CHECKED :	S.R.
REVIEWED :	PKP	DATE :	20.07.2009
APPROVED :	AK		

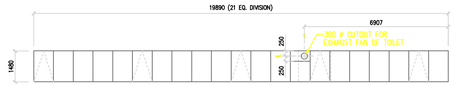
SCALE : 1200, 1:3000
DCPL JOB NO.: K4A12

DRAWING NO. REL-DCRTP-CES-308-H-201 REV. Z

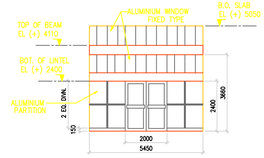
A1 (09–96) [841 x 594]



DET. OF STRUCTURAL GLAZING MKD. CW/2
(FOR GROUND FLOOR ONE AS DRAWN, ANOTHER ONE IS SIMILAR BUT OPPOSITE HANDED)
(FOR FIRST FLOOR ONE AS DRAWN)



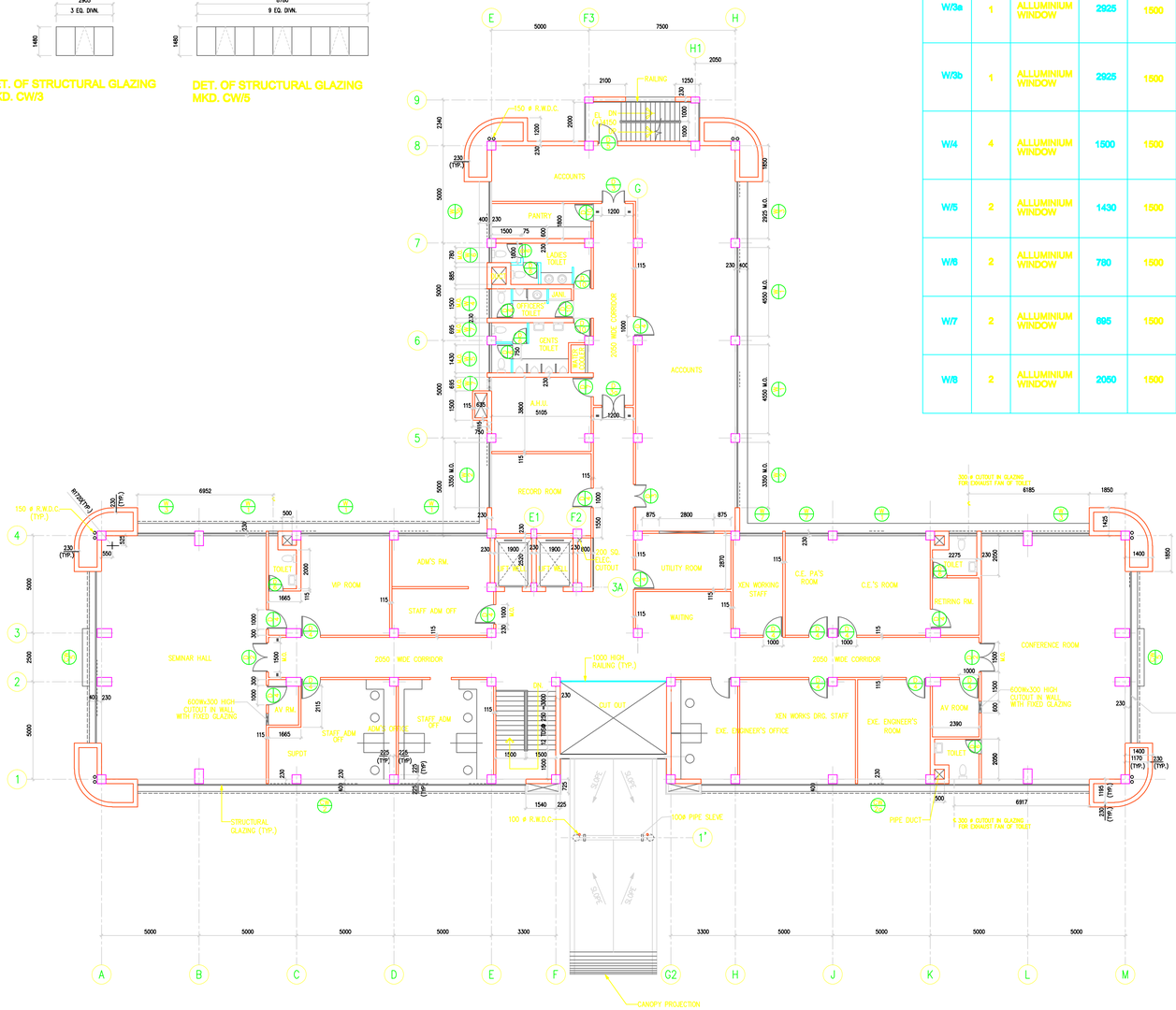
DET. OF STRUCTURAL GLAZING MKD. CW/2a
(FOR FIRST FLOOR AS DRAWN)



DET. OF ALUMINIUM PARTITION MKD. CW/1

DET. OF STRUCTURAL GLAZING MKD. CW/3

DET. OF STRUCTURAL GLAZING MKD. CW/5



FIRST FLOOR PLAN

WINDOW SCHEDULE

WINDOW MARKED	QTY.	DESCRIPTION	MASONRY OPENING		WINDOW SIZE		SKETCH	REMARKS
			WIDTH	HEIGHT	WIDTH	HEIGHT		
W/1	4	ALLUMINIUM WINDOW	4550	1500	4530	1480	9 EQ. DIVISIONS = 4530	PARTLY FIXED PARTLY OPENABLE GLAZED WINDOW WITH 4MM THK. CLEAR GLASS
W/2	4	ALLUMINIUM WINDOW	3350	1500	3330	1480	6EQ DIVISIONS=3330	PARTLY FIXED PARTLY OPENABLE GLAZED WINDOW WITH 4MM THK. CLEAR GLASS
W/3	2	ALLUMINIUM WINDOW	2925	1500	2905	1480	6EQ DIVISIONS=2905	PARTLY FIXED PARTLY OPENABLE GLAZED WINDOW WITH 4MM THK. CLEAR GLASS
W/3a	1	ALLUMINIUM WINDOW	2925	1500	2905	1480	300 ø CUTOUT FOR EXHAUST FAN OF KITCHEN; 6EQ DIVISIONS=2905	PARTLY FIXED PARTLY OPENABLE GLAZED WINDOW WITH 4MM THK. CLEAR GLASS
W/3b	1	ALLUMINIUM WINDOW	2925	1500	2905	1480	300 ø CUTOUT FOR EXHAUST FAN OF PANTRY; 6EQ DIVISIONS=2905	PARTLY FIXED PARTLY OPENABLE GLAZED WINDOW WITH 4MM THK. CLEAR GLASS
W/4	4	ALLUMINIUM WINDOW	1500	1500	1480	1480	300 ø CUTOUT FOR EXHAUST FAN OF TOILET; 3EQ. DIVN=1480	PARTLY FIXED PARTLY OPENABLE GLAZED WINDOW WITH 4MM THK. FROSTED GLASS
W/5	2	ALLUMINIUM WINDOW	1430	1500	1410	1480	300 ø CUTOUT FOR EXHAUST FAN OF TOILET; 1410	PARTLY OPENABLE GLAZED WINDOW WITH 4MM THK. FROSTED GLASS
W/6	2	ALLUMINIUM WINDOW	780	1500	760	1480	300 ø CUTOUT FOR EXHAUST FAN OF TOILET; 760	PARTLY OPENABLE GLAZED WINDOW WITH 4MM THK. FROSTED GLASS
W/7	2	ALLUMINIUM WINDOW	695	1500	675	1480	300 ø CUTOUT FOR EXHAUST FAN OF TOILET; 675	PARTLY OPENABLE GLAZED WINDOW WITH 4MM THK. FROSTED GLASS
W/8	2	ALLUMINIUM WINDOW	2050	1500	1800	1480	300 ø CUTOUT FOR EXHAUST FAN OF TOILET; 1880	AS PER W/3

DOOR SCHEDULE

MARKED	QTY.	DESCRIPTION	MASONRY OPENING		DOOR OPENING		SKETCH	REMARKS
			WIDTH	HEIGHT	WIDTH	HEIGHT		
D/1	1	ALUMINIUM DOOR WITH GLAZING IN CURTAIN WALL	2000	2400			REF. SKETCH OF CURTAIN WALL CW/1	
D/2	2	DOUBLE LEAF WOODEN FLUSH DOOR WITH VISION PANEL	1500	2400	1480	2390	2390; 1480	
D/2a	2	ALUMINIUM DOOR WITH GLAZING	1200	2400	1180	2390	2390; 1180	
D/3	7	DOUBLE LEAF WOODEN FLUSH DOOR WITH VISION PANEL	1200	2400	1180	2390	2390; 1180	
D/3a	2	DOUBLE LEAF WOODEN PANEL DOOR WITH ETCHED CLEAR GLASS	1200	2400	1180	2390	2390; 1180	
D/4	28	SINGLE LEAF WOODEN FLUSH DOOR	1000	2400	980	2390	2390; 980	
D/5	2	FIRE CHECKED METAL DOOR	1000	2400	980	2390	2390; 980	
D/6	13	SINGLE LEAF WOODEN PANEL DOOR	750	2400	730	2390	2390; 730	
D/7	2	DOUBLE LEAF HOLLOW METAL FLUSH DOOR	1200	2400	1180	2390	2390; 1180	
D/8	1	SINGLE LEAF HOLLOW METAL FLUSH DOOR	750	2400	730	2390	2390; 730	
D/9	6	SINGLE LEAF WOODEN PANEL DOOR	800	2100	580	2090	2090; 580	
D/10	6	SINGLE LEAF WOODEN FLUSH DOOR	900	2400	880	2390	2390; 880	WITH DOOR CLOSER

NOTES :

1.) ALL DIMENSIONS ARE IN MILLIMETER UNLESS NOTED OTHERWISE.
2.) FOR GENERAL NOTES REF. DWG. NO. REL-DCRTP-CES-308-H-201

REF. DWGS.–

1.) REL-DCRTP-CES-308-H-201 ADMINISTRATIVE BUILDING – GROUND FLOOR PLAN & LOCATION MAP
2.) REL-DCRTP-CES-308-H-203 ADMINISTRATIVE BUILDING – ROOF PLAN, FINISH SCHEDULE
3.) REL-DCRTP-CES-308-H-204 ADMINISTRATIVE BUILDING – ELEVATIONS
4.) REL-DCRTP-CES-308-H-205 ADMINISTRATIVE BUILDING – SECTIONS

AS BUILT

ADMINISTRATIVE BUILDING
FIRST FLOOR PLAN, DOOR & WINDOW SCHEDULE

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION, PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PVT. LTD., CONSULTING ENGINEERS, NEW DELHI – INDIA

CENTRAL ELECTRICAL AUTHORITY, SEWA BHAWAN, R K PURAM, NEW DELHI

RELIANCE ENERGY LIMITED, EPC BUSINESS GROUP, RELIANCE ENERGY TOWER, A-2, SECTOR 24, NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA :– MUMBAI :– CHENNAI :– NEW DELHI

DRAWN :	MAJAY	CHECKED :	S.R.	SCALE :	1:100
REVIEWED :	PKP			DATE :	16.05.2006
APPROVED :	AA			DCPL JOB NO.:	K4A12

DRAWING NO. REL-DCRTP-CES-308-H-202 REV. Z

APPROV.	H.O.D	MECH.	INST.	ELEC.	STRL.	ARCH.
REVIEWED						

NO.	NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE
	AS BUILT			Z	

RELEASE STATUS	DATE	SIGNATURE
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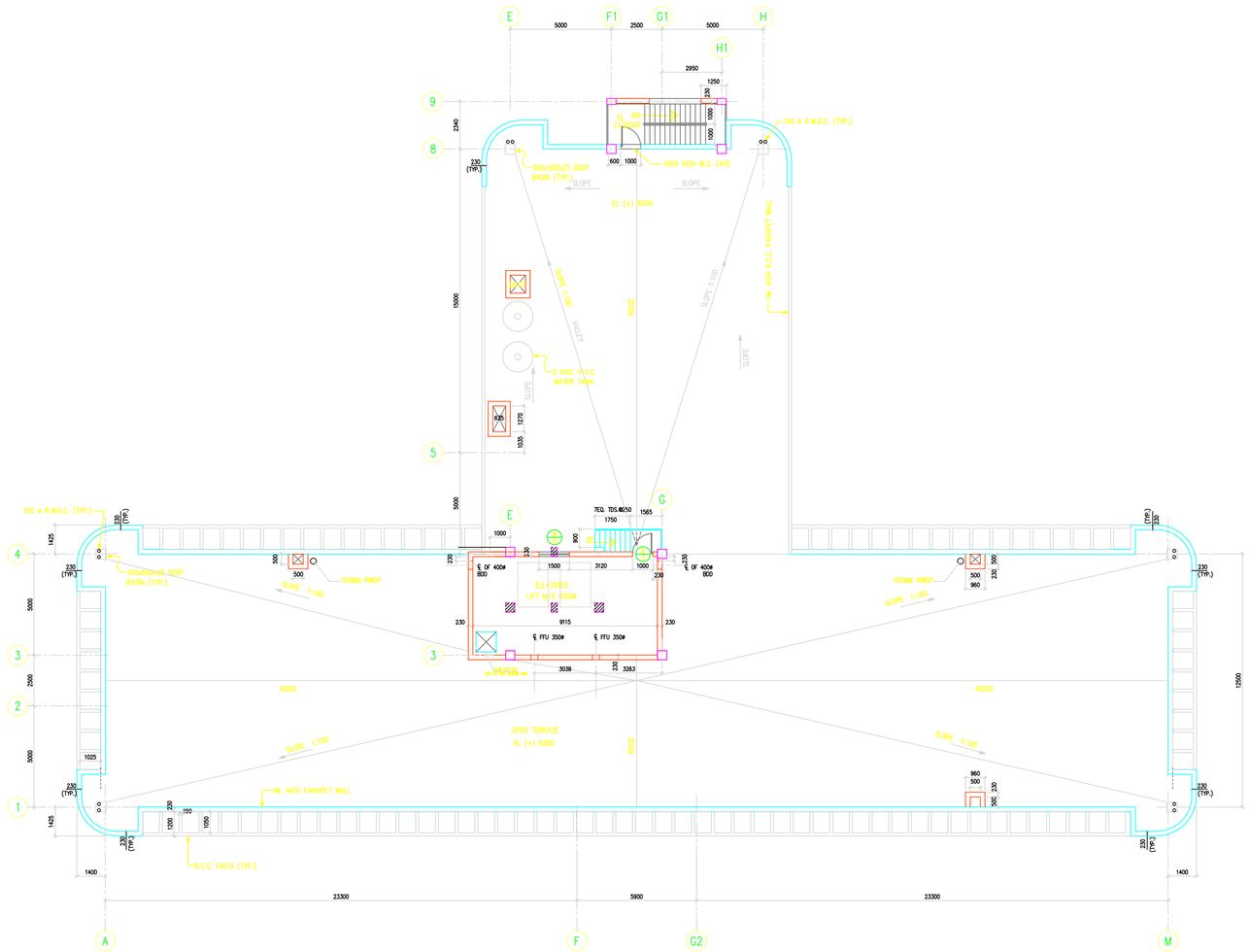
REVIEWED: ARCHITECTURAL		
REVIEWED: CIVIL & STRUCTURAL		
REVIEWED: ELECTRICAL		
REVIEWED: INSTRUMENTATION		
REVIEWED: MECHANICAL		
REVIEWED: ENGG. MANAGER		

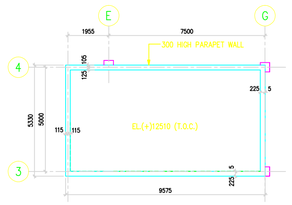
DWG. NO. REL-DCRTP-CES-308-H-203 REV. Z

FINISH SCHEDULE – ADMINISTRATIVE BUILDING

NAME OF THE ROOM	FLOOR							SKIRTING 150 HIGH						DADO			WALL				CEILING					REMARKS
	KOTA STONE	ANTISKID CERAMIC TILE	MARBELLE	TERRAZO TILES	IPS	GRANITE STONE SLAB	VITRIFIED CERAMIC TILES	TERRAZO TILES	CEMENT FINISH	GRANITE STONE SLAB	2MM THICK PVC TILE	UNGLAZED CERAMIC TILE	VITRIFIED CERAMIC TILES	GLAZED CERAMIC TILE UPTO 2.1M HIGH	CEMENT FINISH	MOISTURE CURED POLYURETHANE PAINT OVER PUTTY	ACRYLIC EMULSION PAINT OVER POP	OIL BOUND DISTEMPER PAINT	WHITE WASH	CEMENT PAINT	ACRYLIC EMULSION PAINT	SUSPENDED CEILING WITH GYPSUM BOARD	WHITE WASH	ALUMINIUM TILES SUSPENDED CEILING	MINERAL FIBER BOARD	
ENTRANCE LOBBY						●				●							●						●			GRANITE IN COMBINATION WITH MARBEL
RECEPTION AREA							●						●				●						●			
MAIN STAIRCASE			●														●						●			
ENTRANCE PORCH					●															●						
OFFICE AREA/LIBRARY							●						●								●				●	
CENFERENCE ROOM							●						●								●				●	
COMPUTER ROOM							●						●								●				●	
TOILET/PANTRY		●						●						●				●					●			
ALL OTHER AREAS INCLUDING AHU,ELC. ROOM.					●													●					●			
RECORD ROOM	●																	●					●			



ROOF PLAN



ROOF PLAN OF LIFT MACHINE ROOM AT EL.(+)12.510M

NOTES :

1.) ALL DIMENSIONS ARE IN MILLIMETER UNLESS NOTED OTHERWISE.
2.) FOR GENERAL NOTES REF. DWG. NO. REL-DCRTP-CES-308-H-201

REF. DWGS.–

1.) REL-DCRTP-CES-308-H-201 ADMINISTRATIVE BUILDING – GROUND FLOOR PLAN & LOCATION MAP
2.) REL-DCRTP-CES-308-H-202 ADMINISTRATIVE BUILDING – FIRST FLOOR PLAN, DOOR & WINDOW SCHEDULE
3.) REL-DCRTP-CES-308-H-204 ADMINISTRATIVE BUILDING – ELEVATIONS
4.) REL-DCRTP-CES-308-H-205 ADMINISTRATIVE BUILDING – SECTIONS

AS BUILT

ADMINISTRATIVE BUILDING
ROOF PLAN & FINISH SCHEDULE

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: **HARYANA POWER GENERATION CORPORATION**
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PVT. LTD.
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CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

APPROV.	H.O.D	MECH.	INST.	ELEC.	STRL.	ARCH.
REVIEWED						

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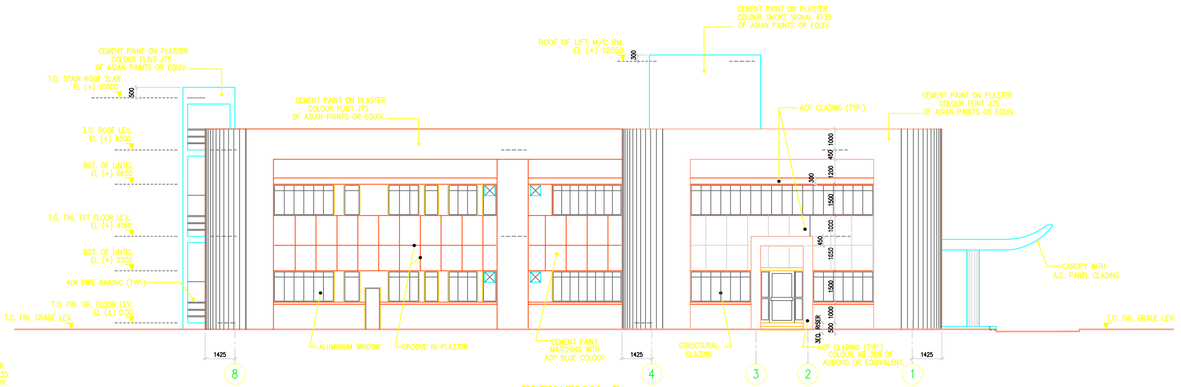
INSTRUMENTATION		
MECHANICAL		
ENGG. MANAGER		

REVIEWED

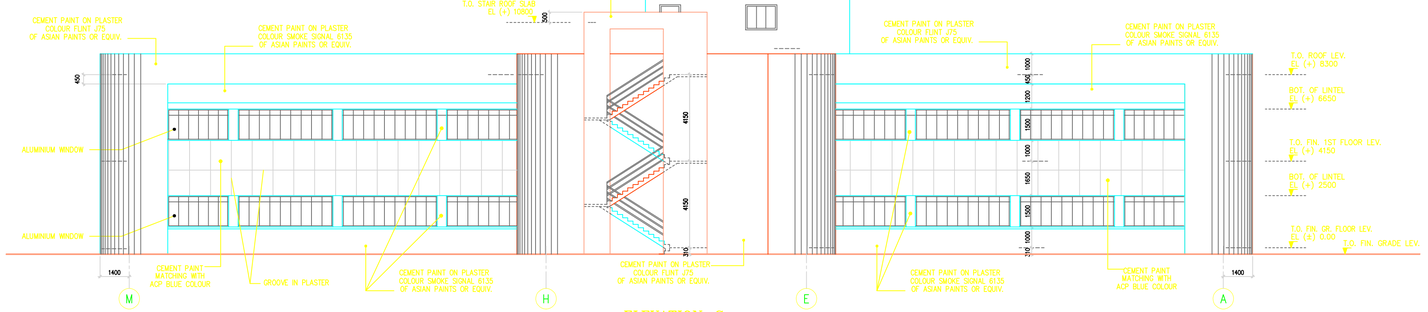
DRAWN : MKAY CHECKED : SR SCALE : 1:100
REVIEWED : PKP DATE : 15.07.2005
APPROVED : AA DCPL JOB NO.: K4A12

DRAWING NO. REL-DCRTP-CES-308-H-203 REV. Z

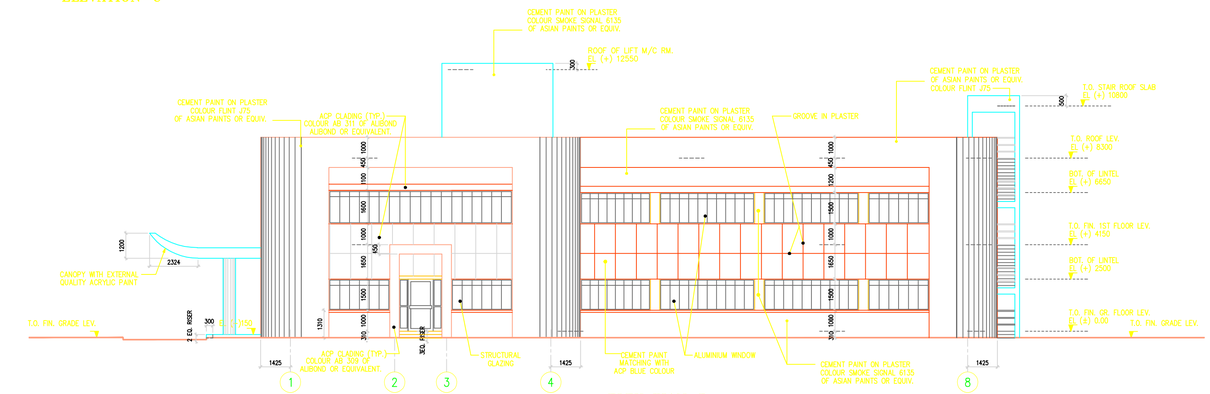
A1 (09-96) [841 x 594]



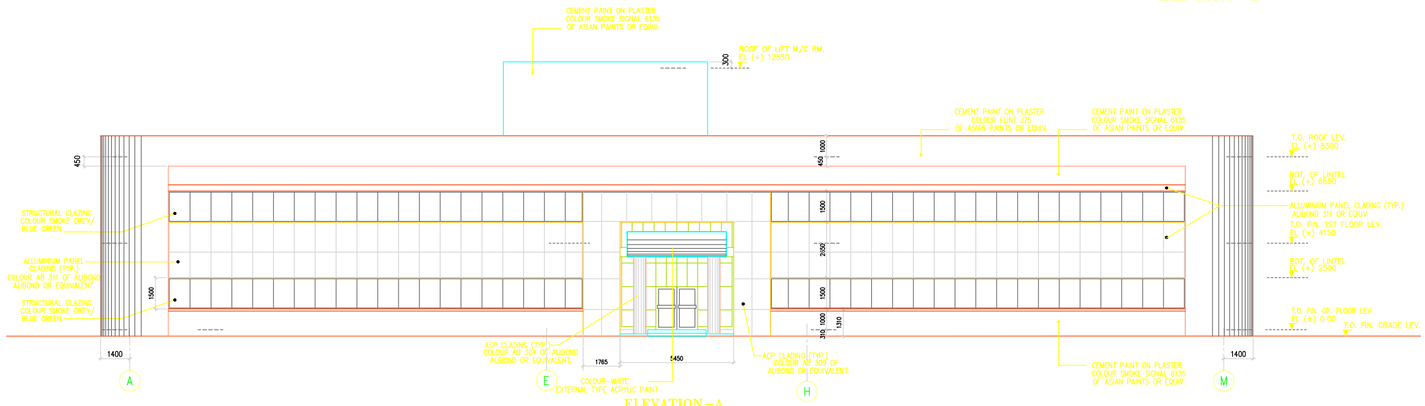
ELEVATION–D



ELEVATION–C



ELEVATION–B



ELEVATION–A

NOTES :

1.) ALL DIMENSIONS ARE IN MILLIMETER UNLESS NOTED OTHERWISE.

2.) FOR GENERAL NOTES REF. DWG. NO. REL-DCRTP-CES-308-H-201

REF. DWGS.–

1.) REL-DCRTP-CES-308-H-201 ADMINISTRATIVE BUILDING :– GROUND FLOOR PLAN & LOCATION MAP.

2.) REL-DCRTP-CES-308-H-202 ADMINISTRATIVE BUILDING :– FIRST FLOOR PLAN, DOOR & WINDOW SCHEDULE.

3.) REL-DCRTP-CES-308-H-203 ADMINISTRATIVE BUILDING :– ROOF PLAN & FINISH SCHEDULE.

4.) REL-DCRTP-CES-308-H-205 ADMINISTRATIVE BUILDING :– SECTIONS.

AS BUILT

ADMINISTRATIVE BUILDING
ELEVATIONS

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION
PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PVT. LTD.
DESEIN PRIVATE LIMITED
CONSULTING ENGINEERS
NEW DELHI – INDIA

CENTRAL ELECTRICAL AUTHORITYDD
CENTRAL ELECTRICITY AUTHORITY
SEWA BHAWAN, R K PURAM
NEW DELHI

RELIANCE ENERGY LIMITED
EPC BUSINESS GROUP
RELIANCE ENERGY TOWER, A-2, SECTOR 24
NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

												RELEASE STATUS	DATE	SIGNATURE
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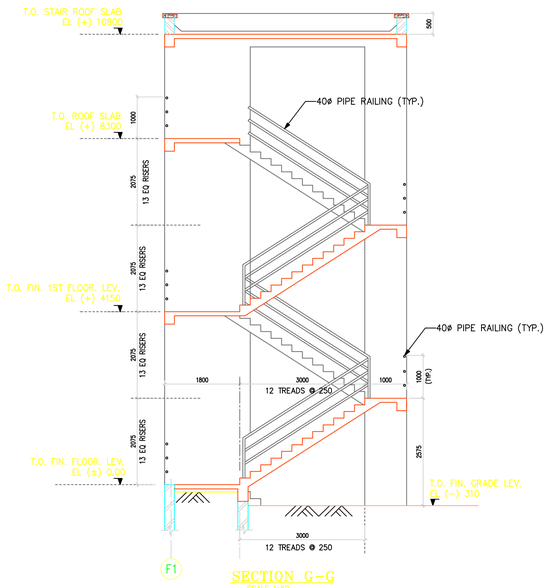
												FOR TENDER ONLY		
												FOR CONSTRUCTION		
												ARCHITECTURAL		
												CIVIL & STRUCTURAL		
												ELECTRICAL		
												INSTRUMENTATION		
												MECHANICAL		
												ENG. MANAGER		
APPROV.	H.O.D	MECH.	INST.	ELEC.	STRL.	ARCH.	AS BUILT	NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE	REVIEWED	

DRAWN : MKAY CHECKED : SR SCALE : 1:100
REVIEWED : PKP DATE : 15.05.2006
APPROVED : AA DCPL JOB NO.: K4A12

DRAWING NO. REL-DCRTP-CES-308-H-204 REV. 2

A1 (09-96) [841 x 594]



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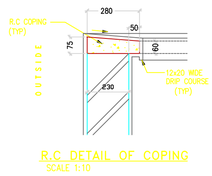

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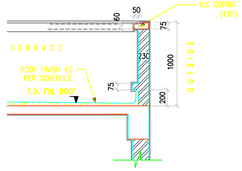

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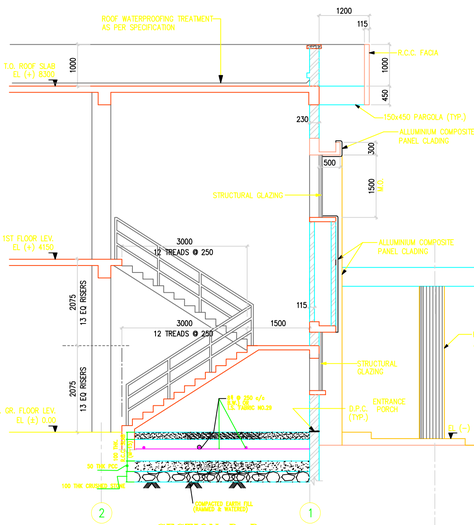

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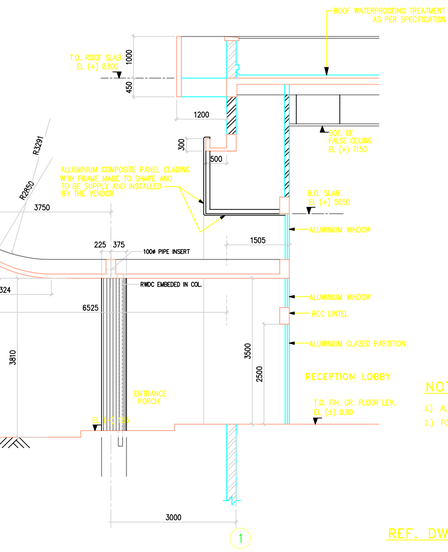

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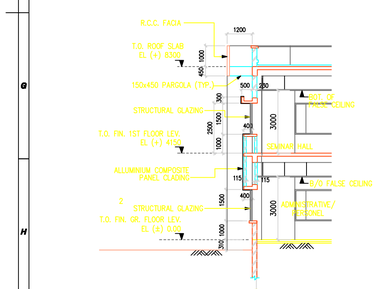

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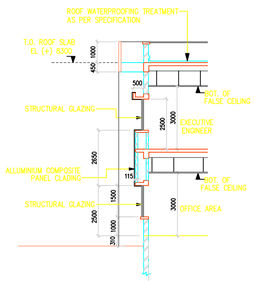

SECTION E–E

SECTION A–A

SECTION C–C

NOTES :

1.) ALL DIMENSIONS ARE IN MILLIMETER UNLESS NOTED OTHERWISE.
2.) FOR GENERAL NOTES REF. DWG. NO. REL-DCRTP-CES-312-C-821

REF. DWGS.–

1.) REL-DCRTP-CES-308-H-201 ADMINISTRATIVE BUILDING – GROUND FLOOR PLAN & LOCATION MAP
2.) REL-DCRTP-CES-308-H-202 ADMINISTRATIVE BUILDING – FIRST FLOOR PLAN, DOOR & WINDOW SCHEDULE
3.) REL-DCRTP-CES-308-H-203 ADMINISTRATIVE BUILDING – ROOF PLAN & FINISH SCHEDULE
4.) REL-DCRTP-CES-308-H-204 ADMINISTRATIVE BUILDING – ELEVATIONS

AS BUILT

ADMINISTRATIVE BUILDING
SECTIONS

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PVT. LTD. CONSULTING ENGINEERS NEW DELHI – INDIA

CENTRAL ELECTRICAL AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI

RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A–2, SECTOR 24 NOIDA–201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED
CONSULTING ENGINEERS
KOLKATA – MUMBAI – CHENNAI – NEW DELHI

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														FOR TENDER ONLY		
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														ARCHITECTURAL		
														CIVIL & STRUCTURAL		
														ELECTRICAL		
														INSTRUMENTATION		
														MECHANICAL		
														ENGG. MANAGER		

REVIEWED

APPROV.	H.O.D	MECH.	INST.	ELEC.	STRL.	ARCH.
REVIEWED						

					Z	AS BUILT
						NATURE OF REVISION & DESCRIPTION

CHECKED	DRAWN	REV.	DATE

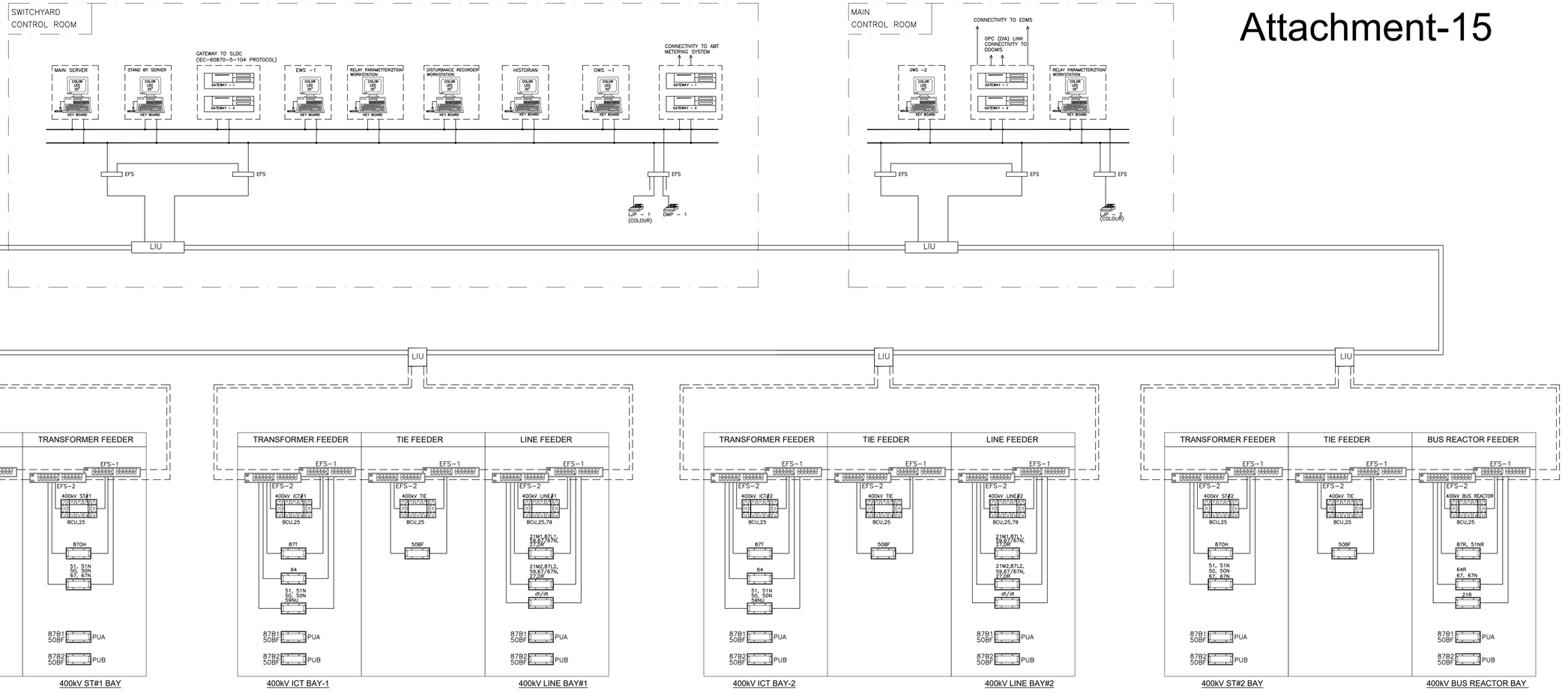
DRAWN :	MALAY	CHECKED :	SIR
REVIEWED :	PKP		
APPROVED :	AA		

SCALE : 1:100
DATE : 16.05.2012
DCPL JOB NO.: K4A12

DRAWING NO. REL-DCRTP-CES-308-H-205 REV. Z

A1 (09–96) [841 x 594]

Attachment-15

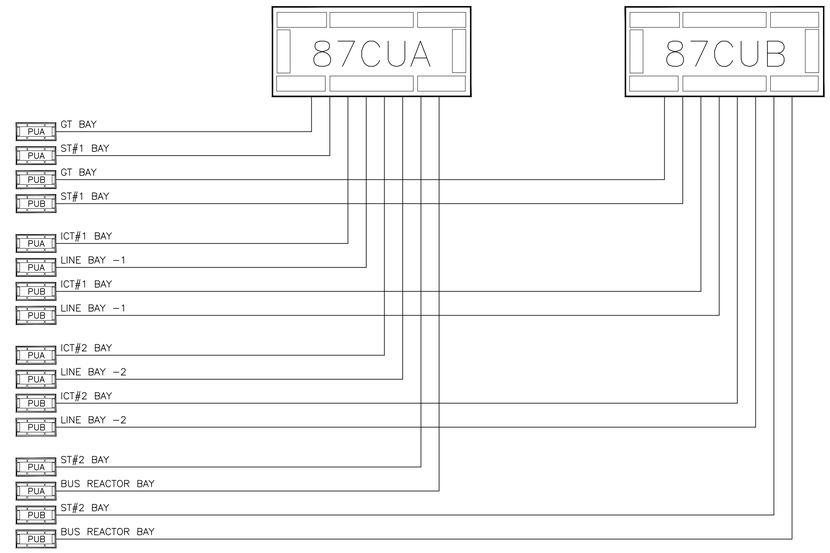


NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION.
2. THE REQUIREMENT SHOWN ARE MINIMUM ONLY. BIDDER TO PROVIDE COMPLETE SAS FOR THE RELIABLE OPERATION.
3. FOR CONNECTION RJ45 CABLE (CAT 5/ CAT 6), SINGLE MODE OFC PATCH CABLE & SINGLE MODE MUTICORE CABLE TO BE USED..

LEGEND:

EFS	ETHERNET FIBER SWITCH
OWS	OPERATOR WORKSTATION
EWS	ENGINEERING WORKSTATION
LJP	LASERJET PRINTER
DDCMIS	DISTRIBUTEDDIGITAL CONTROL MONITORING AND INFORMATION SYSTEM
DMP	DOT MATRIX PRINTER
PU	PERIPHERAL UNIT
CU	CENTRAL UNIT
LIU	LINE INTERFACE UNIT



SR.	No.	PARTY
		PRINT DISTRIBUTION

REFERENCE DRAWINGS.

NOTES

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	6							
	5							
	4							
	3							
	2							
	1							
	0	FOR TENDER PURPOSE ONLY	01.06.2023					

REVISIONS APPROVED

Page 1 of 1

CLIENT: HPGCL

HARYANA POWER GENERATION CORPORATION LTD.

CONSULTANT: DESEIN

DESEIN PRIVATE LIMITED
CONSULTING ENGINEERS, NEW DELHI, INDIA

PROJECT: 1x800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR

TITLE :- 400KV SAS CONFIGRATION DIAGRAM

	NAME	SIGN.	DATE
CAD/DRAWN	MOTI RAM		23.05.2023
DESIGNED	VNG		23.05.2023
CHECKED	VNG		01.06.2023
SCALE	NTS		

JOB. NO. D-04041

DWG. NO. 112-10-0400

REV. O

RELAY MANAGEMENT SYSTEM (RMS)

ATTACHMENT 16

LEGEND:

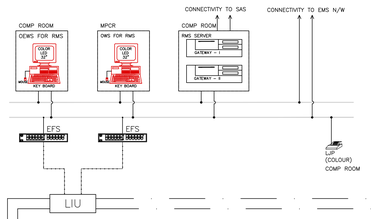
EFS	ETHERNET FIBER SWITCH
OWS	OPERATOR WORKSTATION
OEWS	OPERATOR CUM ENGINEERING WORKSTATION
LJP	LASERJET PRINTER
DDCMIS	DISTRIBUTED DIGITAL CONTROL MONITORING AND INFORMATION SYSTEM
MPCR	MAIN PLANT CONTROL ROOM
NR	NUMERICAL RELAY
MFM	MULTIFUNCTION METER
LIU	LINE INTERFACE UNIT
IC	INTELLIGENT CONTROLLER

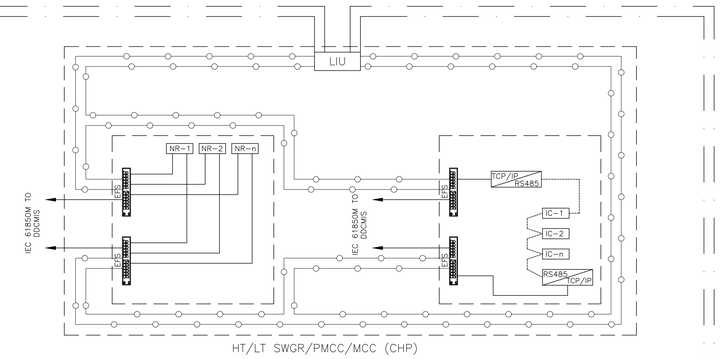
RS 485 COPPER WIRE LINK

FIBRE OPTIC CABLE

FIBRE OPTIC PATCH CABLE

UTP CABLE (CAT5/CAT6) RJ45 ETHERNET LINK





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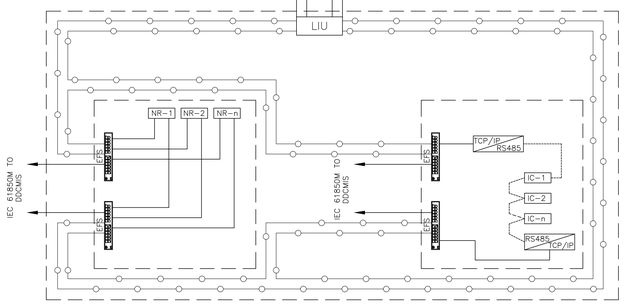

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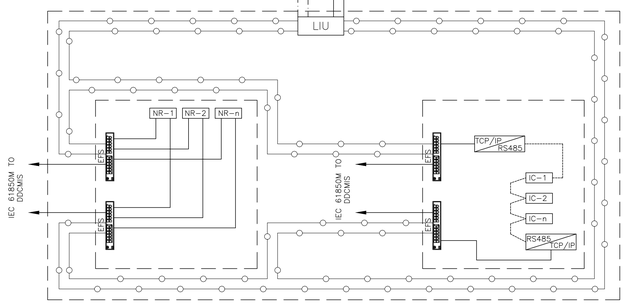

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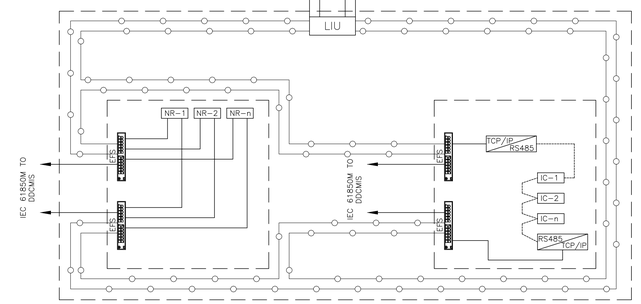

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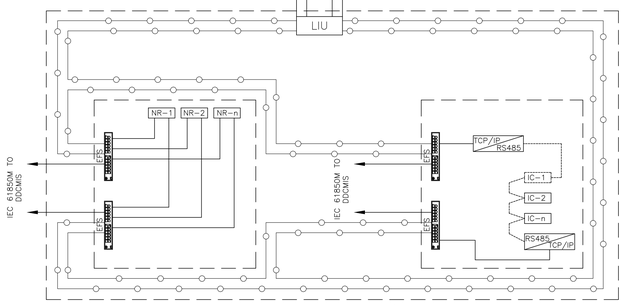

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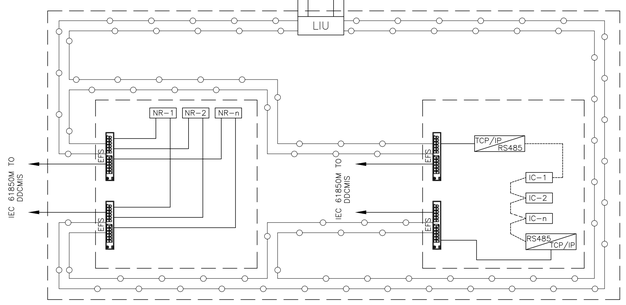

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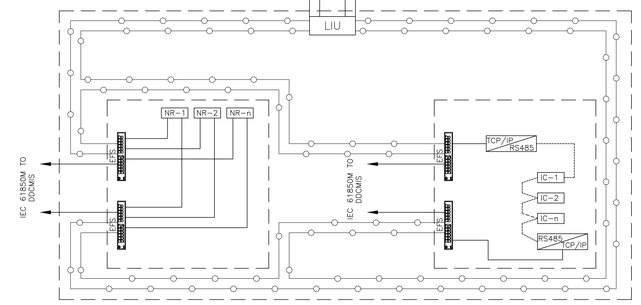

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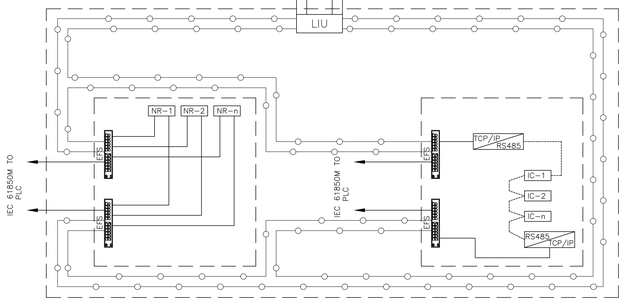

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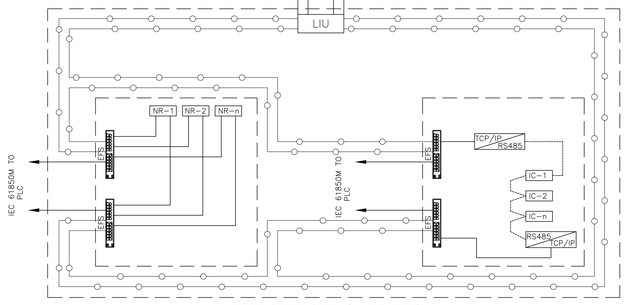

LT SWGR/PMCC/MCC (ETP & STP)

REFERENCE DRAWINGS.

NOTES

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REVISIONS

APPROVED

CLIENT: HARYANA POWER GENERATION CORPORATION LTD.

CONSULTANT: DESEIN PRIVATE LIMITED
CONSULTING ENGINEERS, NEW DELHI, INDIA

PROJECT: 1x800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR

TITLE :- RELAY & ENERGY MANAGEMENT SYSTEM

	NAME	SIGN.	DATE
CAD/DRAWN	MOTI RAM		12.06.2023
DESIGNED	VNG		12.06.2023
CHECKED	VNG		12.06.2023
SCALE	NTS		

JOB. NO. D-04041

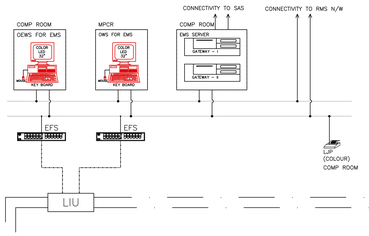
DWG. NO. 112-10-0500 REV. O

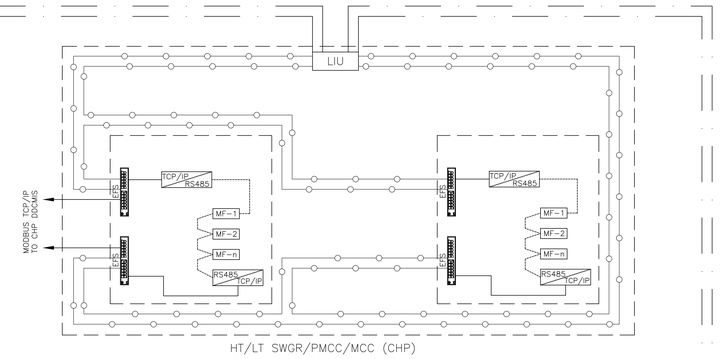
SHEET NO. 01 OF 02

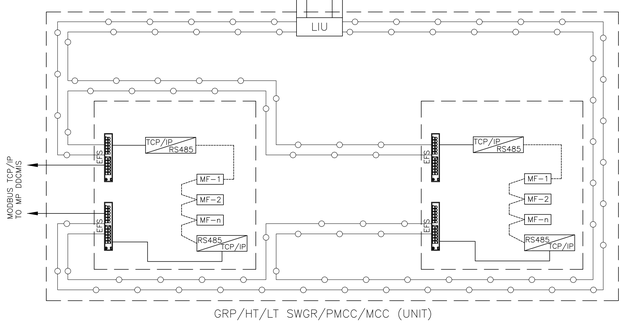
ENERGY MANAGEMENT SYSTEM (EMS)

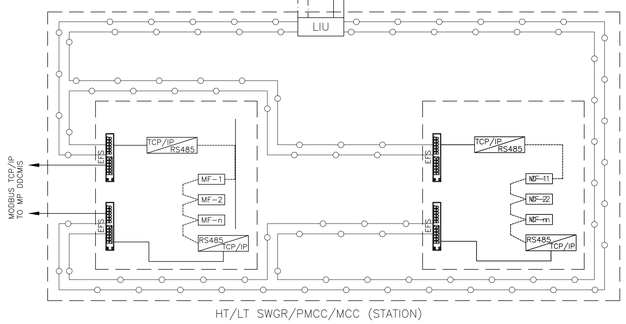
NOTES:

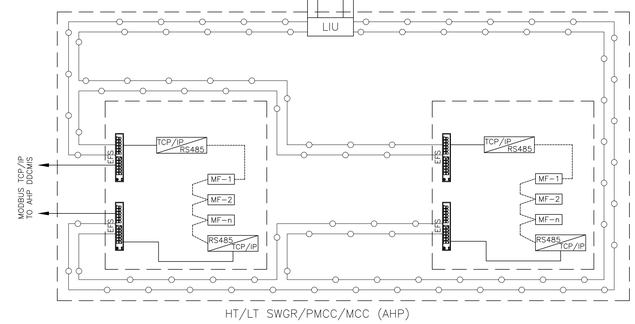
1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION.
2. THE REQUIREMENT SHOWN ARE MINIMUM ONLY. BIDDER TO PROVIDE COMPLETE RMS & EMS FOR THE RELIABLE OPERATION.
3. "n" DENOTES NUMBER OF RELAYS/INTELLIGENT CONTROLLERS/METERS AS APPLICABLE.
4. THE COMPLETE SYSTEM (EMS & RMS) SHALL BE SYNCHRONISED WIT GPS MASTER CLOCK SYSTEM.
5. EFS OF RELAY MANAGEMENT SYSTEM AND ENERGY MANAGEMENT SYSTEM IN MPB (UNIT & STATION), CHP, AHP, FGD, DM PLANT, RW SYSTEM, H2 PLANT, ETP & STP SHALL BE CONNECTED TO RESPECTIVE AREA DDCMIS/PLC (AS APPLICABLE)
6. NUMBER OF EFS (MIN. 8 PORTS), NUMBER OF MF IN SERIAL INTERFACE CONNECTION SHALL BE DECIDED DURING DETAILED ENGINEERING.
7. ENERGY MANAGEMENT SYSTEM (EMS) SERVER SHALL BE COMMON FOR ENTIRE PLANT (LOCATED IN MPCR/COMPUTER ROOM) INCLUDING MPB. CHP. AHP. FGD, DM PLANT, RW SYSTEM, H2 PLANT AND ETP/STP.
8. RELAY MANAGEMENT SYSTEM (RMS) SERVER SHALL BE COMMON FOR ENTIRE PLANT (LOCATED IN MPCR/COMPUTER ROOM) INCLUDING MPB. CHP. AHP. FGD, DM PLANT, RW SYSTEM, H2 PLANT AND ETP/STP.
9. EMS NETWORK SHALL BE CONNECTED TO SAS THROUGH SUITABLE COMMUNICATION LINK/GATEWAYS. EMS NETWORK SHALL ALSO BE CONNECTED TO RMS NETWORK.
10. ALL SWBD LEVEL EFS SHALL BE HOUSED IN SEPERATE NETWORK PANEL WHICH SHALL BE EITHER STANDALONE OR WALL MOUNTED TO BE DECIDED DURING DETAILED ENGINEERING.

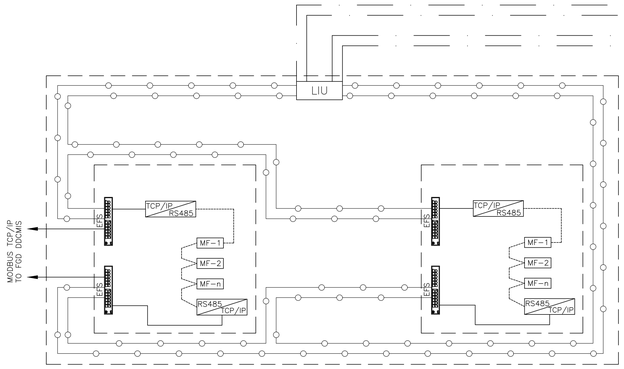


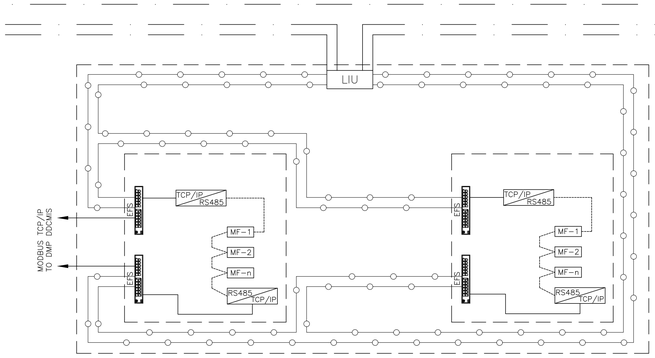


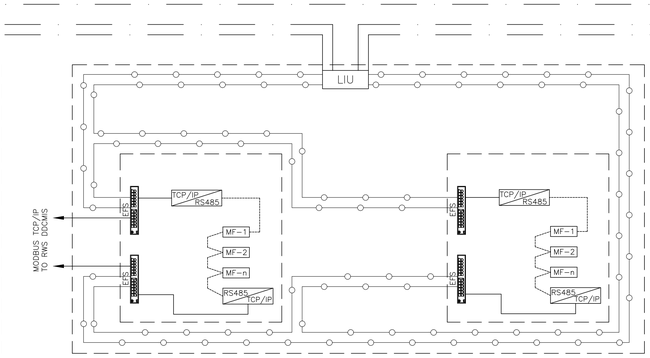


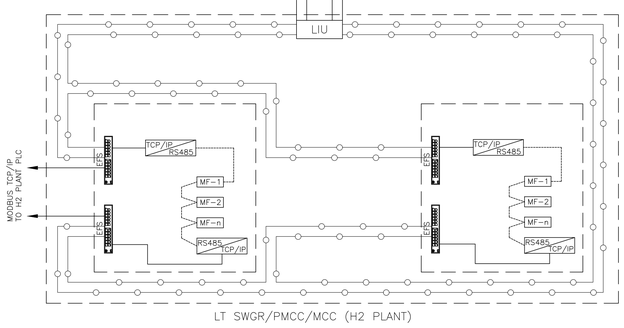


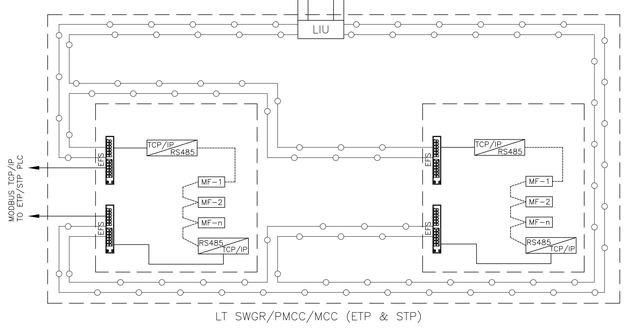












REFERENCE DRAWINGS.	NOTES	NOTICE
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APPROVED

CLIENT: HARYANA POWER GENERATION CORPORATION LTD. (HPGCL)

CONSULTANT: DESEIN PRIVATE LIMITED
CONSULTING ENGINEERS, NEW DELHI, INDIA

PROJECT: 1x800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR

TITLE :-
RELAY & ENERGY MANAGEMENT SYSTEM

	NAME	SIGN.	DATE
CAD/DRAWN	MOTI RAM		12.06.2023
DESIGNED	VNG		12.06.2023
CHECKED	VNG		12.06.2023
SCALE	NTS		

JOB. NO. D-04041

DWG. NO. 112-10-0500 SHEET NO. 02 OF 02 — REV. O

Attachment No. – 17

REACTOR CLARIFIER UNIT

1) The unit shall be designed with a minimum retention time of 90 minutes in the settling zone. Larger retention time may be provided to meet the equipment guarantee.

2) The overall area of the unit shall be based on an average flow velocity not more than 3 $m^3/m^2/hr$. Weir loading shall not exceed 300 $m^3/m/day$. For uniform overflow over weirs, triangular notches (saw tooth weir) shall be provided as necessary.

3) Clear width of the bridge shall not be less than 1200 mm. All the Reactor Clarifiers shall be equipped with full bridge.

4) Design of the sludge removal system should be such as to reduce loss of water during sludge blow off within 3% of rated flow.

5) The clarifier periphery (all around) shall have sufficient width (minimum 850 mm) to have an easy walkway for general inspection. The walkway shall be provided with handrails along with periphery access (staircase) at least from two (2) locations with platforms and hand railing for the clarifiers for good approach. Permanent ladder shall also be provided (not rungs) for approaching the sludge pipeline valves for maintenance.

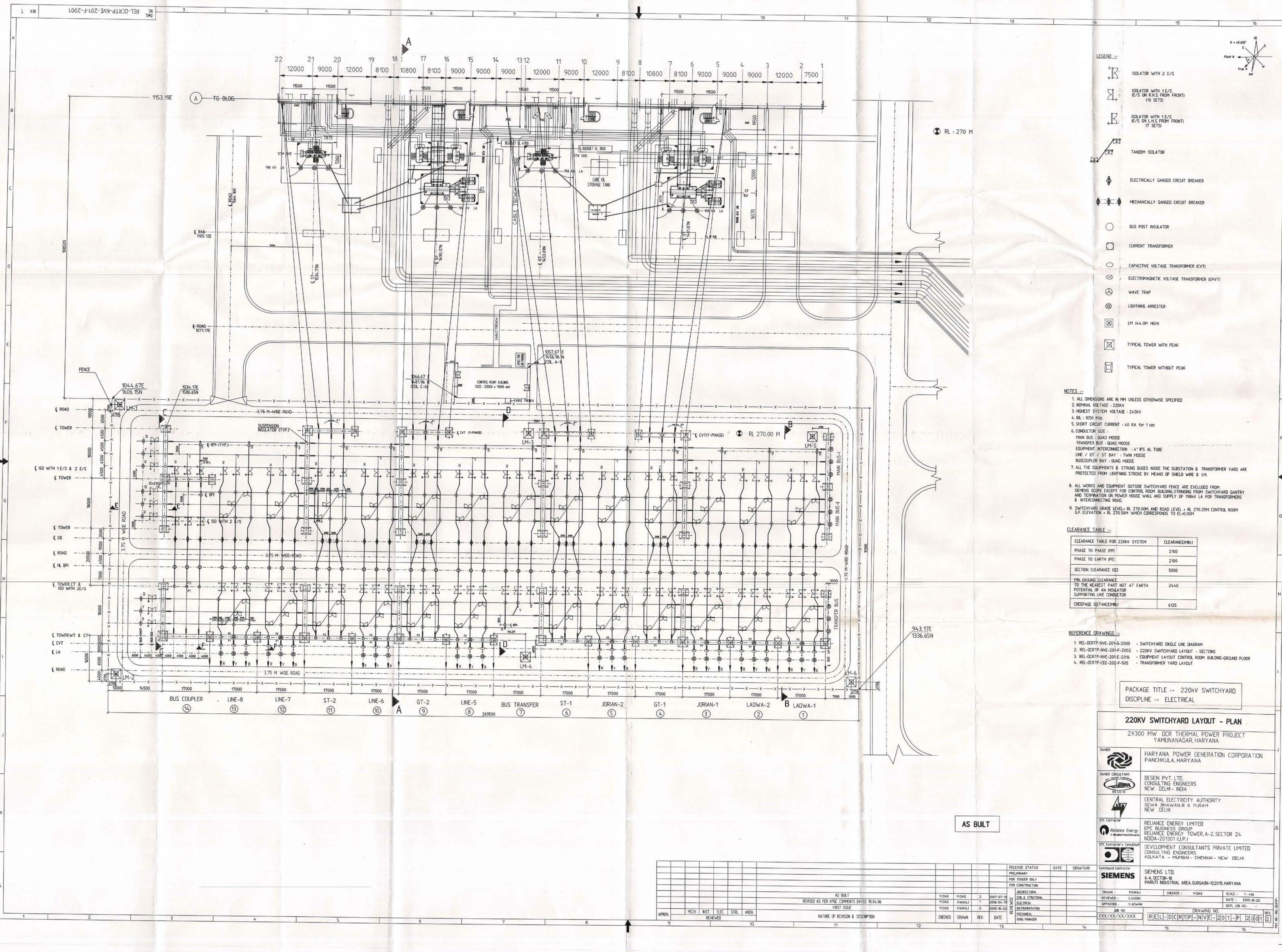
6) The sludge valves shall be operatable from the top of the sludge chamber through head stock and extended spindle arrangement.

Attachment/18

Chapter -9, Painting (9.9)(b)

Structure	Prime coat (Micron)	Intermediate coat (Micron)	Top coat (Micron)	Total Dft.
Station building, Boiler structure, Mill & bunker bay structure, ESP structure , Misc. Covered structure	Inorganic zinc silicate 1x75		HB epoxy polyamide (pigmented) 1x75	150
DM plant	Inorganic zinc silicate 1x75	HB MIO Epoxy 1x125	Aromatic Polyurethane acid resistant 1x50	250
FGD structures, coal handling structures, ash handling structures, lime handling and Gypsum handling structures.	Inorganic zinc silicate 1x75	HB MIO Epoxy 1x125	HB epoxy polyamide (pigmented) 1x75	275
Pipe and cable rack and misc open structure	Inorganic zinc silicate 1x75		Aliphatic polyurethane (UV resistant) 1x50	125

Attachment-19



LEGEND :-

- ISOLATOR WITH 2 E/S
- ISOLATOR WITH 1 E/S (E/S ON R.H.S. FROM FRONT) (10 SETS)
- ISOLATOR WITH 1 E/S (E/S ON L.H.S. FROM FRONT) (7 SETS)
- TANDEM ISOLATOR
- ELECTRICALLY GANGED CIRCUIT BREAKER
- MECHANICALLY GANGED CIRCUIT BREAKER
- BUS POST INSULATOR
- CURRENT TRANSFORMER
- CAPACITIVE VOLTAGE TRANSFORMER (CVT)
- ELECTROMAGNETIC VOLTAGE TRANSFORMER (EMVT)
- WAVE TRAP
- LIGHTNING ARRESTER
- LM 144.0M HIGH
- TYPICAL TOWER WITH PEAK
- TYPICAL TOWER WITHOUT PEAK

NOTES :-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED
2. NOMINAL VOLTAGE : 220KV
3. HIGHEST SYSTEM VOLTAGE : 245KV
4. BIL : 1050 KVp
5. SHORT CIRCUIT CURRENT : 40 KA for 1 sec
6. CONDUCTOR SIZE :
   MAIN BUS : QUAD MOOSE
   TRANSFER BUS : QUAD MOOSE
   EQUIPMENT INTERCONNECTION : 4" IPS AL TUBE
   LINE / GT / ST BAY : TWIN MOOSE
   BUSCOUPLER BAY : QUAD MOOSE
7. ALL THE EQUIPMENTS & STRUNG BUSES INSIDE THE SUBSTATION & TRANSFORMER YARD ARE PROTECTED FROM LIGHTNING STROKE BY MEANS OF SHIELD WIRE & LM.
8. ALL WORKS AND EQUIPMENT OUTSIDE SWITCHYARD FENCE ARE EXCLUDED FROM SIEMENS SCOPE EXCEPT FOR CONTROL ROOM BUILDING,STRINGING FROM SWITCHYARD GANTRY AND TERMINATION ON POWER HOUSE WALL AND SUPPLY OF 198kV LA FOR TRANSFORMERS & INTERCONNECTING ROAD.
9. SWITCHYARD GRADE LEVEL= RL 270.00M, AND ROAD LEVEL = RL 270.25M. CONTROL ROOM G.F. ELEVATION = RL 270.50M WHICH CORRESPONDS TO EL=0.00M

CLEARANCE TABLE :-

CLEARANCE TABLE FOR 220kV SYSTEM	CLEARANCE(MIN.)
PHASE TO PHASE (PP)	2100
PHASE TO EARTH (PE)	2100
SECTION CLEARANCE (SC)	5000
MIN. GROUND CLEARANCE TO THE NEAREST PART NOT AT EARTH POTENTIAL OF AN INSULATOR SUPPORTING LIVE CONDUCTOR	2440
CREEPAGE DISTANCE(MIN.)	6125

REFERENCE DRAWINGS :-

1. REL-DCRTP-NVE-201G-2000 - SWITCHYARD SINGLE LINE DIAGRAM
2. REL-DCRTP-NVE-201F-2002 - 220kV SWITCHYARD LAYOUT - SECTIONS
3. REL-DCRTP-NVE-201E-2016 - EQUIPMENT LAYOUT CONTROL ROOM BUILDING-GROUND FLOOR
4. REL-DCRTP-CEE-202-F-505 - TRANSFORMER YARD LAYOUT

PACKAGE TITLE :- 220kV SWITCHYARD
DISCIPLINE :- ELECTRICAL

220KV SWITCHYARD LAYOUT - PLAN

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
OWNER CONSULTANT	DESEIN PVT. LTD. CONSULTING ENGINEERS NEW DELHI - INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
EPC Contractor	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
EPC Contractor's Consultant	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
Switchyard Contractor	SIEMENS LTD. 6-A, SECTOR-18 MARUTI INDUSTRIAL AREA, GURGAON-122015, HARYANA

AS BUILT

REVIEWED	RELEASE STATUS	DATE	SIGNATURE
	PRELIMINARY		
	FOR TENDER ONLY		
	FOR CONSTRUCTION		
	ARCHITECTURAL		
	CIVIL & STRUCTURAL		
	ELECTRICAL		
	INSTRUMENTATION		
	MECHANICAL		
	ENGG. MANAGER		

REV.	NATURE OF REVISION & DESCRIPTION	DRAWN	CHECKED	DATE
2	AS BUILT	M.DAS	M.DAS	2007-07-10
1	REVISED AS PER HPGC COMMENTS DATED 19.04.06	M.DAS	PANKAJ	2006-04-19
0	FIRST ISSUE	M.DAS	PANKAJ	2005-10-20

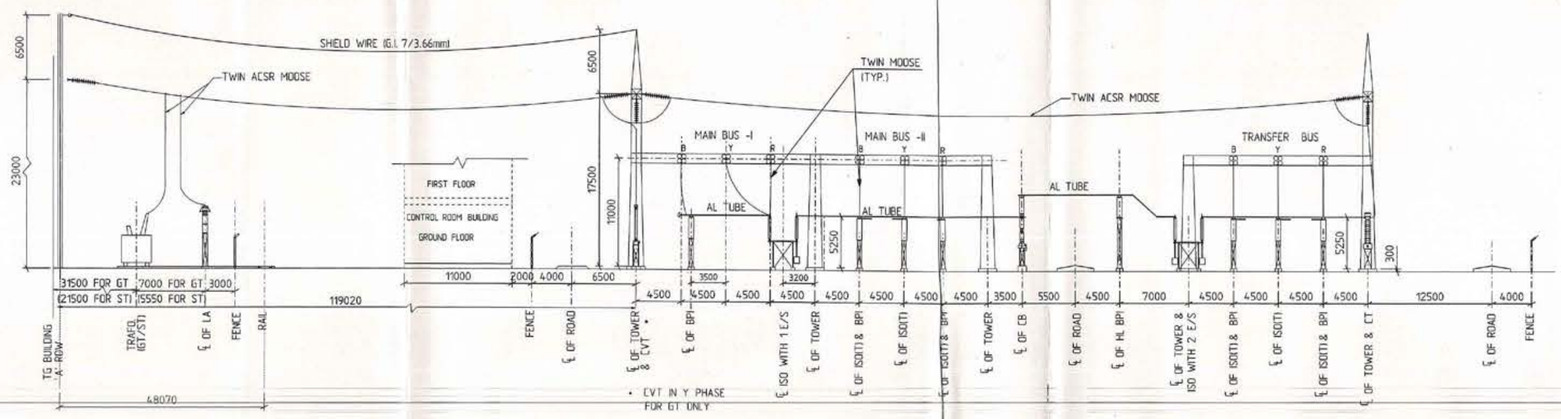
APPRV. REVIEWED: MECH. INST. ELEC. STRL. ARCH.

DRAWN : PANKAJ	CHECKED : M.DAS
REVIEWED : S.GHOSH	SCALE : 1:400
APPROVED : V.ADWANI	DATE : 2005-10-20
JOB NO. XXX/XX/XX/XXX	DCPL JOB NO. : -
DRAWING NO. REL-DCRTP-NVE-201-F-2001	REV. 2

PAGE NO. REL-DCRTP-

Page 1 of 2

A1 (ISO x 841)



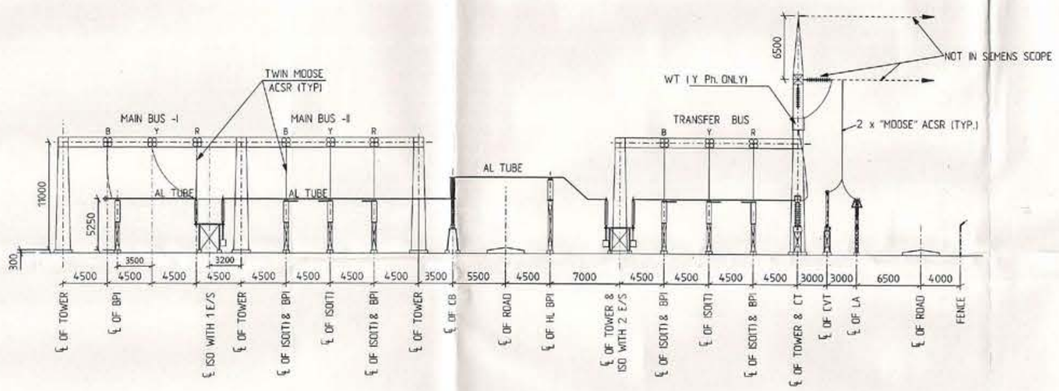
NOTES:-

1. ALL THE DIMENSIONS ARE IN MM.
2. FOR OTHER NOTES AND DETAIL REFER " 220KV SWITCHYARD LAYOUT-PLAN"
3. PLANT GRADE LEVEL RL:270.0M CORRESPONDS TO EL-0.5M
   CONTROL ROOM BLDG. G/F GRADE LEVEL RL:270.5M CORRESPONDS TO EL 0.0M
   ROAD TOP GRADE LEVEL RL:270.25M CORRESPONDS TO EL-0.25M
   SWITCHYARD GRAVEL TOP GRADE LEVEL RL:270.10M CORRESPONDS TO EL-0.4M

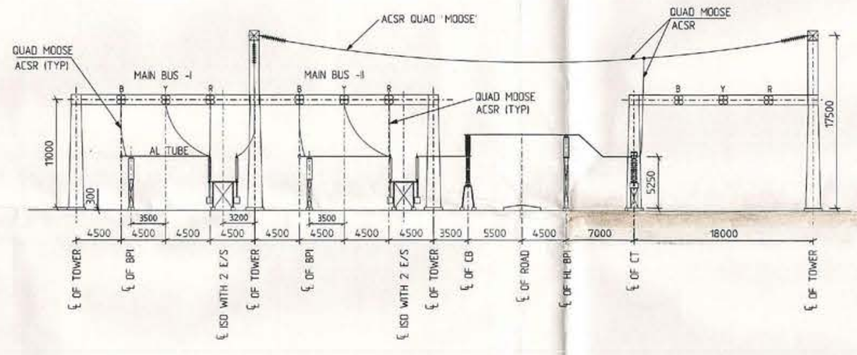
REFERENCE DRAWINGS:-

1 REF. DRAWING - REL-DCRTP-NVE-201-G-2000 - SWITCHYARD SINGLE LINE DIAGRAM
2 REF. DRAWING - REL-DCRTP-NVE-201-F-2001 - 220KV SWITCHYARD LAYOUT-PLAN

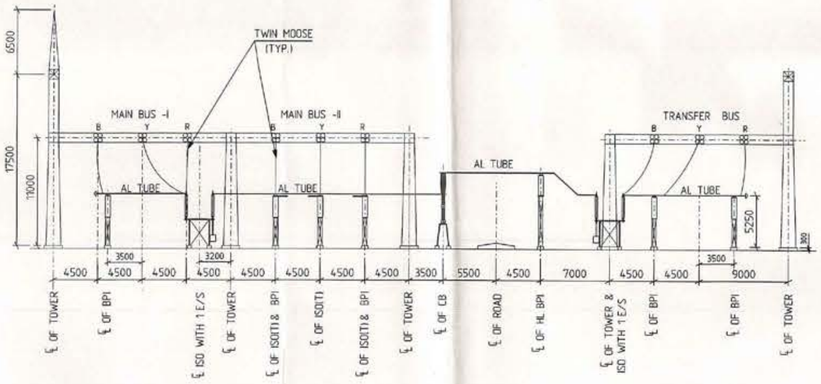
(GEN. TRANF. / STATION TRANF. BAY)
SECTION A-A



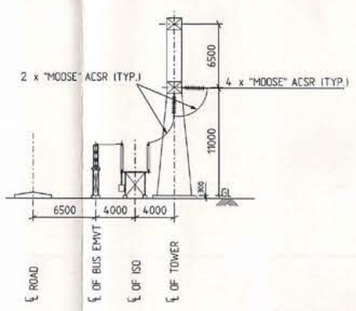
LINE BAY
SECTION B-B



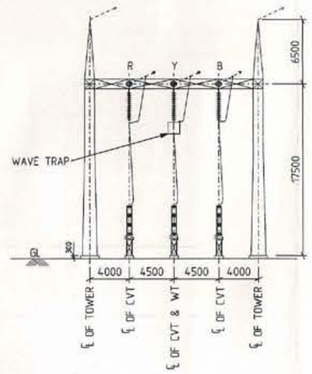
BUS COUPLER BAY
SECTION C-C



BUS TRANSFER BAY
SECTION D-D



(BUS EMVT)
SECTION E-E



SECTION F-F

PACKAGE TITLE :- 220kV SWITCHYARD
DISCIPLINE :- ELECTRICAL

220kV SWITCHYARD LAYOUT- SECTIONS

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER:	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
OWNER CONSULTANT: DESEIN	DESEIN PVT. LTD. CONSULTING ENGINEERS NEW DELHI - INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
EPC Contractor: Reliance Energy	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
EPC Contractor's Consultant	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
Switchyard Contractor: SIEMENS	SIEMENS LTD. 6-A, SECTOR-18 MARUTI INDUSTRIAL AREA, GURGAON-122015, HARYANA

DRAWN :	CHANDAN PRASAD	CHECKED :	M.DAS	SCALE :	1 : 300
REVIEWED :	S. GHOSH			DATE :	2005-10-20
APPROVED :	V. AGWAN			DCPL JOB NO. :	-
JOB NO.	XXX/XX/XX/XXX	DRAWING NO.	REL-DCRTP-NVE-201-F-2002	REV.	2

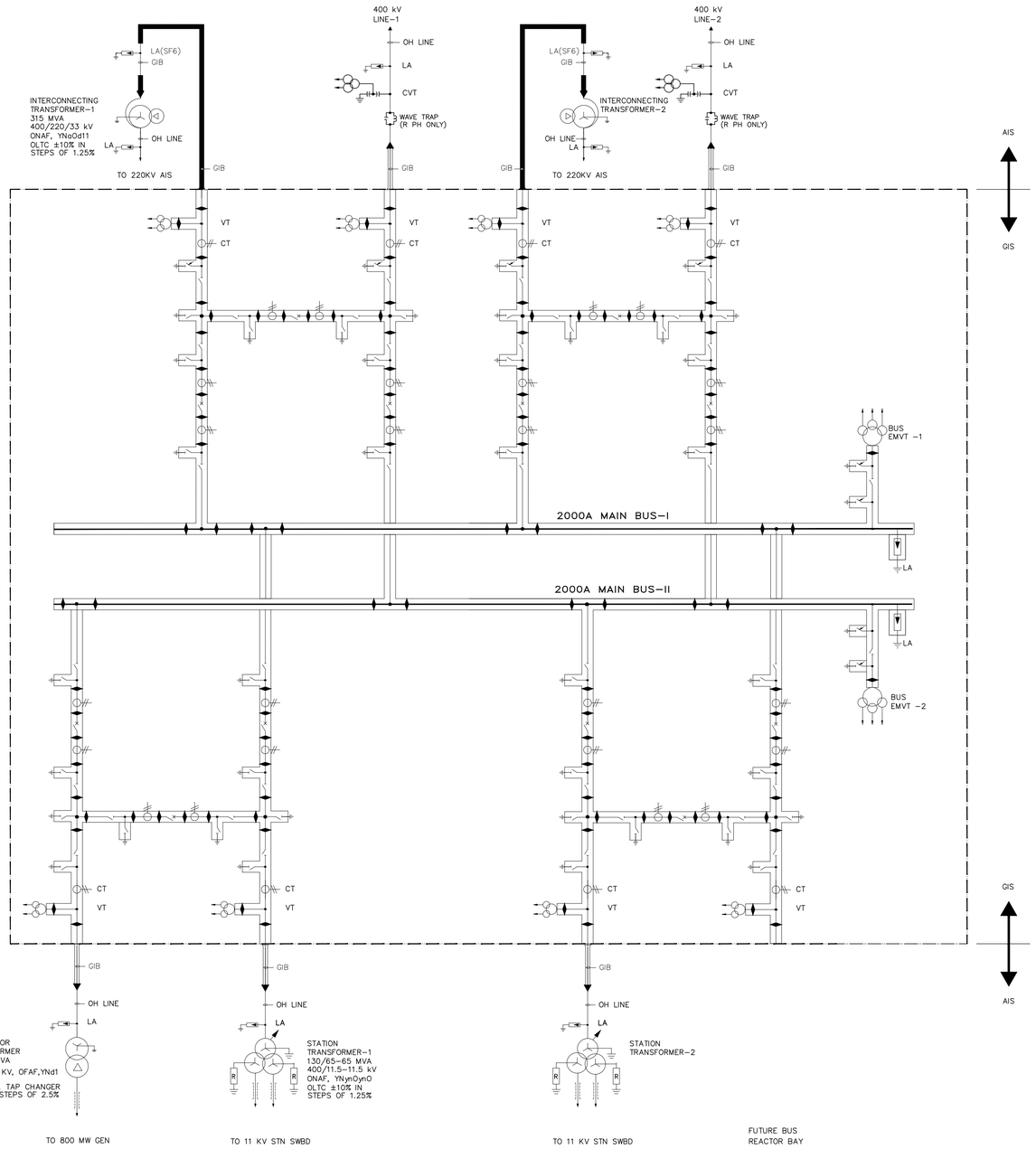
NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE
AS BUILT	M.DAS	M.DAS	2	2007.07.10
REVISED AS PER DISCUSSION WITH REL/DCPL ON 29.11.05	NANDA	PANKAJ	1	2005.12.15
FIRST ISSUE	M.DAS	CP	0	2005.10.20

RELEASE STATUS: PRELIMINARY / FOR TENDER ONLY / FOR CONSTRUCTION — DATE — SIGNATURE

REVIEWED: ARCHITECTURAL, CIVIL & STRUCTURAL, ELECTRICAL, INSTRUMENTATION, MECHANICAL, ENGG. MANAGER

APPROV. | MECH. | INST. | ELEC. | STRL. | ARCH. — REVIEWED

Attachment-20



SYSTEM DATA:

1.	SYSTEM VOLTAGE	400 KV
2.	HIGHEST SYSTEM VOLTAGE	420 KV
3.	NO OF PHASE	3
4.	FREQUENCY	50Hz
5.	ONE MIN. POWER FREQUENCY WITHSTAND VOLTAGE	630kV (r.m.s.)
6.	LIGHTNING WITHSTAND VOLTAGE	1425 KVP
7.	SWITCHING IMPULSE VOLTAGE	1050 KVP
8.	SHORT CIRCUIT LEVEL	63 kA FOR 1Sec.
9.	CREEPACE DISTANCE	31 mm/kV
10.	TYPE OF EARTHING	SOLIDLY GROUNDED
11.	LA	336 kV
12.	CIRCUIT BREAKER RATING	2000 A
13.	ISOLATOR RATING	2000 A
14.	BUS BAR RATING	2000 A
15.	TRANSFORMER BAY RATING	2000 A
16.	TIE BAY RATING	2000 A
17.	EARTH SWITCH RATING	2000 A
18.	PHASE TO PHASE CLEARANCE	4200 mm
19.	PHASE TO EARTH CLEARANCE	3400 mm
20.	SECTIONAL CLEARANCE	6400 mm
21.	GROUND CLEARANCE	8000 mm
22.	SYSTEM EARTHING	SOLIDLY EARTHED

LEGEND:

- THREE NOS. OF SINGLE-PHASE TRANSFORMER, CONNECTION STAR-DELTA
- LIGHTING ARRESTER
- EARTH
- CURRENT TRANSFORMER (CT)
- ISOLATOR
- EARTH SWITCH
- HIGH SPEED EARTH SWITCH
- CIRCUIT BREAKER (EHV)
- VOLTAGE TRANSFORMER (VT)
- BUS EMVT
- NGR — NEUTRAL GROUNDING RESISTOR
- IPBD/ SPBD
- GIS TERMINAL
- GIS BARRIER
- GAS INSULATED BUSDUCT (GIB)
- CAPACITOR VOLTAGE TRANSFORMER WITH CAPACITOR
- WAVE TRAP

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION.
2. THE REQUIREMENT SHOWN ARE MINIMUM ONLY. AS PER SYSTEM REQUIREMENT ALL NECESSARY EQUIPMENTS DEVICES SHALL BE PROVIDED.
3. ALL BREAKERS SHALL BE PROVIDED WITH CONTROL SWITCHING DEVICE.

REFERENCE DRAWINGS.

NOTES

DO NOT SCALE, ASK WHEN IN DOUBT.
ALL DIMENSIONS ARE IN MILIMETRES UNLESS NOTED OTHERWISE.

NOTICE

THIS DRAWING IS THE PROPERTY OF DESEIN PRIVATE LIMITED, NEW DELHI, AND IS LENT SUBJECT TO THE CONDITION THAT IT SHALL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OF, DIRECTLY OR INDIRECTLY. IT SHALL NOT BE USED TO FURNISH ANY INFORMATION FOR THE MAKING OF DRAWINGS, APPARATUS, OR PARTS THEREOF EXCEPT FOR THE PROJECT SPECIFICALLY PROVIDED FOR BY CONTRACT AGREEMENT WITH DESEIN.

ZONE	MARK	PARTICULARS	DATE	CIVIL	MECH.	ELEC.	C&I	H.O.D.
	2	BAY CONFIGURATION UPDATED	02.06.2023					
	1	UPDATED FOR TENDER PURPOSE	27.12.2022					
	0	FOR TENDER PURPOSE ONLY	21.10.2022					

Page 1 of 1 REVISIONS — APPROVED

SR. No. PARTY — PRINT DISTRIBUTION

CLIENT: HARYANA POWER GENERATION CORPORATION LTD.

CONSULTANT: DESEIN PRIVATE LIMITED, CONSULTING ENGINEERS, NEW DELHI, INDIA

PROJECT: 1x800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR

TITLE :- 400KV GIS SINGLE LINE DIAGRAM

	NAME	SIGN.	DATE
CAD/DRAWN	MOTI RAM		20.10.2022
DESIGNED	VNG		21.10.2022
CHECKED	VNG		21.10.2022
SCALE	NTS		

JOB. NO. D-04041

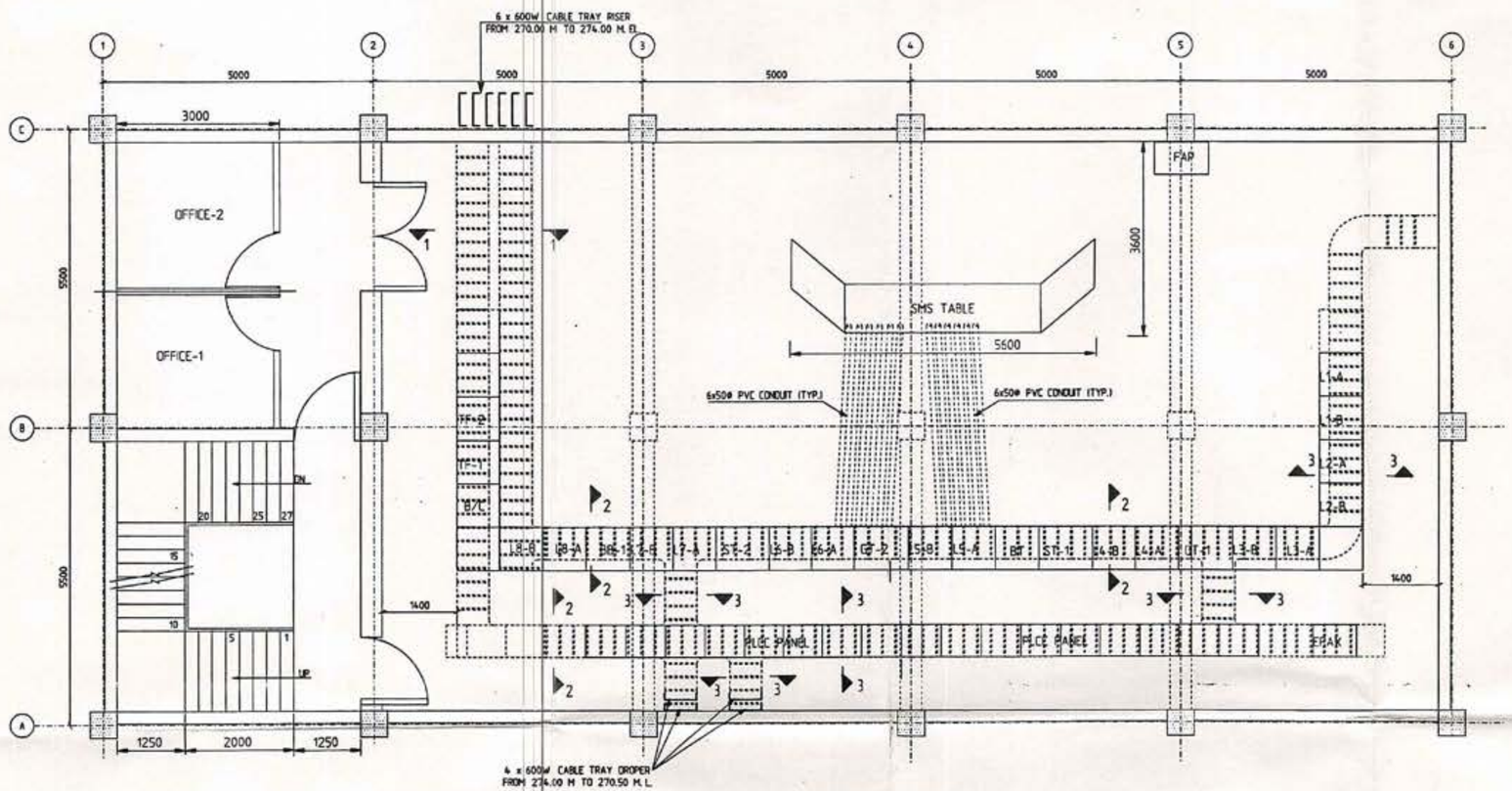
DWG. NO. 112-10-200 — REV. 2

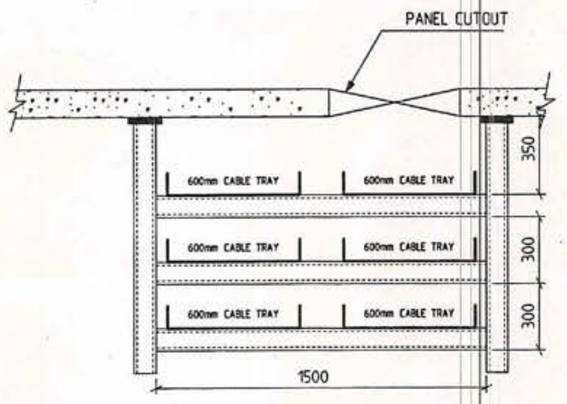
Attachment-21

SWITCHYARD SIDE

TRANSFORMER YARD SIDE

FIRST FLOOR PLAN





SECTION 1-1
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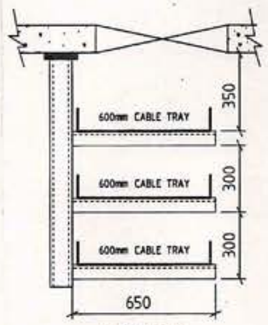

SECTION 2-2
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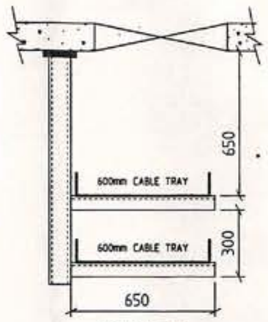


SECTION 3-3
(SCALE-1:12.5)

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS AND ALL LEVELS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. BELOW BEAM, TRAY ARE SUITABLY OFFSET TO AVOID FOULING.
3. FOR INVERTER & SERVER PANEL CABLE IS TAKEN THROUGH CONDUIT & CONDUIT TO BE EMBEDED IN CONCRETE.

REFERENCE DRAWING

REL-DCRTP-NVE-201-E-2016 - EQUIPMENT LAYOUT CONTROL ROOM BUILDING-GROUND FLOOR (SH 1 OF 4)

REL-DCRTP-NVE-201-E-2016 - EQUIPMENT LAYOUT CONTROL ROOM BUILDING-FIRST FLOOR (SH 2 OF 4)

AS BUILT

PACKAGE TITLE :- 220kV SWITCHYARD
DISCIPLINE :- ELECTRICAL

CONTROL ROOM BUILDING
CABLE TRENCH LAYOUT-FIRST FLOOR (SH. 4 OF 4)

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION, PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PVT. LTD., CONSULTING ENGINEERS, NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY, SEWA BHAWAN, R K PURAM, NEW DELHI

EPC Contractor: Reliance Energy — RELIANCE ENERGY LIMITED, EPC BUSINESS GROUP, RELIANCE ENERGY TOWER, A-2, SECTOR 24, NOIDA-201301 (U.P.)

EPC Contractor's Consultant: DEVELOPMENT CONSULTANTS PRIVATE LIMITED, CONSULTING ENGINEERS, KOLKATA - MUMBAI - CHENNAI - NEW DELHI

Switchyard Contractor: SIEMENS — SIEMENS LTD., 6-A, SECTOR-18, MARUTI INDUSTRIAL AREA, GURGAON-122015, HARYANA

DRAWN : PANKAJ	CHECKED : S.GHOSH	SCALE :	1:50
REVIEWED : S.GHOSH		DATE :	2005-11-28
APPROVED : V.AGWAN		DCPL JOB NO. :	-
JOB NO. XXX/XX/XX/XXX	DRAWING NO. REL-DCRTP-NVE-201-E-2016		REV. 1

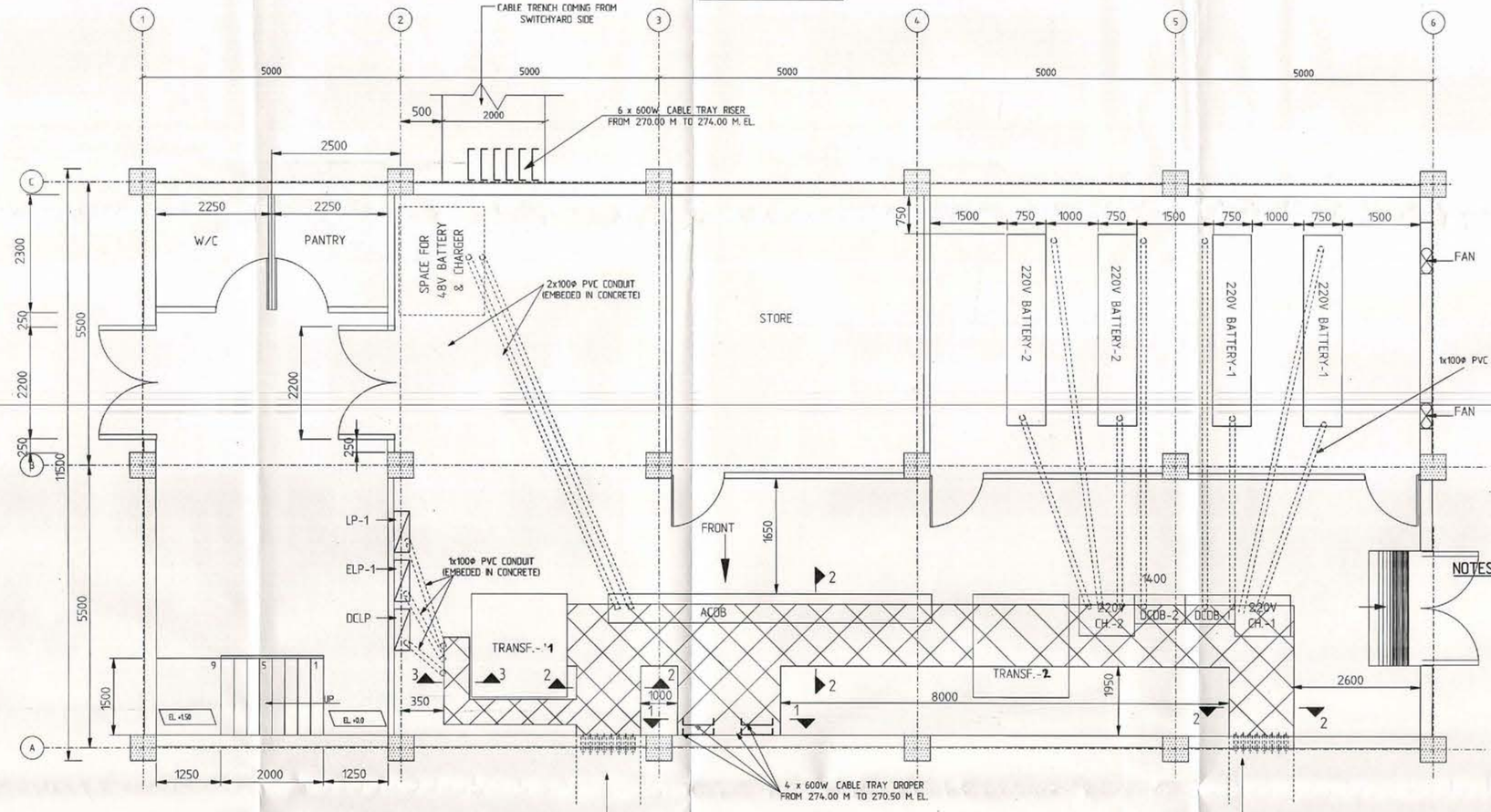
APPROV.	MECH.	INST.	ELEC.	STRL.	ARCH.	NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE
	REVIEWED					AS BUILT	M.DAS	M.DAS	1	2007.06.22
						FIRST ISSUE	S.GHOSH	PANKAJ	0	2006.06.07

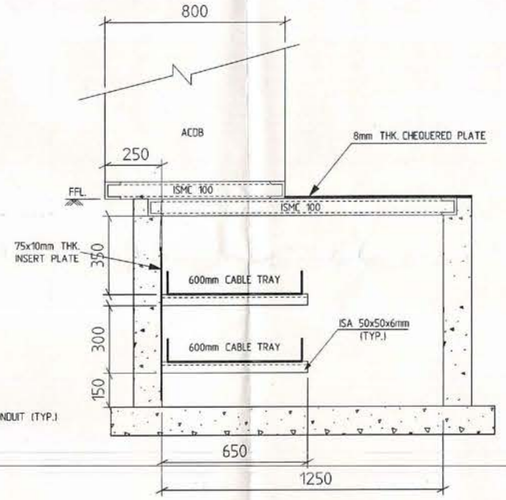
RELEASE STATUS: PRELIMINARY; FOR TENDER ONLY; FOR CONSTRUCTION

REVIEWED: ARCHITECTURAL; CIVIL & STRUCTURAL; ELECTRICAL; INSTRUMENTATION; MECHANICAL; ENGG. MANAGER

DATE | SIGNATURE

SWITCHYARD SIDE





SECTION 2-2
(SCALE-1:12.5)

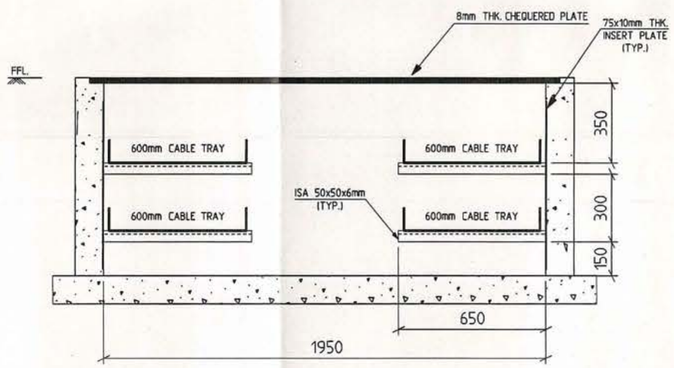
NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS AND ALL LEVELS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. CABLE TRENCH IS COVERED WITH CHEQUERED PLATE.
3. WHEREVER CABLE TRENCH IS CROSSING PLINGTH BEAM, CABLE TRAY IS DISCONTINUED & CABLE IS TAKEN W/O TRAY.

REFERENCE DRAWING

REL-DCRTP-NVE-201-E-2015	- EQUIPMENT LAYOUT CONTROL ROOM BUILDING-GROUND FLOOR (SH 1 OF 4)
REL-DCRTP-NVE-201-E-2016	- EQUIPMENT LAYOUT CONTROL ROOM BUILDING-FIRST FLOOR (SH 2 OF 4)

TRANSFORMER YARD SIDE



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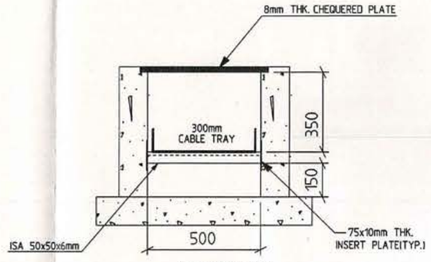

SECTION 3-3
(SCALE-1:12.5)

AS BUILT

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													FOR TENDER ONLY		
													FOR CONSTRUCTION		
													ARCHITECTURAL		
													CIVIL & STRUCTURAL		
													ELECTRICAL		
													INSTRUMENTATION		
													MECHANICAL		
													ENGG. MANAGER		
							AS BUILT	M.DAS	M.DAS	1	2007.06.22	REVIEWED			
							FIRST ISSUE	S.GHOSH	PANKAJ	0	2006.06.07				
APPROV.		MECH.	INST.	ELEC.	STRL.	ARCH.	NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE				
		REVIEWED													

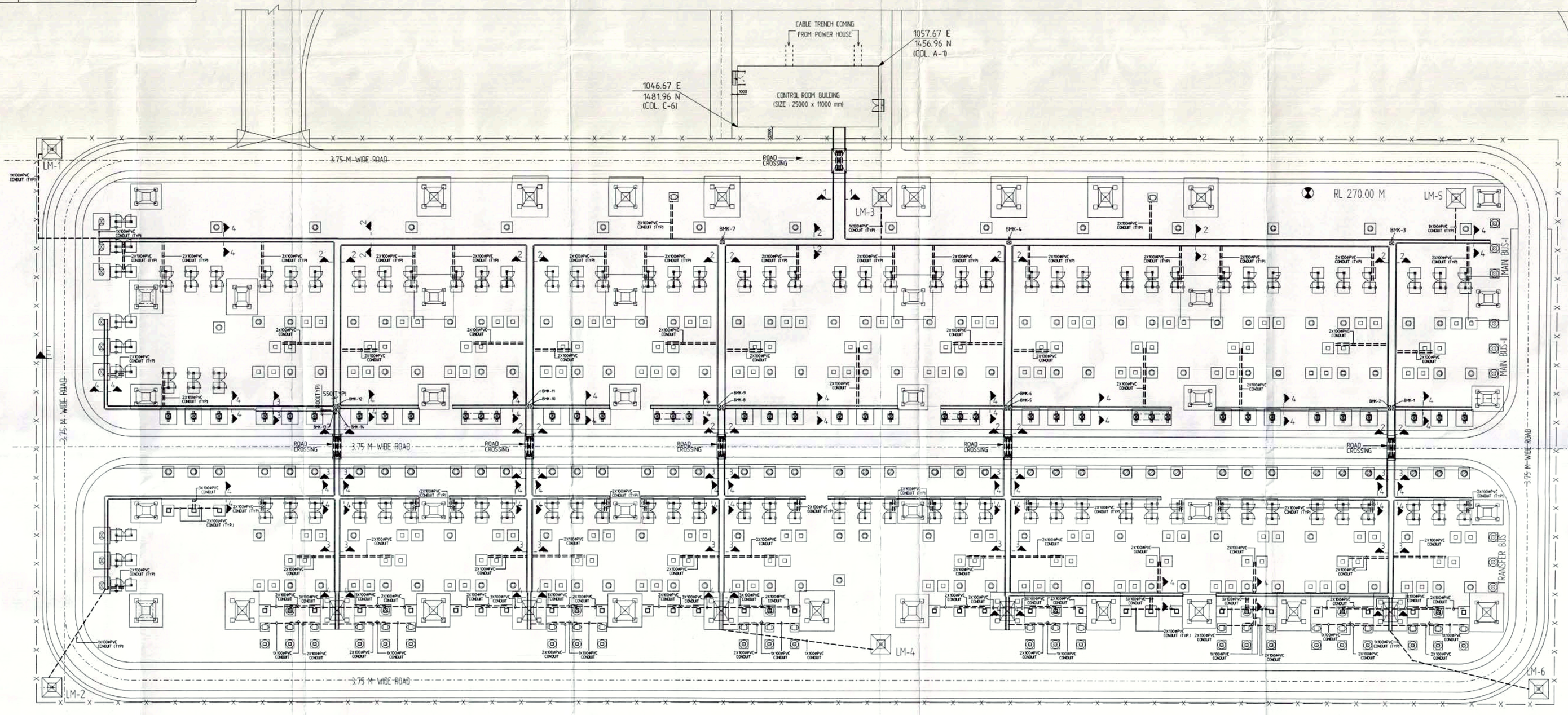
PACKAGE TITLE :- 220kV SWITCHYARD
DISCIPLINE :- ELECTRICAL

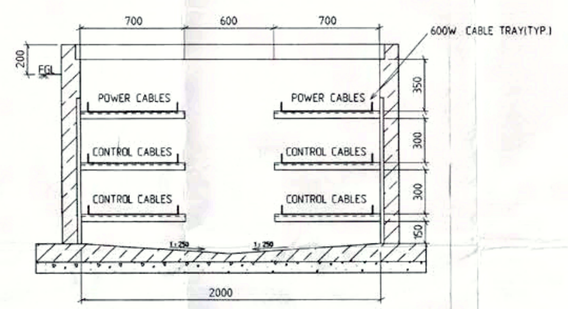
CONTROL ROOM BUILDING
CABLE TRENCH LAYOUT-GROUND FLOOR (SH. 3 OF 4)

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER:	HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA
OWNER CONSULTANT: DESEIN	DESEIN PVT. LTD. CONSULTING ENGINEERS NEW DELHI - INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI
EPC Contractor: Reliance Energy	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)
EPC Contractor's Consultant	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
Switchyard Contractor: SIEMENS	SIEMENS LTD. 6-A, SECTOR-18 MARUTI INDUSTRIAL AREA, GURGAON-122015, HARYANA

DRAWN : PANKAJ	CHECKED : S.GHOSH	SCALE :	1:50
REVIEWED : S.GHOSH		DATE :	2005-11-28
APPROVED : V.AGWAN		DCPL JOB NO.:	-
JOB NO. XXX/XX/XX/XXX	DRAWING NO. REL-DCRTP-NVE-201-E-2016	REV.	1





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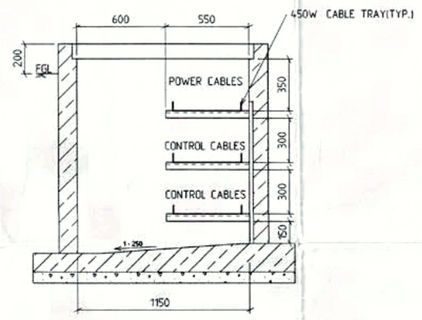

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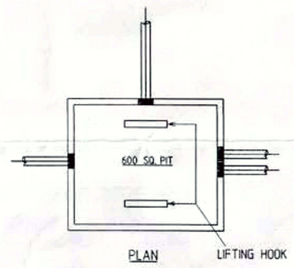

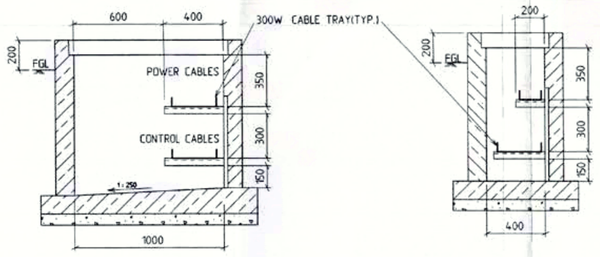

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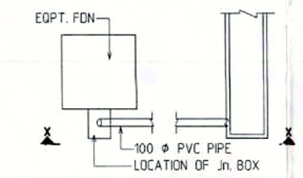
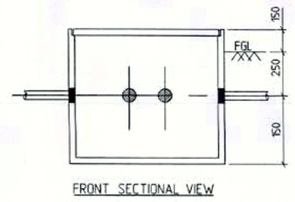
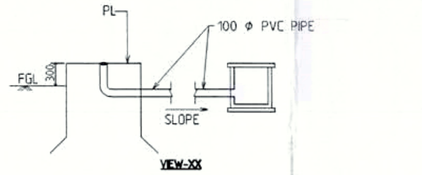
SECTION 4-4
(SCALE-1:20)

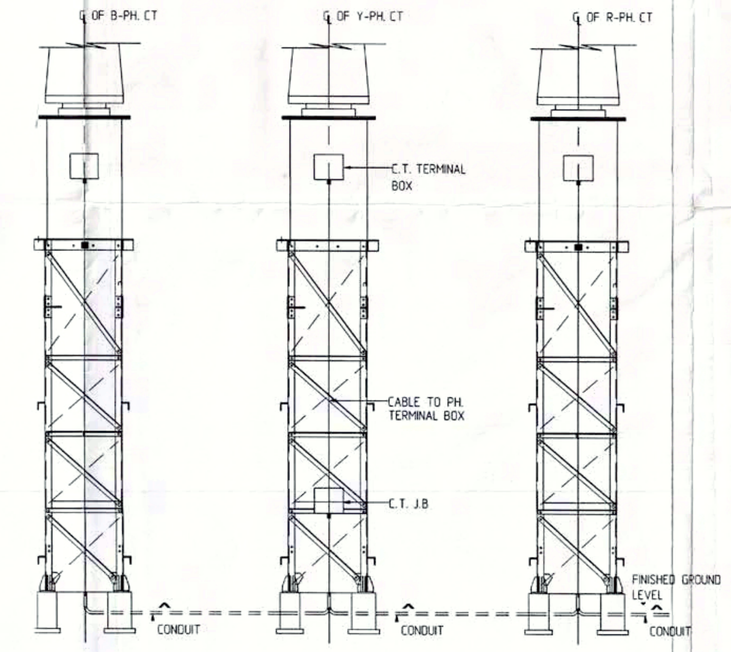


TYP. CABLE EXIT THROUGH PIPE FROM TRENCH



TYPICAL DETAIL FOR CABLE PULL PIT
(NTS)





TYPICAL DETAIL FOR CT CABLE TERMINATION
(NTS)

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. OUTLINE OF COLUMNS AND FOUNDATIONS ARE INDICATIVE ONLY. FOR DETAILS REFER CIVIL FOUNDATION DRAWINGS.
3. CABLE TRENCH SECTION ONLY TO BE REFERED FOR CABLE RACK ARRANGEMENT DETAILS OF TRENCH WALL,COVER SLAB,EXPENSION JOINT,TYPE OF CONCRETE ETC ARE FURNISHED IN CIVIL DRAWINGS.
4. SUPPORT DETAILS FOR TRAYS IN TRENCHES ARE AS PER CIVIL DRG.NO. REL-DCRTP-NVS-201-C-2105
5. EARTH FLAT IN CABLE TRENCH RUNS ALONG THE TOP TIER OF EACH CABLE TRENCH SECTION.IT IS WELDED AT EVERY SUPPORT. PROVISIONAL HAS BEEN KEPT TO CONNECT EXTERNAL EARTH GRID AT EVERY 30MTR. INTERVAL.
6. PIPE CONDUIT HAS BEEN PROVIDED TO TAKE CABLES OUT FROM TRENCH TO RESPECTIVE EQUIPMENT. DEPTH OF BURIAL IS 250MM BELOW FINISHED FORMATION LEVEL.
7. PVC PIPE IS PROVIDED FOR THE ABOVE PURPOSE AND SUITABLE SLOPE IS MAINTAINED TOWARDS MAIN TRENCH SIDE TO AVOID WATER LOCKING. OPEN END OF PIPE ABOVE GROUND HAS BEEN SUITABLY SEALED.
8. DETAILS AT ROAD CROSSING ARE IN CIVIL DRAWING REL-DCRTP-NVS-201-C-2105.
9. AFTER LAYING THE CABLES THE ENDS OF PIPES HAVE BEEN SUITABLY SEALED AT SITE TO PREVENT INGRESS OF WATER INSIDE THE PIPES.
10. SEPARATE PIPES ARE PROVIDED FOR POWER AND CONTROL CABLES.
11. LIFTING EYES ARE PROVIDED FOR TRENCH COVER AT APPROPIATE LOCATION.
12. NECESSARY OPENING IN CABLE TRENCHES ARE PROVIDED FOR PVC PIPES AT APPROPIATE LOCATION.
13. EXTENSION OF PIPES UP TO MAIN AND EARTH SWITCH OPERATING MECH.BOX HAVE BEEN DONE AS PER ACTUAL SITE CONDITION.
14. SIZE OF PIPES/CONDUITS IS SELECTED CONSIDERING 50% FILL CRITERIA.
15. PVC PIPES USED ARE CLASS-4 AS PER IS-4985
16. POWER AND CONTROL CABLES IN CABLE TRENCHES HAVE BEEN LAID IN SEPARATE TIER.
17. A SLOPE OF 1500 IS PROVIDED ALONG THE ROUTE OF CABLE TRENCH.
18. 800X400 OPENING HAS BEEN PROVIDED BELOW BMK FOR CABLE ENTRY.

REFERENCE DRAWINGS:-

1. DRG.NO. REL-DCRTP-NVE-201-F-2001 220kV SUBSTATION LAYOUT PLAN.
2. DRG.NO. REL-DCRTP-NVS-201-C-2101 SWITCHYARD FOUNDATION LAYOUT PLAN FOR 220kV YARD

AS BUILT

PACKAGE TITLE :- 220kV SWITCHYARD
DISCIPLINE :- ELECTRICAL

220KV OUTDOOR SWITCHYARD CABLE TRENCH LAYOUT PLAN & SECTION

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR,HARYANA

OWNER	HARYANA POWER GENERATION CORPORATION PANCHKULA,HARYANA
OWNER CONSULTANT	DESEIN PVT. LTD. CONSULTING ENGINEERS NEW DELHI- INDIA
	CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN,R.K.PURAM NEW DELHI
EPC Contractor	RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER,A-2,SECTOR 24 NOIDA-201301 (U.P.)
EPC Contractor's Consultant	DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI
Switchyard Contractor	SIEMENS LTD. 6-A,SECTOR-18 MARUTI INDUSTRIAL AREA,GURGAON-122015,HARYANA

DRAWN :	CHANDAN	CHECKED :	NANDA	SCALE : 1:100
REVIEWED :	S.GHOSH			DATE : 2006-09-16
APPROVED :	V.KOHAN			DCPL JOB NO. : -
JOB NO.	XXX/XX/XX/XXX	DRAWING NO.	REL-DCRTP-NVE-201-E-2013	REV. 2

RELEASE STATUS	DATE	SIGNATURE
PRELIMINARY		
FOR TENDER ONLY		
FOR CONSTRUCTION		
AS BUILT	2006-06-20	

REV. NO.	NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE
	AS BUILT	M.DAS	M.DAS	2	2006-06-20
	REVISED AS PER COMMENTS	S.GHOSH	PANKAJ	1	2006-04-10
	FIRST ISSUE	NANDA	CHANDAN	0	2006-03-16

APPVD. | MECH. | INST. | ELEC. | STRL. | ARCH. — REVIEWED

DISCIPLINE : ARCHITECTURAL, CIVIL & STRUCTURAL, ELECTRICAL, INSTRUMENTATION, MECHANICAL, ENGG. MANAGER

Page 1 of 3

Attachment-22

TO 220KV SWITCHYARD

FROM 220KV SWITCHYARD

FROM 220KV SWITCHYARD

TO 220KV SWITCHYARD

220KV FAULT LEVEL 40KA, RMS 1SEC

220KV FAULT LEVEL MAIN BUSDUCT 75KA, RMS 3SEC; TAP OFF TO UAT 74KA, RMS 3SEC

6.6KV FAULT LEVEL 40KA RMS 1SEC

415V FAULT LEVEL PMCC (BREAKER PROT. CKT) 50KA, RMS 1SEC; MCC (FUSE PROT. CKT) 50KA, RMS 0.165SEC

220V DC FAULT LEVEL 25KA, 1SEC.

LEGEND:-

- G — GENERATOR
- 2-WINDING TRANSFORMER (WITH OLTC)
- 2-WINDING TRANSFORMER (WITH OLTC)
- THREE WINDING TR WITH OLTC
- BUS DUCT
- CABLE CONNECTION
- SWITCH-FUSE UNIT
- CONTACTOR
- THERMAL OVERLOAD
- GROUNDING RESISTOR
- NEUTRAL GROUNDING TRANSF.
- CIRCUIT BREAKER
- MCCB
- DRAWOUT
- M — MOTOR
- LT (415V) FUSE
- ON LOAD ISOLATING SWITCH
- CONTACT NORMALLY CLOSE
- DG — DIESEL GENERATOR

NOTES:-

1. ALL ELECTRICAL EQUIPMENT WILL BE DESIGNED FOR AN AMBIENT TEMP. OF 50°C
2. SYSTEM PARAMETERS FOR UTILITY SYSTEM

SYSTEM VOLT & FREQUENCY	FAULT LEVEL
a) 220KV ±10%, 3PHASE, 3WIRE 50HZ (±) 5%	40KA, 1SEC.
b) 6600V ±10%, 3PHASE, 3WIRE 50HZ (±) 5%	40KA, 1SEC.
c) 415V ±10% 3PHASE 3WIRE 50HZ (±) 5%	50KA, 1SEC.
d) 220V DC (+) 10% TO (-) 15%, 2WIRE	25KA, 1SEC.

3. 6600V AND 415V SYSTEM WILL BE 3PHASE, 3WIRE SYSTEM. HOWEVER, 415V SYSTEM DERIVED THROUGH 415/415V ISOLATION TRANSF. AND LIGHTING TRANSF. WILL BE 3PHASE, 4WIRE SYSTEM.
4. INCOMER AND BUS-COUPLER OF 6600V SWITCHBOARDS AT CHP & ASP AND ALL 415V PMCC/MCC WILL BE PROVIDED WITH 2-OUT-OF-3 INTERLOCK. INCOMER OF 415V EMERGENCY PMCC WILL BE PROVIDED WITH 1-OUT-OF-4 ELECTRICAL INTERLOCK.
5. AIR CIRCUIT BREAKER WILL BE PROVIDED AT THE OUTGOING LINE FEEDER OF PMCC IF THE FEEDER RATING EXCEEDS 400A. FOR MOTOR FEEDERS, AIR CIRCUIT BREAKERS WILL BE PROVIDED FOR MOTORS RATED ABOVE 100KW.
6. ALL MOTORS RATED ABOVE 175KW WILL BE FED FROM 6600V SWGR. MOTOR DESIGNATION GIVEN UNDER ( ) INDICATES STANDBY MOTORS.

6600V MOTOR DETAILS

SL. NO.	DESCRIPTION	NAME PLATE IN KW
1	I.D. FAN	2240
2	F.D FAN	920
3	PA FAN	2530
4	PA/SEALING MILLS	560
5	B. F. PUMP	3600
6	C.E. PUMP	630
7	2W. C.W. PUMP	410
8	C.W. PUMP	1530
9	A.C.W. PUMP	300
10	CRUSHER MOTOR	350
11	CONVEYING BLOWER	300
12	AIR COMPRESSOR	450

KEY SINGLE LINE DIAGRAM

2X300 MW DCR THERMAL POWER PROJECT
YAMUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PRIVATE LIMITED CONSULTING ENGINEERS NEW DELHI - INDIA

CENTRAL ELECTRICITY AUTHORITY SEWA BHAVAN, R.K. PURAM NEW DELHI

RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, A-2, SECTOR 24 NOIDA-201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA - MUMBAI - CHENNAI - NEW DELHI

								RELEASE STATUS	DATE	SIGNATURE
								PRELIMINARY		
								FOR TENDER ONLY		
								FOR CONSTRUCTION		
							2	20.12.07	ARCHITECTURAL	
						AS BUILT	1	23.05.06	CIVIL & STRUCTURAL	
						REVISED AS MARKED	0	13.05.05	ELECTRICAL	
						FIRST ISSUE			INSTRUMENTATION	
KLG		PKD	AKS	KS					MECHANICAL	
APPROV.		MECH.	INST.	ELEC.	STRL	ARCH.				
		REVIEWED								

CHECKED	DRAWN	REV.	DATE
GV	TEJ	1	23.05.06
CHECKED	DRAWN	REV.	DATE

NATURE OF REVISION & DESCRIPTION

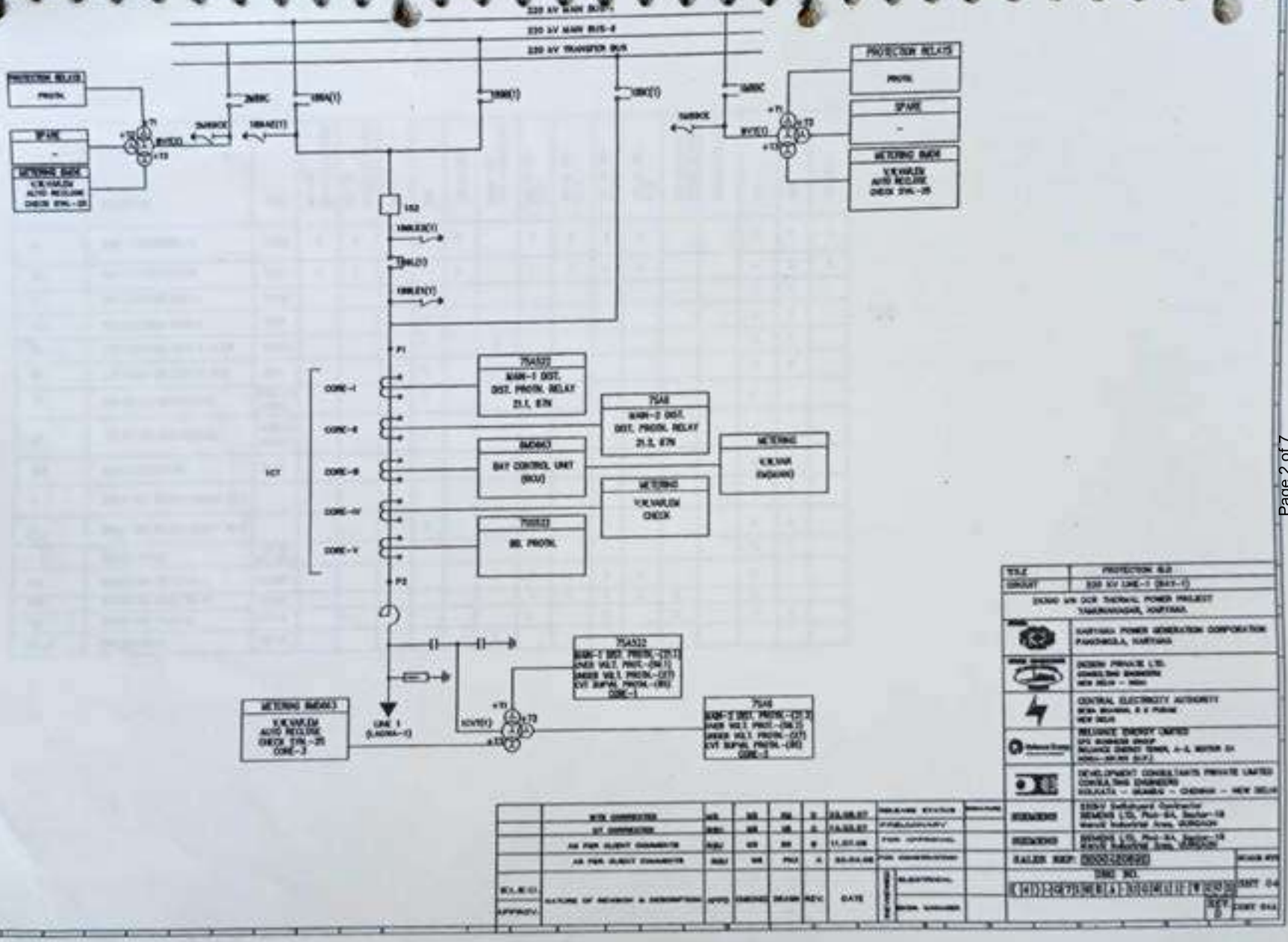
DRAWN : xx CHECKED : xx SCALE : NIL
REVIEWED : xx DATE : 31/12/99
APPROVED : xx DEPL. JOB NO. : K412

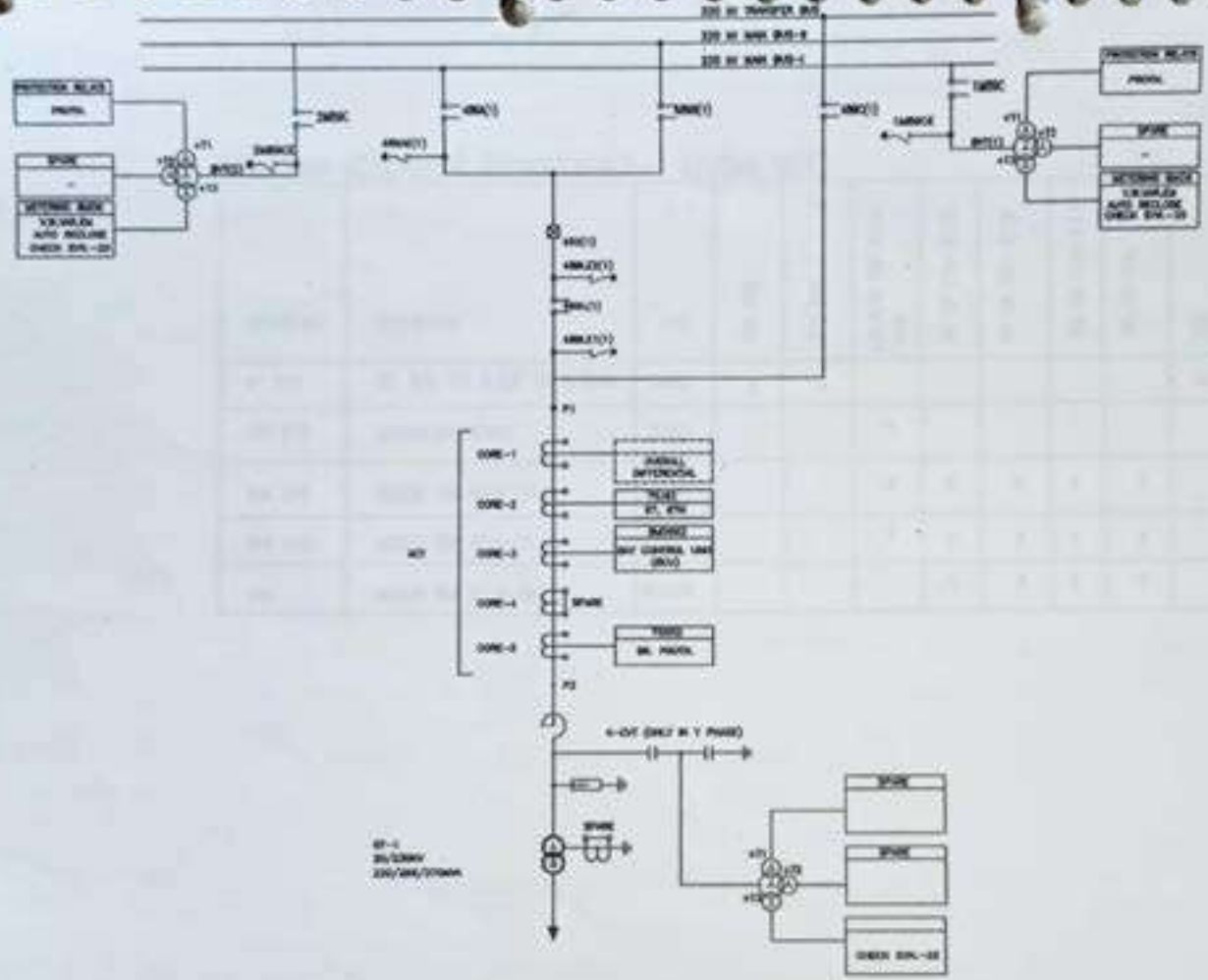
JOB NO. EPC/ND/XX/XXX

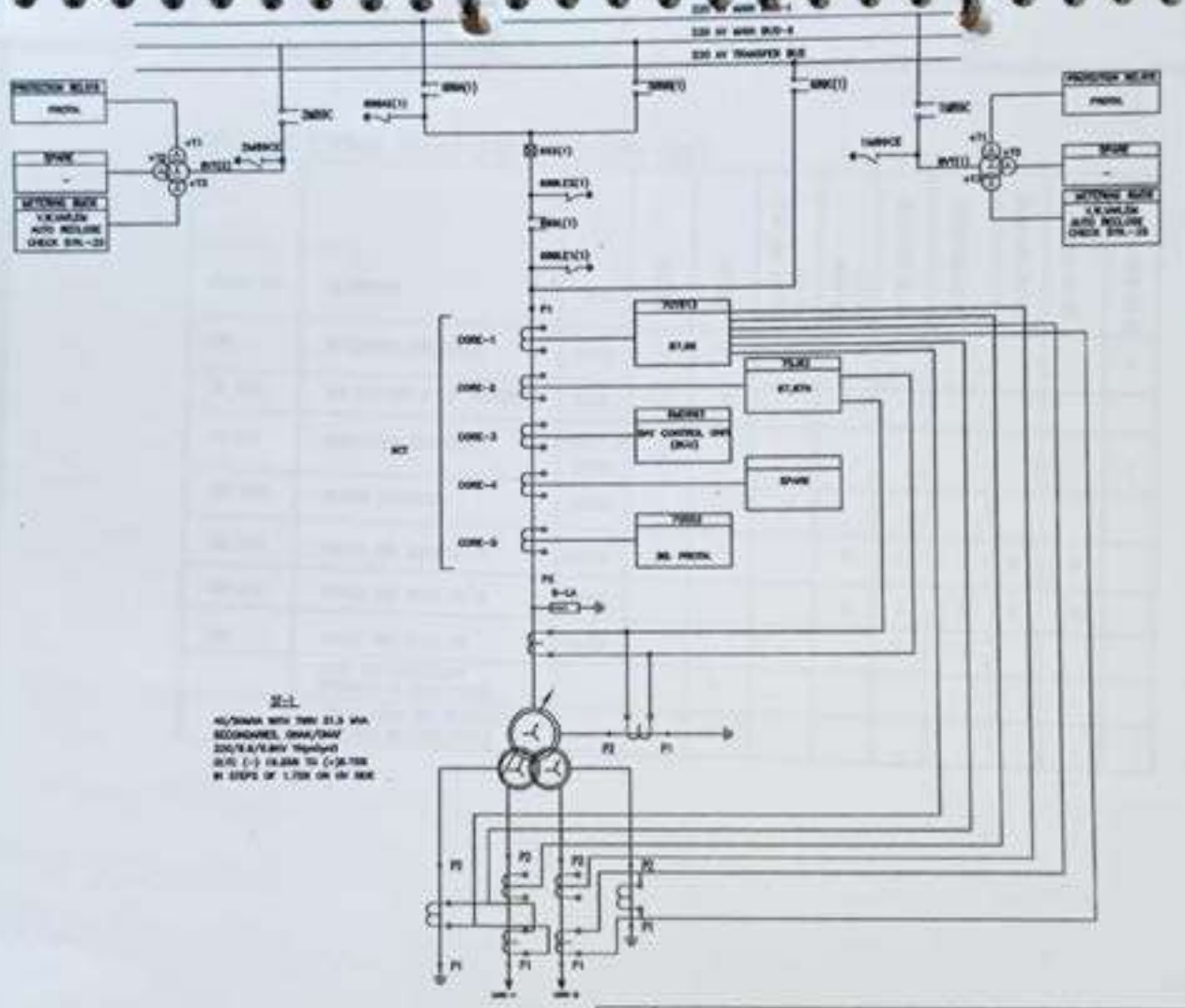
DRAWING NO. REL-DCRTP-CEE-299-G-501

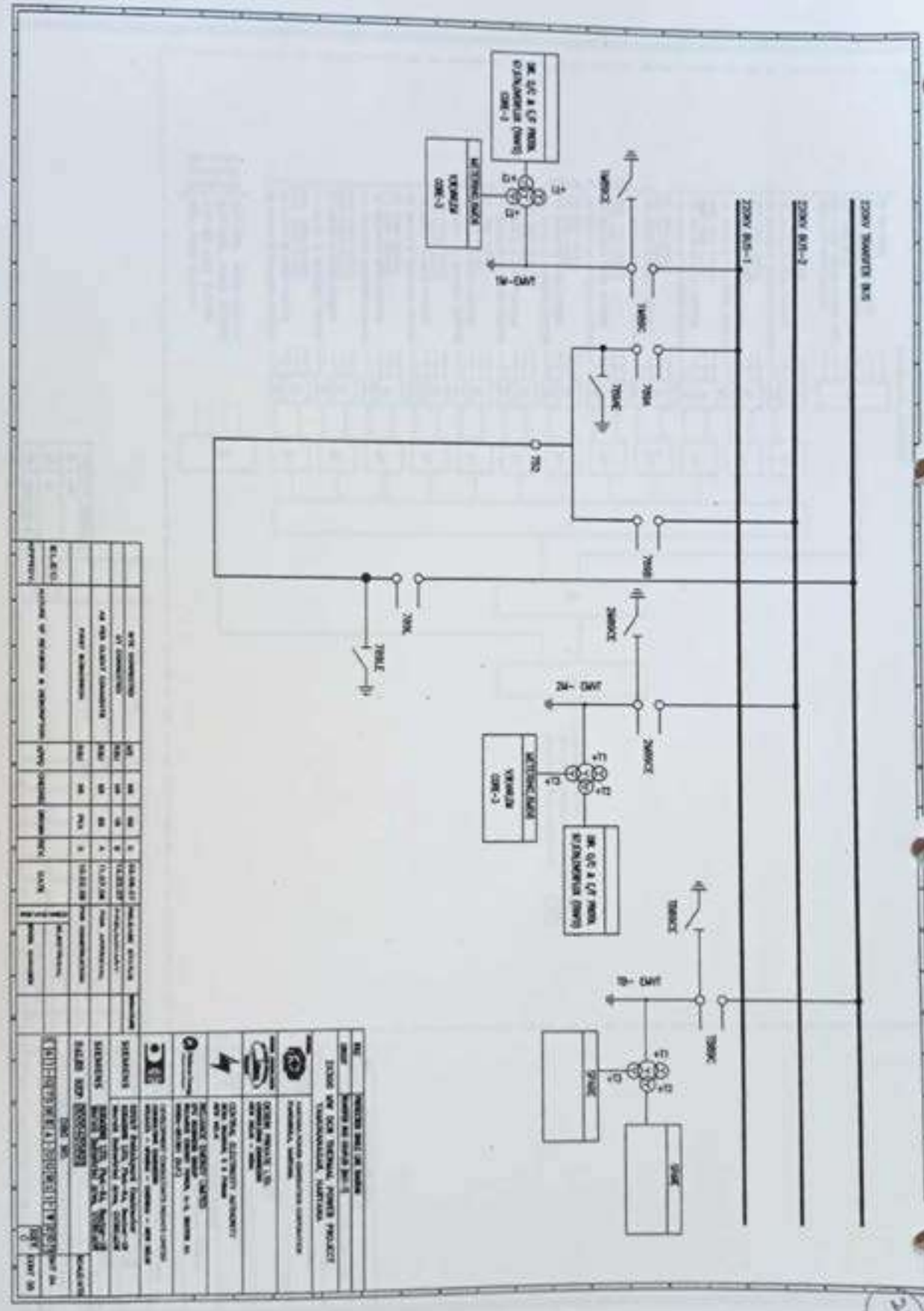
REV. 2

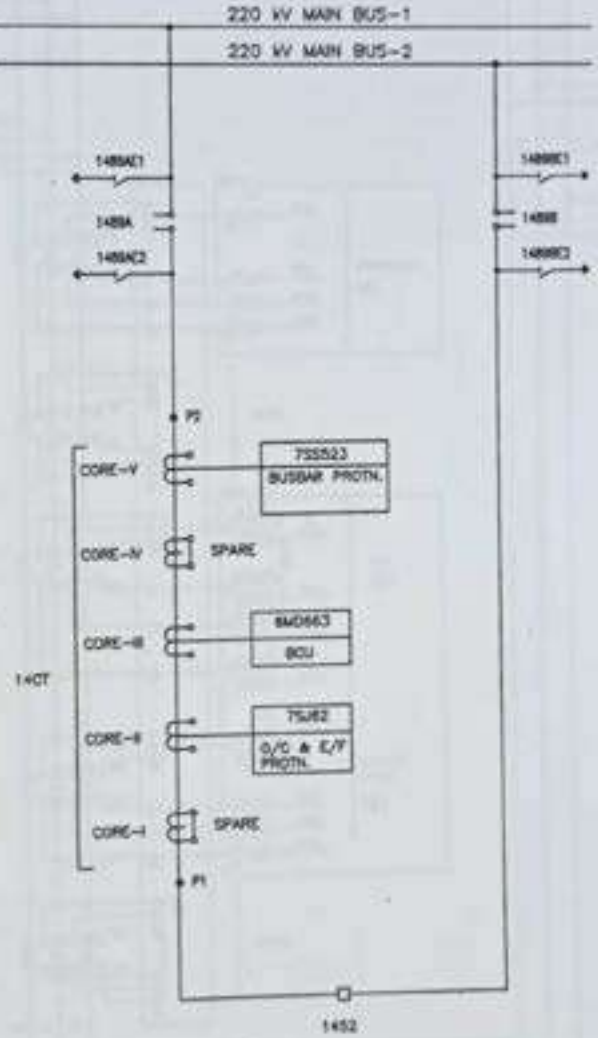
Page 1 of 7


220 kV MAIN BUS-I
220 kV MAIN BUS-II
220 kV TRANSFER BUS
PROTECTION RELAYS
SPARE
METERING
PROTECTION RELAYS
SPARE
METERING
152
CORE-I
CORE-II
CORE-III
CORE-IV
CORE-V
PT
METERING
METERING
METERING
LINE 1
(LAGNA-I)
220 kV LINE-I (BAY-I)
CENTRAL ELECTRICITY AUTHORITY
RELIANCE ENERGY LIMITED
DEVELOPMENT CONSULTANTS PRIVATE LIMITED
SIEMENS
SIEMENS
DRG NO.


220 kV TRANSFER BUS
220 kV MAIN BUS-II
220 kV MAIN BUS-I
PROTECTION RELAYS
MAIN
SPARE
INTERFACE BOX
SPARE
CORE-1
CORE-2
CORE-3
CORE-4
CORE-5
SPARE
SPARE
SPARE






220 kV MAIN BUS-1
220 kV MAIN BUS-2
1488AE1
1488A
1488AC2
1488BE1
1488B
1488BC2
P2
CORE-V
7SS523
BUSBAR PROTN.
CORE-IV
SPARE
CORE-III
6MD663
BCU
14CT
CORE-II
7SJ62
O/C & E/F
PROTN.
CORE-I
SPARE
P1
1452

DWG. NO. REL-DCRTP-CEE-200-G-502 REV. 1

TO 220KV SWITCHYARD

CORE-I 2000-1000/1A CL : PS
CORE-II 2000-1000/1A CL : 5P20
CORE-III 2000-1000/1A CL : 0.5 SPARE
CORE-IV 2000-1000/1A CL : 0.5 SPARE
CORE-V 2000/1A CL : PS

BUSBAR DIFFERENTIAL PROTECTION

CVT 220KV / 110V

GENERATOR SYNCHRONISING

ACSR OVERHEAD CONDUCTOR

198KV, 10KA

1000/1A CL : PS

GEN. TRANF. 222/296/370MVA, ONAN/ONAF/OFAF 230/20KV, YNd1.

1000/1A CL : PS

1000/1A CL : 5P20

12000/5A CL : PS

24KV, IPBD (TYP)

FROM BUS CVT

μ-P BASED BAY CONTROLLER AT SWITCHYARD CONTROL ROOM

GT NUMERICAL PROTECTION

	PROTECTION
51	INVERSE TIME OVERCURRENT
51N	INVERSE TIME EARTH FAULT
67	DIRECTIONAL PHASE OVER CURRENT
67N	DIRECTIONAL EARTH FAULT
50Z	BREAKER FAILURE PROTECTION
	BREAKER CONNTROL & MONITORING FUNCTION
	MMI & COMMUNICATION
	INDICATION, MEASURING & RECORDING

GT NUMERICAL PROT. AT CCR

- 87 OVERALL DIFFERENTIAL
- 87T DIFFERENTIAL
- 64 HV WINDING RESTRICTED EARTH FAULT
- 51N INVERSE TIME STANDBY EARTH FAULT
- OVER FLUXING
- 63 BUCHHOLTZ
- CHARGER TROUBLE
- OLTC SURGE PROTECTION
- WINDING TEMPERATURE
- OIL TEMPERATURE
- PRESSURE RELIEF DEVICE
- CONSERVATOR OIL LEVEL ALARM

UAT NEUMERICAL PROT. AT CCR

- 87 Id DIFFERENTIAL
- 50 HV PHASE INST. OVER CURRENT
- 51 HV PH. INVERSE TIME OVERCURRENT
- 64 Iod LV RESTRICTED EARTHFAULT
- 51N LV STANDBY EARTHFAULT
- 63 BUCHHOLTZ
- WINDING TEMPERATURE
- OIL TEMPERATURE
- PRESSURE RELIEF DEVICE
- CONSERVATOR OIL LEVEL ALARM

800/5A CL : PS
800/5A CL : PS
12000/5A CL : PS

UNIT AUX. TR #1 20/25MVA, 20/6.9KV Dyn11

300A FOR 10SEC. 13.2Ω Ohm

300/1A CL : PS Itw ≥ 2500A

150/1A CL : 5P20

FROM UAT LV SIDE DIFFERENTIAL CT

VT & LA CABINET

DDCMIS AT CCR

Wh Varh W VAR V A Hz Cosφ EA EV

GENERATOR METERING PANEL AT CCR

TO NUMERICAL GEN. TR. PROT. AT CCR

TO GFR

TO GFR

UNIT AUX. TR #2 20/25MVA, 20/6.9KV Dyn11

300A FOR 10SEC. 13.2Ω Ohm

300/1A CL : PS Itw ≥ 2500A

150/1A CL : 5P20

FROM UAT LV SIDE DIFFERENTIAL CT

800/5A CL : PS

800/5A CL : 5P20

12000/5A CL : PS

UAT NEUMERICAL PROT. AT CCR

- 87 Id DIFFERENTIAL
- 50 HV PHASE INST. OVER CURRENT
- 51 HV PH. INVERSE TIME OVERCURRENT
- 64 Iod LV RESTRICTED EARTHFAULT
- 51N LV STANDBY EARTHFAULT
- 63 BUCHHOLTZ
- WINDING TEMPERATURE
- OIL TEMPERATURE
- PRESSURE RELIEF DEVICE
- CONSERVATOR OIL LEVEL ALARM

FROM UAT LV SIDE DIFFERENTIAL CT

FROM 220KV SWITCHYARD

CORE-I 1000-500/1A CL : PS
CORE-II 1000-500/1A CL : 5P20
CORE-III 1000-500/1A CL : 0.5 SPARE
CORE-IV 1000-500/1A CL : PS SPARE
CORE-V 2000/1A CL : PS

BUSBAR DIFFERENTIAL PROTECTION

ACSR OVERHEAD CONDUCTOR

198KV, 10KA

150/1A CL : PS

STATION TRASF. 220/6.9/6.9KV ONAN – 40/25/25MVA ONAF – 50/31.5/31.5MVA YNyn0yn0

150/1A CL : 5P20

300/1A CL : PS

300/1A CL : PS Itw ≥ 3000A

300/1A CL : PS Itw ≥ 3000A

150/1A CL : 5P20

300A FOR 10SEC. 13.2Ω Ohm

SPBD

SPBD

TO ST NUMERICAL PROT. AT SWYD CONTROL ROOM

FROM LV#1 WDG. BUSHING CT

FROM LV SIDE DIFFERENTIAL CT

FROM LV#2 WDG. BUSHING CT

FROM LV SIDE DIFFERENTIAL CT

FROM BUS CVT

μ-P BASED BAY CONTROLLER AT SWITCHYARD CONTROL ROOM

ST NUMERICAL PROTECTION

	PROTECTION
50	INSTANTANEOUS OVER CURRENT
51	INVERSE TIME OVERCURRENT
50Z	BREAKER FAILURE PROTECTION
67N	DIRECTIONAL EARTH FAULT
	BREAKER CONTROL & MONITORING FUNCTION
	MMI & COMMUNICATION
	INDICATION, MEASURING & RECORDING

ST NUMERICAL PROTECTION

- 87 Id DIFFERENTIAL
- 64 Iod HV RESTRICTED EARTHFAULT
- 64 Iod LV#1 WDG RESTRICTED EARTHFAULT
- 64 Iod LV#2 WDG RESTRICTED EARTHFAULT
- 51N LV#1 WDG. STANDBY EARTHFAULT
- 51N LV#2 WDG. STANDBY EARTHFAULT
- 63 BUCHHOLTZ
- OLTC SURGE PROTECTION
- WINDING TEMPERATURE
- OIL TEMPERATURE
- PRESSURE RELIEF DEVICE
- CONSERVATOR OIL LEVEL ALARM

LEGEND :–

- GENERATOR
- TWO WINDING TR. WITH O.L.T.C.
- TWO WINDING TR. WITH OUT
- THREE WINDING TR. WITH O.L.T.C.
- CURRENT TRANSFORMER
- BUSHING CT
- TWO WINDING VOLTAGE TRANSFORMER
- THREE WINDING VOLTAGE TRANSFORMER
- FOUR WINDING VOLTAGE TRANSFORMER
- NEUTRAL GROUNDING TRANSFORMER
- NEUTRAL GROUNDING RESISTOR
- LIGHTNING ARRESTOR
- CAPACITOR
- VACCUM CIRCUIT BREAKER
- DISCONNECTING SWITCH
- FUSE
- LINK
- BUSDUCT
- OVERHEAD CONDUCTOR
- DRAWOUT
- GROUNDING
- AMM. TR.
- V VOLTMETER
- W WATTMETER
- VAR TR.
- FREQUENCY METER
- Cosφ POWER FACTOR METER
- EA EXCITATION FIELD AMMETER
- EV EXCITATION FIELD VOLTMETER
- Wh WATT HOUR METER
- Varh VAR HOUR METER
- AS AMMETER SELECTOR SWITCH
- VS VOLTMETER SELECTOR SWITCH
- INDICATION LAMP
- IPBD ISO PHASE BUSDUCT
- SPBD SEGREGATED PHASE BUSDUCT
- NBD NEUTRAL BUSDUCT

μ-P BASED FEEDER CONTROLLER AT 6600V SWITCH BOARD

PROTECTION

- 51 INVERSE TIME OVERCURRENT RELAY
- 51N INVERSE TIME EARTH FAULT RELAY
- 27 U< UNDER VOLTAGE RELAY
- BREAKER CONTROL & MONITORING FUNCTION
- MEASUREMENT

6600V / 110V CL 1.0

3000/1A CL : 5P20

7000/1A CL : 1

3000/1A CL : PS

TO ST. NUMERICAL PROTECTION AT SWYD CONTROL ROOM

6600V STN. SWITCH BOARD (OCA)

TO STN. OCT

TO STN. OCT

μ-P BASED FEEDER CONTROLLER AT 6600V SWITCH BOARD

PROTECTION

- 51 INVERSE TIME OVERCURRENT RELAY
- 51N INVERSE TIME EARTH FAULT RELAY
- 27 U< UNDER VOLTAGE RELAY
- BREAKER CONTROL & MONITORING FUNCTION
- MEASUREMENT

6600V / 110V CL 1.0

3000/1A CL : 5P20

3000/1A CL : 1

3000/1A CL : PS

TO ST. NUMERICAL PROTECTION AT SWYD CONTROL ROOM

6600V STN. SWITCH BOARD (OCB)

μ-P BASED FEEDER CONTROLLER AT 6600V SWITCH BOARD

PROTECTION

- 51 INVERSE TIME OVERCURRENT RELAY
- 51N INVERSE TIME EARTH FAULT RELAY
- 27 U< UNDER VOLTAGE RELAY
- BREAKER CONTROL & MONITORING FUNCTION
- MEASUREMENT

μ-P BASED FEEDER CONTROLLER AT 6600V SWITCH BOARD

PROTECTION

- 51 INVERSE TIME OVERCURRENT RELAY
- 51N INVERSE TIME EARTH FAULT RELAY
- 27 U< UNDER VOLTAGE RELAY
- BREAKER CONTROL & MONITORING FUNCTION
- MEASUREMENT

TO UAT NUMERICAL PROTECTION AT CCR

6600V UNIT SWITCH BOARD (1CA)

GENERATOR 370MW, 20KV 3PH, 50HZ, 0.85PF X_d=16% (SAT)

EXCITATION SYSTEM PROT.

- 64R R FIELD GROUND DETECTOR

12000/5A 60VA CL : 0.2

12000/5A 60VA 5P20

12000/5A 60VA CL : 0.25

12000/5A 60VA 5P20

12000/5A 60VA 5P20

12000/5A 60VA 5P20

NEUTRAL MAKE-UP ADAPTOR BOX NBD

TO GEN. PROT. MODULE#3

TO GFR

TO GEN. PROT. MODULE#3

TO GEN. PROT. MODULE#3

TO OVERALL DIFFERENTIAL PROT. AT CCR

20KA/400A

0.2 Ω 50VA

20/0.24KV 50KVA TIME RATING : 5MIN.

10/5A, 20VA CL : 0.5

TO GEN PROT MODULE#3

GFR

FROM GEN. CT

FROM GEN. VT

GEN. NGT CABINET

AVR

AVR

GEN. PROT. MODULE # A AT CCR

- 87G GENERATOR DIFFERENTIAL
- 64G1 STATOR EARTH FAULT SIDE
- 64G2 STATOR INTERTURN FAULT
- 59 OVER VOLTAGE
- 27 UNDER VOLTAGE
- 81O OVER FREQUENCY
- 81U UNDER FREQUENCY
- 46 NEGATIVE PHASE SEQUENCE CURRENT
- 51 INVERSE TIME OVER CURRENT
- 40 LOSS OF EXCITATION
- 49 THERMAL OVERLOAD
- 32 REVERSE POWER # 1
- 32 REVERSE POWER # 2
- 37 LOW FORWARD PROTECTION
- 21 BACK UP IMPEDANCE
- 60 VOLTAGE BALANCE
- 78 GENERATOR POLE SLIPPING
- 99 OVER FLUXING
- VT & CT SUPERVISION
- DEAD MACHINE PROTECTION
- START UP / SHUT DOWN

GEN. PROT. MODULE # B AT CCR

- 87G Id GENERATOR DIFFERENTIAL
- 64G2 Iod STATOR EARTH FAULT 100%
- 95 STATOR INTERTURN FAULT
- 59 U > OVER VOLTAGE
- 27 U < UNDER VOLTAGE
- 81O f > OVER FREQUENCY
- 81U f < UNDER FREQUENCY
- 46 I2 > NEGATIVE PHASE SEQUENCE CURRENT
- 51 I > t INVERSE TIME OVER CURRENT
- 40 I R < LOSS OF EXCITATION
- 49 θ > THERMAL OVERLOAD
- 32 P → REVERSE POWER # 1
- 32 P → REVERSE POWER # 2
- 37 P < LOW FORWARD PROTECTION
- 21 Z < BACK UP IMPEDANCE
- 60 U2 / U1 VOLTAGE BALANCE
- 78 GENERATOR POLE SLIPPING
- 99 OVER FLUXING
- 98 VT & CT SUPERVISION
- 96 DEAD MACHINE PROTECTION
- START UP / SHUT DOWN

VOLTAGE INPUT FROM GEN. NGT

FROM GEN. NEUTRAL SIDE CT

FROM GEN. PHASE SIDE CT

GEN. PROT. MODULE

PB				KS	
PRELIMINARY				PM	
APPROV.	MECH.	INST.	ELEC.	STRL.	ARCH.
REVIEWED					

NATURE OF REVISION & DESCRIPTION	CHECKED	DRAWN	REV.	DATE
REVISED ACCORDING TO HPGC COMMENTS.	TS	GD	1	03.02.06
PRELIMINARY	PM	PKD	0	19.04.05

RELEASE STATUS	DATE	SIGNATURE
PRELIMINARY		
FOR TENDER ONLY		
FOR CONSTRUCTION		
ARCHITECTURAL		
CIVIL & STRUCTURAL		
ELECTRICAL		
INSTRUMENTATION		
MECHANICAL		

REVIEWED

…& UAT UNDER… SIMILAR …NT WILL BE E… …LAYS SHALL BE …IDED TO RECEIVE …IPTS FROM NUMER… …RELAYS AND TO …NTACTS AS NEED… …TO INITIATE …N ACTION. LOCKO… …LAYS SHALL BE …RESET TYPE.

…SET OF CT SIGNAL… …INDEPENDENT TRIP… …SHALL BE PROVID… …IN NUMERICAL RELAY.

…S SUCH AS I&C, … …'C & PT DETAILS (SUCH …IN ACCURACY CLAS… …SHALL BE FURNISHED …PARATE DOCUMENT.

5. FOR GEN. METERING ACTIVE & REACTIVE ENERGY METER WILL BE μ-P BASED, OTHER METERS IN THE GEN. METERING PANEL WILL BE DISCRETE STATIC TYPE.

REFERENCE DRAWINGS:

1. KEY SINGLE LINE DIAGRAM : REL-DCRTP-CEE-200-G-501, REV.C
2. TYPICAL SLD FOR 6600V SWBD INCOMER : REL-DCRTP-CEE-207-G-501 (SHT. 2 OF 8), REV.B
3. 220KV SWYD METERING & PROT. DIAGRAM : REL-DCRTP-CEE-201-A-501, REV.NIL
4. SLD FOR GEN. PROTECTION & METERING : 50-F248C-D01-02, REV.1 (BHEL SEC)

X'mr : 18/7/06 @ COMMISSIONING

ELECTRICAL METERING AND PROTECTION DIAGRAM FOR GT, ST AND UAT

2X300 MW DCR THERMAL POWER PROJECT TAHUNANAGAR, HARYANA

OWNER: HARYANA POWER GENERATION CORPORATION PANCHKULA, HARYANA

OWNER CONSULTANT: DESEIN PRIVATE LIMITED CONSULTING ENGINEERS NEW DELHI – INDIA

CENTRAL ELECTRICITY AUTHORITY SEWA BHAWAN, R K PURAM NEW DELHI

RELIANCE ENERGY LIMITED EPC BUSINESS GROUP RELIANCE ENERGY TOWER, G-2, SECTOR 24 NOIDA–201301 (U.P.)

DEVELOPMENT CONSULTANTS PRIVATE LIMITED CONSULTING ENGINEERS KOLKATA – MUMBAI – CHENNAI – NEW DELHI

DRAWN : P. K. DAS	CHECKED : P. MONDA
REVIEWED : P. MUKHERJEE	SCALE : NOT TO SCALE
APPROVED : P. BANERJEE	DRG. SIZE : A1
JOB NO. EPC/ND/XX/XXX	DRAWING NO. REL-DCRTP-CEE-200-G-502

ISO JOB NO.: K4412

Attachment No.23

FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.1, OF VOLUME II, Chapter 4 (ROUTE 1)

(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.2, OF VOLUME II AND THE COLLABORATOR WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under .....having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM)"/Collaborator, which expression shall include its successors, administrators, executors and permitted assigns)

HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW

AND WHEREAS clause 4.4.20A.2 c) of volume II stipulate that the bidder, who meets the requirement of Clause 4.4.20A.2 a), of volume II, should have a valid ongoing collaboration and technology transfer agreement with "Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer" meeting the requirements of Clause 4.4.20A1, of volume II on its own and the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM.

WHEREASM/s (Bidder)is submitting its proposal in response to the aforesaid Invitation for----------
Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS the Bidder and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees for its 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical

guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor jointly and severally undertake to promptly indemnify, and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to **One hundred million rupees**.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer.

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including preparation of purchase specification for critical auxiliaries viz Slurry Recirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps, Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

(vi) Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall
responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer for successful commissioning and performance of Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall depute its technical experts from time to time to the Contractor's/ Sub-vendor’s works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contract.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at

Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor's works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities and penalties and fulfillment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions of the Bidding Documents. The value of such Bank Guarantees shall be equal Rupees One Hundred Million and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for end of defect liability period/ Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delay The Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

Witness :

1..... ..

(Name in Block Letters)

.....

(Official Address)

For M/s .....

(Bidder/Contractor)

….....

(Signature of the authorized representative)

Name :.....

Designation : .....

Common Seal of the Company

For M/s.....

(QFGDM)

.....

1.....

(Name in Block Letters)

(Signature of the authorized representative)

.....

(Official Address)

Name:.....

Designation: .....

Common Seal of the Company

Notes:

i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.

ii) * Bidder to strike out, whichever is not applicable.

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FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.2 c), ALONGWITH NOTE 4 (i) OF CLAUSE 4.4.20A, OF VOLUME II
(ROUTE 2)
(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.1, OF VOLUME II AND THE COLLABORATOR (A HOLDING COMPANY ALONG WITH ITS SUBSIDIRES) WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM) Collaborator Holding company", which expression shall include its successors, administrators, executors and permitted assigns) AND

*M/s .....a Company registered under …….. having its Registered Office at....., *M/s ..... a Company registered under ……..having its Registered Office at ..... and M/s ..... a Company registered under …….. having its Registered Office at ..... (the Subsidiary(ies) of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer who are lending strength/ experience to the Qualified Wet Limestone Based Flue Gas Desulphurisation System for meeting the requirements stipulated in clause 4.4.20A.1 and hereinafter collectively called the "Subsidiary(ies)", which expression shall include its successors, administrators, executors and permitted assigns)

in favour of HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Purchaser invited WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS clause 4.4.20A.2 c), of volume II, stipulate that the bidder, who meets the requirement of Clause 4.4.20A.2 a), of volume II, should have a valid ongoing collaboration and technology transfer agreement with "Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer" meeting the requirements of Clause 4.4.20A.1, of volume I-A on its own and the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM. Further as per note 4 i) of clause 4.4.20A, of Volume II, the Holding Company and all such subsidiaries lending strength / experience to the Holding Company shall necessarily be part of the DJU being submitted by the Bidder.

WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the aforesaid Invitation for---------- Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS the Bidder and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees for its 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies), do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies), do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) jointly and severally undertake to promptly indemnify, and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to one hundred million rupees.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or subsidiary(ies), nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or subsidiary(ies).

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including preparation of purchase specification for critical auxiliaries viz Slurry Recirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps, Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System
Manufacturer and subsidiary(ies) shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) for successful commissioning and performance of Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based

Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall depute its technical experts from time to time to the Contractor's/ Sub-vendor's works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contracts.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor's works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities and penalties and fulfillment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions of the Bidding Documents. The value of such Bank Guarantees shall be equal to one hundred million rupees and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for entire period of contract, i.e. till three months beyond the end of the Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delay. The Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, subsidiary(ies) and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer subsidiary(ies) and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

For M/s .....
(Bidder/Contractor)

Witness :
1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the authorized representative)

Name :.....

Designation : .....
Common Seal of the Company

1.....
(Name in Block Letters)

.....
(Official Address)

For M/s.....
(Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer i.e. HOLDING COMPANY)

.....
(Signature of the authorized representative)

Name:.....

Designation: .....

Common Seal of the Company
….....

For M/s .....
(*SUBSIDIARY 1 OF HOLDING COMPANY)

WITNESS :
1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the Authorised Representative)
Name.....
Designation.....
Common Seal of the Company

For M/s .....
(*SUBSIDIARY 2 OF HOLDING COMPANY)

WITNESS :

1.....

.....
(Signature of the Authorised Representative)
Name.....

(Name in Block Letters)

.....
(Official Address)

WITNESS :

1.....
(Name in Block Letters)

.....
(Official Address)

Designation.....
Common Seal of the Company
.....

For M/s .....
(*SUBSIDIARY 3 OF HOLDING COMPANY)
.....
(Signature of the Authorised Representative)
..... Name.....
Designation.....
Common Seal of the Company

Notes:
i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.
ii) * Bidder to strike out, whichever is not applicable.

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FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.3.5, OF VOLUME II (ROUTE 3) (ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.3.1, OF VOLUME II AND THE COLLABORATOR WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under .....having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM)"/Collaborator, which expression shall include its successors, administrators, executors and permitted assigns)

in favour of HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Purchaser invited WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS clause 4.4.20A.4, of volume II stipulate that the bidder, who meets the requirement of Clause 4.4.20A.3.1, of volume II should have a valid ongoing collaboration and technology transfer agreement with "Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer" meeting the requirements of Clause 4.4.20A.1 of volume II on its own and the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM.

WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the aforesaid Invitation for---------- Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW

AND WHEREAS the Bidder and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees for its 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor jointly and severally undertake to promptly indemnify,

and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to one hundred million rupees.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer.

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including preparation of purchase specification for critical auxiliaries viz Slurry Recirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps, Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

(vi) Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall
responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer for successful commissioning and performance of Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall depute its technical experts from time to time to the Contractor's/ Sub-vendor’s works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contracts.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor’s works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities and penalties and fulfilment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions of the Bidding Documents. The value of such Bank Guarantees shall be equal to one hundred million rupees and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for entire period of contract, i.e. till three months beyond the end of the Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delay The Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

Witness :

1..... ..

(Name in Block Letters)

For M/s .....

(Bidder/Contractor)

….....

(Signature of the authorized representative)

.....
(Official Address)

Name :.....

Designation : .....

Common Seal of the Company

For M/s.....
(QFGDM)

.....

1.....
(Name in Block Letters)

(Signature of the authorized representative)

.....
(Official Address)

Name:.....
Designation: .....
Common Seal of the Company

Notes:

i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.

ii) * Bidder to strike out, whichever is not applicable.

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FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.3.5, ALONGWITH NOTE 4 (i) OF CLAUSE 4.4.20A, OF VOLUME II
(ROUTE 3)
(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.3.1, OF VOLUME II AND THE COLLABORATOR (A HOLDING COMPANY ALONG WITH ITS SUBSIDIRES) WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM) Collaborator Holding company", which expression shall include its successors, administrators, executors and permitted assigns)

*M/s .....a Company registered under …….. having its Registered Office at....., *M/s ..... a Company registered under ……..having its Registered Office at ..... and M/s ..... a Company registered under …….. having its Registered Office at ..... (the Subsidiary(ies) of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer who are lending strength/ experience to the Qualified Wet Limestone Based Flue Gas Desulphurisation System for meeting the requirements stipulated in clause 4.4.20A.1 and hereinafter collectively called the "Subsidiary(ies)", which expression shall include its successors, administrators, executors and permitted assigns)

in favour of HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Purchaser invited WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS clause 4.4.20A.3.4, of volume II, stipulate that the bidder, who meets the requirement of Clause 4.4.20A.3.1, of volume II, should have a valid ongoing collaboration and technology transfer agreement with "Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer" meeting the requirements of Clause 4.4.20A.1, of volume II on its own and the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM. Further as per note 4 i) of clause 4.4.20A, of Volume II, the Holding Company and all such subsidiaries lending strength / experience to the Holding Company shall necessarily be part of the DJU being submitted by the Bidder.

WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the aforesaid Invitation for---------- Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW

AND WHEREAS the Bidder and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies), do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies), do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) jointly and severally undertake to promptly indemnify, and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to one hundred million rupees.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or subsidiary(ies), nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or subsidiary(ies).

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including preparation of purchase specification for critical auxiliaries viz Slurry Recirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps, Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) for successful commissioning and performance of

Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall depute its technical experts from time to time to the Contractor's/ Sub-vendor's works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contract.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor's works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities and penalties and fulfillment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions of the Bidding Documents. The value of such Bank Guarantees shall be equal to one hundred million rupees only and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for entire period of contract, i.e. till three months beyond the end of the Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delay. The Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, subsidiary(ies) and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer subsidiary(ies) and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

For M/s .....
(Bidder/Contractor)

Witness :
1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the authorized representative)

Name :.....

Designation : .....
Common Seal of the Company

1.....
(Name in Block Letters)

.....
(Official Address)

For M/s.....
(Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer i.e. HOLDING COMPANY)

.....
(Signature of the authorized representative)

Name:.....

Designation: .....

Common Seal of the Company
….....

For M/s .....
(*SUBSIDIARY 1 OF HOLDING COMPANY)

WITNESS :
1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the Authorised Representative)
Name.....
Designation.....
Common Seal of the Company

For M/s .....
(*SUBSIDIARY 2 OF HOLDING COMPANY)

WITNESS :

1.....
(Name in Block Letters)

.....
(Signature of the Authorised Representative)
Name.....
Designation.....
Common Seal of the Company
.....

.....
(Official Address)

For M/s .....
(*SUBSIDIARY 3 OF HOLDING COMPANY)
.....
(Signature of the Authorised Representative)
..... Name.....
Designation.....
Common Seal of the Company

WITNESS :

1.....
(Name in Block Letters)

.....
(Official Address)

Notes:
i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.
ii) * Bidder to strike out, whichever is not applicable.

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FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.3.5, OF VOLUME II (ROUTE 3) (ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR(INDIAN JOINT VENTURE COMPANY) MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.3.2, OF VOLUME II AND THE COLLABORATOR WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] AND THE PROMOTOR(S) HAVING 25% OR HIGHER EQUITY PARTICIPATION IN THE INDIAN JOINT VENTURE COMPANY FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor/Indian Joint venture (JV) Company", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under .....having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM)"/Collaborator, which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under .....having its Registered Office at.....and having 25% or higher equity participation in the Bidder/Contractor (hereinafter called the **"**PROMOTER", which expression shall include its successors, administrators, executors and permitted assigns),

in favour of HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Purchaser invited WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS clause 4.4.20A.3.4, of volume II, stipulate that the bidder, who meets the requirement of Clause 4.4.20A.3.2, of volume II, should have a valid ongoing collaboration and technology transfer agreement with "Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer" meeting the requirements of Clause 4.4.20A.1, of volume II on its own and the other Promoter of the Indian Joint Venture (JV) Company having 25% or higher equity participation in the Bidder, meeting the requirement of Clause 4.4.20A.3.2, of Volume II and furnish a Deed of Joint Undertaking. Further, the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM.

WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the aforesaid Invitation for---------- Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW.

WHEREAS M/s ..... (Bidder/Contractor), a Joint Venture Company incorporated in India under the Companies Act of India, as on original schedule date of Bid opening, promoted by

(i) M/s..……., an Indian Company registered in India under the Companies Act of India and
(ii) M/s. ……*a Steam Generator Manufacturer meeting the requirement of Clause 4.4.20A.3.1, of Volume II **or** *a QFGDM meeting the requirement of Clause 4.4.20A.1, of Volume II, created for the purpose of manufacturing/supplying in India steam generator sets/ Flue Gas Desulphurisation System and other Promoter *M/s.……(hereinafter called "PROMOTER") having 25% or higher equity participation in the Bidder/ Contractor meeting the requirements specified in Clause 4.4.20A.3.2, of Volume II.

AND WHEREAS the Bidder (Joint Venture Company), and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees for its1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER, do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER, do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER and the Contractor jointly and severally undertake to promptly indemnify, and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to one hundred million rupees only.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or the PROMOTER, nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or the PROMOTER.

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation Systemincluding preparation of purchase specification for critical auxiliaries viz SlurryRecirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps,Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer for successful commissioning and performance of Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall depute its technical experts from time to time to the Contractor's/ Sub-vendor's works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contracts.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor's works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities and penalties and fulfilment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions

of the Bidding Documents. The value of such Bank Guarantees shall be equal to one hundred million rupees only and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for entire period of contract, i.e. till three months beyond the end of the Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delay The Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

Witness :

1..... ..

(Name in Block Letters)

.....

(Official Address)

For M/s .....

(Bidder/Contractor)

….....

(Signature of the authorized representative)

Name :.....

Designation : .....

Common Seal of the Company

1.....

(Name in Block Letters)

.....

(Official Address)

For M/s.....

(QFGDM)

(Signature of the authorized representative)

Name:.....

Designation: .....

Common Seal of the Company

….....

1.....

(Name in Block Letters)

.....

(Official Address)

For M/s.....

(PROMOTOR)

.....

(Signature of the authorized representative)

Name:.....

Designation: .....

Common Seal of the Company

Notes:

i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.

ii) * Bidder to strike out, whichever is not applicable.

******

FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.3.5, ALONGWITH NOTE 4 (i)4.4.20A, OF VOLUME II (ROUTE 3)
(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR (INDIAN JOINT VENTURE COMPANY) MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.3.2, OF VOLUME II AND THE COLLABORATOR (A HOLDING COMPANY ALONG WITH ITS SUBSIDIARIES) WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] AND THE PROMOTOR(S) HAVING 25% OR HIGHER EQUITY PARTICIPATION IN THE INDIAN JOINT VENTURE COMPANY FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor/Indian Joint venture (JV) Company", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under .....having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM)" Collaborator, which expression shall include its successors, administrators, executors and permitted assigns) AND

*M/s .....a Company registered under …….. having its Registered Office at....., *M/s ..... a Company registered under ……..having its Registered Office at ..... and M/s ..... a Company registered under …….. having its Registered Office at ..... (the Subsidiary(ies) of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer who are lending strength/ experience to the Qualified Wet Limestone Based Flue Gas Desulphurisation System for meeting the requirements stipulated in clause 4.4.20A.1 and hereinafter collectively called the "Subsidiary(ies)", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under .....having its Registered Office at.....and having 25% or higher equity participation in the Bidder/Contractor (hereinafter called the **"**PROMOTER", which expression shall include its successors, administrators, executors and permitted assigns),

in favour of HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Purchaser invited WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS clause 4.4.20A.3.4, of volume II, stipulate that the bidder, who meets the requirement of Clause 4.4.20A.3.2, of volume II, should have a valid ongoing collaboration and technology transfer agreement with "Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer" meeting the requirements of Clause 4.4.20A.1, of volume II on its own and the other Promoter of the Indian Joint Venture (JV) Company having 25% or higher equity participation in the Bidder, meeting the requirement of Clause 4.4.20A.3.2, of Volume II and furnish a Deed of Joint Undertaking. Further, the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM. Further as per note 4 i) of clause 4.4.20A, of Volume II the Holding Company and all such subsidiaries lending strength / experience to the Holding Company shall necessarily be part of the DJU being submitted by the Bidder.

WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the aforesaid Invitation for----------
Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW

WHEREAS M/s ..... (Bidder/Contractor), a Joint Venture Company incorporated in India under the Companies Act of India, as on original schedule date of Bid opening, promoted by
(i) M/s....., an Indian Company registered in India under the Companies Act of India and
(ii) M/s. .....*a Steam Generator Manufacturer meeting the requirement of Clause 4.4.20A.3.1, of Volume II**or** *a QFGDM meeting the requirement of Clause 4.4.20A.1, of Volume II, created for the purpose of manufacturing/supplying in India steam generator sets/ Flue Gas Desulphurisation System and other Promoter *M/s.....(hereinafter called "PROMOTER") having 25% or higher equity participation in the Bidder/ Contractor meeting the requirements specified in Clause 4.4.20A.3.2, of Volume II.

AND WHEREAS the Bidder (Joint Venture Company), *the steam Generator manufacturer, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees for its 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER, do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER, do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER and the Contractor jointly and severally undertake to promptly indemnify, and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to one hundred million rupees only.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or Subsidiary(ies) or the PROMOTER, nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or Subsidiary(ies) or the PROMOTER.

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries

meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including preparation of purchase specification for critical auxiliaries viz Slurry Recirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps, Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) for successful commissioning and performance of Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall depute its technical experts from time to time to the Contractor's/ Sub-vendor’s works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contract.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor’s works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities

and penalties and fulfilment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions of the Bidding Documents. The value of such Bank Guarantees shall be equal to one hundred million rupees only and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for entire period of contract, i.e. till three months beyond the end of the Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delay The Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

For M/s .....
(Bidder/Contractor)

Witness :
1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the authorized representative)

Name :.....

Designation : .....
Common Seal of the Company

For M/s .....
(PROMOTOR)

1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the authorized representative)

Name :.....

Designation : .....
Common Seal of the Company

For M/s.....
(Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer i.e. HOLDING COMPANY)

1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the authorized representative)

Name:.....

Designation: .....

Common Seal of the Company
….....

For M/s .....
(*SUBSIDIARY 1 OF HOLDING COMPANY)

WITNESS :
1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the Authorised Representative)
Name.....
Designation.....
Common Seal of the Company

For M/s .....
(*SUBSIDIARY 2 OF HOLDING COMPANY)

WITNESS :

1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the Authorised Representative)
Name.....
Designation.....
Common Seal of the Company
.....

For M/s .....
(*SUBSIDIARY 3 OF HOLDING COMPANY)

WITNESS :

1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the Authorised Representative)
..... Name.....
Designation.....
Common Seal of the Company

Notes:
i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.
ii) * Bidder to strike out, whichever is not applicable.

******

FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.3.5, OF VOLUME II (ROUTE 3) (ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR(INDIAN SUBSIDIARY COMPANY OF A STEAM GENERATOR MAUFACTURER *OR * QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPURISATION SYSTEM MAUFACTURER (QFGDM), MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.3.3, OF VOLUME II AND THE COLLABORATOR WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] *AND THE PROMOTOR(S) HAVING 25% OR HIGHER EQUITY PARTICIPATION IN THE *SUBSIDIARY COMPANY & MEETINGTHE REQUIREMENTS OF CLAUSE 4.4.20A.3.3, OF VOLUME II FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor/Indian subsidiary Company", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under .....having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM)"/Collaborator, which expression shall include its successors, administrators, executors and permitted assigns) AND

*M/s ..... a Company incorporated under .....having its Registered Office at.....and *M/s ..... a Company incorporated under ..... having its Registered Office at..... having 25% or higher equity participation in the Bidder/Contractor (hereinafter called the **"**PROMOTER(s)", which expression shall include its successors, administrators, executors and permitted assigns),

in favour of HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Purchaser invited WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS clause 4.4.20A.3.4, of volume II, stipulate that the bidder, who meets the requirement of Clause 4.4.20A.3.3, of volume II, should have a valid ongoing collaboration and technology transfer agreement with "Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer" meeting the requirements of Clause 4.4.20A.1, of volume II on its own and the Promoter(s) having 25% or higher equity participation in the Bidder, and furnish a Deed of Joint Undertaking. Further, the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM.

WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the aforesaid Invitation for---------- Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW

WHEREAS M/s ..... (Bidder/Contractor), an Indian Subsidiary Company of M/s.....,a*Steam Generator Manufacturer meeting the requirement of Clause 4.4.20A.3.1, of Volume II/ *Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer meeting the requirement of Clause 4.4.20A.1, of Volume II, registered in India under the Companies Act of India, as on original schedule date of Bid opening, for manufacturing/ supply of *Steam Generator Sets/ *Flue Gas Desulphurisation System, meeting the requirement of Clause 4.4.20A.3.3, of Volume II whose other Promoter(s) having 25% or higher equity participation in the Bidder/ Contractor i.e. *M/s……., *M/s…… (hereinafter called "PROMOTER(s)")

AND WHEREAS the Bidder, Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER(s) are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER(s), do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER(s), do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER(s) and the Contractor jointly and severally undertake to promptly indemnify, and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to one hundred million rupees only.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or the PROMOTER(s), nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or the PROMOTER(s).

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including preparation of purchase specification for critical auxiliaries viz Slurry Recirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps, Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer for successful commissioning and performance of Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall depute its technical experts from time to time to the Contractor's/ Sub-vendor's works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contracts.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor's works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities and penalties and fulfilment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER(s) do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER(s) will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions of the Bidding Documents. The value of such Bank Guarantees shall be equal to one hundred million rupees only and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for entire period of contract, i.e. till three months beyond the end of the Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delay The Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER(s) and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the PROMOTER(s) and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

Witness :

1..... ..

(Name in Block Letters)

.....

(Official Address)

For M/s .....

(Bidder/Contractor)

….....

(Signature of the authorized representative)

Name :.....

Designation : .....

Common Seal of the Company

1.....

(Name in Block Letters)

.....

(Official Address)

For M/s.....

(QFGDM)

(Signature of the authorized representative)

Name:.....

Designation: .....

Common Seal of the Company

….....

1.....

(Name in Block Letters)

.....

(Official Address)

For M/s.....

(PROMOTOR(s))

.....

(Signature of the authorized representative)

Name:.....

Designation: .....

Common Seal of the Company

1.....
(Name in Block Letters)

.....
(Official Address)

For M/s .....
(*other Promotor having 25% or higher equity participation in the Bidder/Contractor)

.....
(Signature of the authorized representative)

Name :.....

Designation : .....
Common Seal of the Company

Notes:
i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.
ii) * Bidder to strike out, whichever is not applicable.

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FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.3.5, ALONGWITH NOTE 4 (i) OF CLAUSE 4.4.20A OF VOLUME II
(ROUTE 3)
(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR(INDIAN SUBSIDIARY COMPANY OF A STEAM GENERATOR MAUFACTURER *OR * QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPURISATION SYSTEM MAUFACTURER (QFGDM), MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.3.3, OF VOLUME II AND THE COLLABORATOR (A HOLDING COMPANY ALONG WITH ITS SUBSIDIARIES) WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] *AND THE PROMOTOR(S) HAVING 25% OR HIGHER EQUITY PARTICIPATION IN THE *SUBSIDIARY COMPANY& MEETINGTHE REQUIREMENTS OF CLAUSE 4.4.20A.3.3, OF VOLUME II FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor/Indian Subsidiary Company", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM) Collaborator Holding Company", which expression shall include its successors, administrators, executors and permitted assigns) AND

*M/s .....a Company registered under …….. having its Registered Office at....., *M/s ..... a Company registered under ……..having its Registered Office at ..... and M/s ..... a Company registered under …….. having its Registered Office at ..... (the Subsidiary(ies) of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer who are lending strength/ experience to the Qualified Wet Limestone Based Flue Gas Desulphurisation System for meeting the requirements stipulated in clause 4.4.20A.1 and hereinafter collectively called the "Subsidiary(ies)", which expression shall include its successors, administrators, executors and permitted assigns) AND

*M/s ..... a Company incorporated under .....having its Registered Office at.....and *M/s ..... a Company incorporated under ..... having its Registered Office at..... having 25% or higher equity participation in the Bidder/Contractor (hereinafter called the **"**PROMOTER(s)", which expression shall include its successors, administrators, executors and permitted assigns),

in favour of HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Purchaser invited WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS clause 4.4.20A.3.4, of volume II, stipulate that the bidder, who meets the requirement of Clause 4.4.20A.3.3, of volume II, should have a valid ongoing collaboration and technology transfer agreement with "Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer" meeting the requirements of Clause 4.4.20A.1.1, of volume II on its own and the Promoter(s) having 25% or higher equity participation in the Bidder, and furnish a Deed of Joint Undertaking. Further, the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM. Further as per note 4 i) of clause 4.4.20A, of Volume II, the Holding Company and all

such subsidiaries lending strength / experience to the Holding Company shall necessarily be part of the DJU being submitted by the Bidder.

WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the afore said Invitation for Techno commercial Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW.

WHEREAS M/s ..... (Bidder/Contractor), an Indian Subsidiary Company of M/s.....,a*Steam Generator Manufacturer meeting the requirement of Clause 4.4.20A.3.1, of Volume II/ *Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer meeting the requirement of Clause 4.4.20A.1, of Volume II, registered in India under the Companies Act of India, as on original schedule date of Bid opening, for manufacturing/ supply of *Steam Generator Sets/ *Flue Gas Desulphurisation System, meeting the requirement of Clause 4.4.20A.3.3, of Volume II whose other Promoter(s) having 25% or higher equity participation in the Bidder/ Contractor i.e.
*M/s……, *M/s…… (hereinafter called “PROMOTER(s)”)

AND WHEREAS the Bidder, Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER(s) are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees for its1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER(s), do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER(s), do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER(s) and the Contractor jointly and severally undertake to promptly indemnify, and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to one hundred million rupees only.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or Subsidiary(ies) or the PROMOTER(s), nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or Subsidiary(ies) or the PROMOTER(s).

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries

meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including preparation of purchase specification for critical auxiliaries viz Slurry Recirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps, Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) for successful commissioning and performance of Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall depute its technical experts from time to time to the Contractor's/ Sub-vendor's works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contracts.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor's works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities

and penalties and fulfilment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER(s) do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER(s) will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions of the Bidding Documents. The value of such Bank Guarantees shall be equal to one hundred million rupees only and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for entire period of contract, i.e. till three months beyond the end of the Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delay The Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER(s) and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and Subsidiary(ies) and the PROMOTER(s) and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

For M/s .....
(Bidder/Contractor)

Witness :
1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the authorized representative)

Name :.....

Designation : .....
Common Seal of the Company

For M/s .....
(PROMOTOR)

1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the authorized representative)

Name :.....

Designation : .....
Common Seal of the Company

For M/s .....

(*other Promotor having 25% or higher equity participation in the Bidder/Contractor)

1.....
(Name in Block Letters)

.....
(Official Address)

1.....
(Name in Block Letters)

.....
(Official Address)

WITNESS :
1.....
(Name in Block Letters)

.....
(Official Address)

WITNESS :

1.....
(Name in Block Letters)

.....
(Official Address)

WITNESS :

1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the authorized representative)

Name :.....

Designation : .....
Common Seal of the Company

For M/s.....
(Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer i.e. HOLDING COMPANY)

.....
(Signature of the authorized representative)

Name:.....

Designation: .....

Common Seal of the Company
….....

For M/s .....
(*SUBSIDIARY 1 OF HOLDING COMPANY)

.....
(Signature of the Authorised Representative)
Name.....
Designation.....
Common Seal of the Company

For M/s .....
(*SUBSIDIARY 2 OF HOLDING COMPANY)
.....
(Signature of the Authorised Representative)
Name.....
Designation.....
Common Seal of the Company
.....

For M/s .....
(*SUBSIDIARY 3 OF HOLDING COMPANY)
.....
(Signature of the Authorised Representative)
..... Name.....
Designation.....
Common Seal of the Company

Notes:
i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.
ii) * Bidder to strike out, whichever is not applicable.

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FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.4.3, OF VOLUME II (ROUTE 4) (ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.4.1, OF VOLUME II AND THE COLLABORATOR WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under .....having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM)" Collaborator, which expression shall include its successors, administrators, executors and permitted assigns)

in favour of HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Purchaser invited WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS clause 4.4.20A.4.2, of volume II, stipulate that the bidder, as an Engineering, Procurement and Construction (EPC) organization, who meets the requirement of Clause 4.4.20A.4.1, of volume II, should have a valid ongoing collaboration and technology transfer agreement with “Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer” meeting the requirements of Clause 4.4.20A.1, of volume II on its own and the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM.

WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the afore said Invitation for Techno commercial Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS the Bidder and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees for its 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical

guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor jointly and severally undertake to promptly indemnify, and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to one hundred million rupees only.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer.

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including preparation of purchase specification for critical auxiliaries viz Slurry Recirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps, Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer for successful commissioning and performance of Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall depute its technical experts from time to time to the Contractor's/ Sub-vendor’s works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contracts.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor’s works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities and penalties and fulfillment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions of the Bidding Documents. The value of such Bank Guarantees shall be equal to one hundred million rupees only and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for entire period of contract, i.e. till three months beyond the end of the Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delay The Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

Witness : For M/s .....

1..... .. (Bidder/Contractor)

(Name in Block Letters) ….....

(Signature of the authorized representative)

.....
(Official Address)

Name :.....

Designation : .....

Common Seal of the Company

For M/s.....
(QFGDM)

1..... .....
(Name in Block Letters)

(Signature of the authorized representative)

.....
(Official Address)

Name:.....

Designation: .....

Common Seal of the Company

Notes:

i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.

ii) * Bidder to strike out, whichever is not applicable.

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FORM OF DEED OF JOINT UNDERTAKING FOR THE COMPLETE FLUE GAS DESULPHURISATION SYSTEM AS PER CLAUSE 4.4.20A.4.3 ALONGWITH NOTE 4 (i) OF CLAUSE 4.4.20A, OF VOLUME II (ROUTE 4)
(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER/ CONTRACTOR MEETING THE REQUIREMENTS OF CLAUSE 4.4.20A.4.1, OF VOLUME II AND THE COLLABORATOR (A HOLDING COMPANY ALONG WITH ITS SUBSIDIARIES) WHO MEETS THE REQUIREMENT OF CLAUSE 4.4.20A.1, OF VOLUME II [AS A QUALIFIED WET LIMESTONE BASED FLUE GAS DESULPHURISATION SYSTEM MANUFACTURER (QFGDM)] FOR SUCCESSFUL PERFORMANCE OF THE FGD SYSTEM INCLUDING MEETING THE TECHNICAL GUARANTEES

The DEED OF UNDERTAKING executed this .....day of .....Two thousand ..... by M/s..... a Company incorporated under ..... having its Registered Office at.....(hereinafter called the "Bidder/Contractor", which expression shall include its successors, administrators, executors and permitted assigns) AND

M/s ..... a Company incorporated under .....having its Registered Office at.....(hereinafter called **"**Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer (QFGDM)" Collaborator, which expression shall include its successors, administrators, executors and permitted assigns) AND

*M/s .....a Company registered under …….. having its Registered Office at....., *M/s ..... a Company registered under ……..having its Registered Office at ..... and M/s ..... a Company registered under …….. having its Registered Office at ..... (the Subsidiary(ies) of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer who are lending strength/ experience to the Qualified Wet Limestone Based Flue Gas Desulphurisation System for meeting the requirements stipulated in clause 4.4.20A.1 and hereinafter collectively called the "Subsidiary(ies)", which expression shall include its successors, administrators, executors and permitted assigns)

in favour of HARYANA POWER GENERATION CORPORATION LIMITED, having its Registered Office at Plot No. C-7, Urja Bhawan, Sector 6, Panchkula, Haryana - 134109 (India) (hereinafter called "HPGCL" or "Owner" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Purchaser invited WHEREAS, the Owner invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, (hereinafter referred to as "Plant") vide its Bidding Document No.:03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS clause 4.4.20A.4.2, of volume II, stipulate that the bidder, as an Engineering, Procurement and Construction (EPC) organization, who meets the requirement of Clause 4.4.20A.4.1, of volume II, should have a valid ongoing collaboration and technology transfer agreement with “Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer” meeting the requirements of Clause 4.4.20A.1, of volume II on its own and furnish a Deed of Joint Undertaking. Further the bidder shall either source the FGD system from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM. Further as per note 4 i) of clause 4.4.20A, of Volume II, the Holding Company and all such subsidiaries lending strength / experience to the Holding Company shall necessarily be part of the DJU being submitted by the Bidder

WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the afore said Invitation for Techno commercial Bid by the Owner for EPC Package for 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, , against the Owner'sBiddingDocumentsNo.03/HPGCL/DCRTPP/EPC/800MW.

AND WHEREAS the Bidder and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) are required to jointly execute and furnish along with the bid an irrevocable Deed of Joint Undertaking and be jointly and severally liable and bound unto the Purchaser for the successful performance of the FGD System including meeting the technical guarantees for its 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR, as per Tender documents, in the event, the Bid is accepted by the Purchaser resulting into a Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. That in consideration of the award of the Contract by the Purchaser to the Contractor, we the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies), do hereby declare and undertake that we shall be jointly and severally responsible to the Purchaser for the execution and successful performance of all the contractual obligations including the technical guarantees for the complete Flue Gas Desulphurisation Package, as specified under the said Contract to the satisfaction of the Purchaser.

2. In case of any breach of the Contract committed by the Contractor, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies), do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the complete Flue Gas Desulphurization (FGD) System and undertake to carry out all obligations and responsibilities stipulated in the Contract, including the technical guarantees for the complete Flue Gas Desulphurisation System Package. Further if the Purchaser sustains any loss or damage on account of any breach of the Contract, we the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) and the Contractor jointly and severally undertake to promptly indemnify, and pay such loss/damages caused to the Purchaser on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

The liability of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer shall be limited to an amount equivalent to one hundred million rupees only.

This is without prejudice to any rights of the Purchaser against the Contractor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Purchaser to first proceed against the Contractor before proceeding against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or subsidiary(ies), nor any extension of time or any relaxation given by the Purchaser to the Contractor would prejudice any rights of the Purchaser under this Deed of Joint Undertaking to proceed against the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or subsidiary(ies).

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

(a) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall be fully responsible for complete engineering, preparation of all designs, design calculations, design documents/ drawings and manufacturing drawings for the Absorber including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating Absorber with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance of all Absorber and auxiliaries meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Wet Limestone based Flue Gas Desulphurisation System.

(b) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall be specifically responsible for the following:

(i) Complete design of Absorber including selection/design of Absorber material, lining & all internals; complete mass flow balance as well as design of structural/supporting system including selection of material & accessories etc.

(ii) Selection of auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including preparation of purchase specification for critical auxiliaries viz Slurry Recirculation pumps, Oxidation Blowers, Wet limestone Grinding mills, Slurry pumps, Agitators, Hydro-cyclones, Vacuum Belt Filters, slurry valves & piping.

(iii) Design of controls, protections and interlocks for all the auxiliaries for Wet Limestone based Flue Gas Desulphurisation System including Absorber for their safe and reliable operation as integral units with other equipments of the Main Plant.

(iv) Providing all design data required by the Contractor to carry out design/ selection of balance equipment/ system including all civil inputs for foundation design, site construction, structural work etc. for Wet Limestone based Flue Gas Desulphurisation System and for their proper interfacing and integration.

(v) Provide manufacturing/fabrication drawings for absorber including its internals.

Further, we, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning and performance testing, both at Contractor's and/ or at Purchaser's Station site. Without prejudice to the overall responsibilities of the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) for successful commissioning and performance of Wet Limestone based Flue Gas Desulphurisation System, the Qualified Wet Limestone Based Flue Gas

Desulphurisation System Manufacturer and subsidiary(ies) shall depute its technical experts from time to time to the Contractor's/ Sub-vendor's works/ Purchaser's Station site, as mutually agreed upon between the Purchaser and the Contractor in accordance with the stipulation of the Contract.

(c) We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) will be fully responsible for the quality of manufacture of all equipments/ main assemblies/ components for incorporation in the Wet Limestone based Flue Gas Desulphurisation System.

For the items to be manufactured by the contractor at his/or his vendor's works as per the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) design & manufacturing drawings released by us, the Collaborator shall ensure completeness and correctness of the design, data, document and information in every detail provided to the Contractor which would result in the same quality of equipment as if manufactured at Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer or its Sub-vendor's works and shall meet Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer acceptance.

(d) We the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall be fully responsible for complete for design, engineering, supply, installation, putting in to satisfactory operation and carrying out the guarantee tests for Wet Limestone Based Flue Gas Desulphurisation System to the satisfaction of the Purchaser.

Further, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall ensure proper design, manufacture, installation, testing and successful performance of the Wet Limestone Based Flue Gas Desulphurisation System under the said Contract in accordance with stipulations of Tender Documents and if necessary, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall advise the Contractor/ his Sub-Vendor suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

(e) In the event the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) and the Contractor fail to demonstrate that the Wet Limestone Based Flue Gas Desulphurisation System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Purchaser.

(f) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Wet Limestone Based Flue Gas Desulphurisation System and payment of financial liabilities and penalties and fulfillment of all other contractual obligations as provided under the contract shall be the joint and severally responsibility of the Contractor and Collaborator.

4. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) do hereby undertake and confirm that this Deed of Joint Undertaking shall be irrevocable and shall not be revoked till three months after the end of the warranty period of the plant under the Contract and further stipulate that the Undertaking herein contained shall terminate after three months upon satisfactory completion of such warranty period. We further agree that this undertaking shall be without any prejudice to the various liabilities of the Contractor, including the Contract Performance Guarantees as well as other obligations of the Contractor in terms of the Contract.

5. We, the Contractor and the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) will be fully responsible for the quality of all equipment/main assemblies/components manufactured at their works or at their Vendor's works or constructed at site, and their repairs or replacement if necessary for incorporation in the relevant system(s) of Flue Gas Desulphurization (FGD) System Package and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contractor's Performance Bank Guarantee furnished by the Contractor, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer and subsidiary(ies) shall furnish "as Security" an on demand Performance Bank Guarantees in favour of the Purchaser as per provisions of the Bidding Documents. The value of such Bank Guarantees shall be equal to one hundred million rupees only and it shall be towards guaranteeing the faithful performance/compliance of this Deed of Joint Undertaking in accordance with the terms and conditions specified herein. The Bank Guarantee shall be unconditional, irrevocable and valid for entire period of contract, i.e. till three months beyond the end of the Warranty period of the complete power plant package under the Contract. In case of delay in completion of the warranty period, the validity at this Bank Guarantee shall be extended by the period of such delayThe Bank Guarantee amount shall be promptly paid to the Purchaser on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Panchkula shall have exclusive jurisdiction.

8. We, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer, subsidiary(ies) and the Contractor agree that this Deed of Joint Undertaking shall be irrevocable and shall form an integral part of the Contract. We further agree that this Deed of Joint Undertaking shall continue to be enforceable till the successful completion of Contract and till the Purchaser discharge it.

9. That this Deed shall be operative from the effective date of the LOA.

IN WITNESS WHEREOF, the Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer subsidiary(ies) and the Contractor, through their authorised representatives, have executed these present and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

For M/s .....
(Bidder/Contractor)

Witness :
1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the authorized representative)

Name :.....

Designation : .....
Common Seal of the Company

1.....
(Name in Block Letters)

.....
(Official Address)

For M/s.....
(Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer i.e. HOLDING COMPANY)

.....
(Signature of the authorized representative)

Name:.....

Designation: .....

Common Seal of the Company
….....

For M/s .....
(*SUBSIDIARY 1 OF HOLDING COMPANY)

WITNESS :
1.....
(Name in Block Letters)

.....
(Official Address)

.....
(Signature of the Authorised Representative)
Name.....
Designation.....
Common Seal of the Company

For M/s .....
(*SUBSIDIARY 2 OF HOLDING COMPANY)

WITNESS :

1.....
(Name in Block Letters)

.....
(Signature of the Authorised Representative)
Name.....
Designation.....
Common Seal of the Company
.....

.....
(Official Address)

WITNESS :

1.....
(Name in Block Letters)

.....
(Official Address)

For M/s .....
(*SUBSIDIARY 3 OF HOLDING COMPANY)
.....
(Signature of the Authorised Representative)
..... Name.....
Designation.....
Common Seal of the Company

Notes:
i) Power of Attorney of each of the person signing the Deed of Joint Undertaking and Board resolution in regard of POA of Authorised signatory, shall be furnished along with this Deed of Joint Undertaking.
ii) * Bidder to strike out, whichever is not applicable.

******

ANNEXURE – H

LETTER OF UNDERTAKING BY HOLDING COMPANY
OF THE BIDDER / ASSOCIATE / COLLABORATOR / TECHNOLOGY PROVIDER
(To be furnished on Non-judicial Stamp paper of appropriate value)

We hereby …… (Name of the Holding Company) declare that M/s. ……(Name of the Bidder / Associate / Collaborator / Technology License Provider) is our subsidiary company and we holds an interest of ……

M/s. ……..(Name of the Bidder) along with M/s.…… (Name of the Associate / Collaborator / Technology License Provider) proposes to submit the bid for Flue Gas Desulphurisation System Package (GA4) of 1X800 MW SUPER CRITICAL EXPANSION UNIT at DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR Haryana, India, under Tender Ref. No. ……..

We ……(Name of the Holding Company) will extend financial support to M/s.....(the Bidder/ associate / Collaborator / technology license provider), to honour the terms and conditions of the Deed of Joint undertaking in case of the Contract is awarded to M/s. ……(Name of the Bidder) along with M/s.……(Name of the Associate / Collaborator / Technology License Provider) and we hereby confirm that this undertaking is unconditional and irrevocable.
We are herewith enclosing a copy of the Board Resolution in support of this undertaking.

WITNESS
……..
Signature:
Name in Block Letters:
Official Address:

For Holding company
(Signature of the Authorized Signatory)
Name in Block Letters:
Designation:
Common Seal of the Company

ANNEXURE – I

LETTER OF UNDERTAKING FOR MAINTAINING EQUITY LOCK IN PERIOD

(To be executed on Non-Judicial Stamp Paper of Requisite Value)

(Proforma of Letter of Undertaking to be Executed by the *Steam Generator Manufacturer / *Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer/*Promotor (other than *Steam Generator Manufacturer/*Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer) holding minimum equity participation of 51% in the* Indian Joint Venture Company/*Indian Subsidiary Company to be submitted along with the Bid as per Note 6 for Clause No.4.4.20A of Vol. II.)

We, M/s. ……..(*Steam Generator Manufacturer/*Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer/ *Promotor (other than *Steam Generator Manufacturer/ * Qualified Wet Limestone Based Flue Gas Desulphurisation System Manufacturer holding minimum equity participation of 51% in the Indian Joint Venture Company/Indian Subsidiary Company) undertake that as per the requirement of Note 6 for clause No. 3.9.2 of Vol. IA we shall maintain minimum equity participation of *51% / *26% (as the case may be) in the *Indian Subsidiary Company/ *Indian Joint Venture (JV) Company M/s…… for a lock in period of 7 years from the date of incorporation of the *Indian Subsidiary Company / *Indian Joint Venture (JV) Company or upto the end of Defect Liability period of the contract, whichever is later.

We are enclosing the Board resolution in support of above as Annexure…….. to this undertaking.

Date
Place

For M/s. ……..
(Signature of the Authorised Representative)……

(Printed Name)……..
(Designation)……..
(Common Seal)……..

Note : * as applicable.

Bidder to use separate sheet as applicable Power of Attorney of the person signing is to be attached along with the undertaking.

Attachment No.24

TO BE INSERTED IN VOLUME II, CHAPTER 4 AFTER CLAUSE 4.4.20.9, SHEET 23

PROVENNESS CRITERIA FOR FLUE GAS DESULPHURIZATION SYSTEM

4.4.20A Wet Limestone Based Flue Gas Desulphurization Qualifying Requirements (QR) of the Bidders

Bidder or Bidder's sub-vendor shall be a company incorporated in India under the Companies Act of India and should meet the qualifying requirements stipulated in any one of the qualifying routes i.eRoute-1 (clause 4.4.20A.1) or Route-2 (clause 4.4.20A.2) or Route-3 (clause 4.4.20A.3) or Route-4 (clause 4.4,20A.4) including requirements stipulated in sub clauses of respective Route.

4.4.20A.1 Route 1: Qualified Wet Limestone based Flue Gas Desulphurisation (FGD) System Manufacturer (QFGDM)

The Bidder or Bidder's sub-vendorshould have designed, engineered, manufactured / got manufactured, supplied, erected / supervised erection, commissioned / supervised commissioning of at least one (1) number of Wet Limestone based Flue Gas Desulphurisation System, having flue gas treatment capacity of not less than 20,00,000 Nm^3/hr, with desulphurisation efficiency of at least 90% operating in a pulverised coal/lignite fired power plant. The above wet limestone based Flue Gas Desulphurisation system should have completed successful operation for at least one (1) year prior to the date of Opening of Techno-commercial Bid (Part-I).

4.4.20A.2 Route 2: Wet Limestone based Flue Gas Desulphurisation System Manufacturer with Collaboration and Technology Transfer Agreement with QFGDM

a) The Bidderor Bidder's sub-vendor should have designed, engineered, manufactured / got manufactured, supplied, erected/ supervised erection, commissioned/supervised commissioning of at least one (1) number of Wet Limestone based Flue Gas Desulphurisation System, having flue gas treatment capacity of not less than 6,00,000 Nm^3/hr, with desulphurisation efficiency of at least 85% operating in a pulverised coal/ lignite fired power plant. The above wet limestone based Flue Gas Desulphurisation system should have completed successful operation for at least one (1) year prior to the date of Opening of Techno-commercial Bid (Part-I).

b) In such a case, the Bidderor Bidder's sub-vendor should have a valid ongoing collaboration and technology transfer agreement with a QFGDM meeting requirements of clause 4.4.20A.1 on its own, valid minimum up to the end of the defect liability/ warranty period of the contract. Such bidder can either source the FGD System from the QFGDM or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM.

c) The Bidder shall furnish a Deed of Joint Undertaking (DJU) executed by it and the QFGDM, in which the executants of DJU shall be jointly and severally liable to the purchaser for successful performance of the FGD System as per format enclosed with the bidding documents. The DJU shall be submitted along with bid, failing which the Bidder shall be disqualified and its bid shall be rejected.

d) In case of award, the QFGDM will be required to furnish an on demand bank guarantee for an amount of **INR One Hundred Million** in addition to contract performance security to be furnished by the bidder.

4.4.20A.3 Route-3: Steam Generator Manufacturer / Indian JV company of Steam Generator manufacturer or QFGDM/ Indian Subsidiary company of Steam Generator manufacturer or QFGDM with Collaboration and Technology Transfer Agreement with QFGDM

4.4.20A.3.1 Bidder should have designed, engineered, manufactured / got manufactured, supplied, erected / supervised erection and commissioned / supervised commissioning of atleast one (1) no. of pulverised coal / lignite fired steam generator for 200 MW or higher capacity unit or having minimum 600T/hr steaming capacity. Further, such Steam Generator should have completed successful operation for at least one (1) year prior to the date of Opening of Techno-commercial Bid (Part-I).

Alternatively

4.4.20A.3.2 The Bidder shall be a Joint Venture (JV) Company incorporated in India under the Companies Act of India, as on the original scheduled date of Techno-commercial Bid (Part-I) opening, promoted by (i) an Indian Company registered in India under the Companies Act of India and (ii) a Steam Generator Manufacturer meeting requirement of clause 4.4.20A.3.1 or a QFGDM meeting requirements of clause 4.4.20A.1 created for the purpose of manufacturing/supplying in India steam generator sets/Flue Gas Desulphurisation System. The Steam Generator Manufacturer/QFGDM shall maintain a minimum equity participation of 26% in the JV Company for a lock-in period of 7 years from the date of incorporation of JV Company and one of the promoters shall be a majority stakeholder who shall maintain a minimum equity participation of 51% in the JV Company for a lock in period of 7 years from the date of incorporation of JV Company or up to the end of defect liability/warranty period of the contract, whichever is later. Further, Bidder should have executed any project(s)/order(s) pertaining to Steam generator sets/Flue Gas Desulphurisation System, during the last 5 years, with the total value of such project(s)/order(s) being INR 500 Crore or more or more as on the original schedule date of Techno-commercial Bid (Part-I) opening.

Alternatively

4.4.20A.3.3 The Bidder shall be an Indian Subsidiary Company of a Steam Generator Manufacturer meeting requirements of clause 4.4.20A.3.1 or an Indian Subsidiary Company of a QFGDM meeting requirements of clause 4.4.20A.1 registered in India under the Companies Act of India, as on the original schedule date of Techno-commercial Bid (Part-I) opening, for manufacturing/supply of Steam Generator sets/Flue Gas Desulphurisation System. The subsidiary Company shall remain a subsidiary company of the Steam Generator Manufacturer/QFGDM for a minimum period of 7 years from the date of incorporation of such Subsidiary Company or up to the end of defect liability /warranty period of the contract, whichever is later. Further, Bidder should have executed any project(s)/order(s) pertaining to Steam generator sets/Flue Gas Desulphurisation System, during the last 5 years, with the total value of such project(s)/order(s) being INR 500 Crore or more or more as on the original schedule date of Techno-commercial Bid (Part-I) opening.

4.4.20A.3.4 In such a case, the Bidder should have a valid ongoing collaboration and technology transfer agreement with a QFGDM meeting requirements of clause 4.4.20A.3.1 on its own, valid minimum up to the end of the defect liability/warranty period of the contract. Such bidder can either source the FGD System from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM.

4.4.20A.3.5 The Bidder shall furnish a Deed of Joint Undertaking (DJU) executed by it, the promoter(s) having 25% or higher equity participation in the Subsidiary Company / JV Company (as the case may be) and the QFGDM, in which the executants of DJU shall be jointly and severally liable to the purchaser for successful performance of the FGD System as per format enclosed with the bidding documents. The DJU shall be submitted along with bid, failing which the Bidder shall be disqualified and its bid shall be rejected.

4.4.20A.3.6 In case of award, the QFGDM will be required to furnish an on demand bank guarantee for an amount of **INR One Hundred Million** in addition to contract performance security to be furnished by the bidder.

4.4.20A.4 Route-4: EPC Organization with Collaboration and Technology Transfer Agreement with QFGDM

4.4.20A.4.1 The Bidder should be an Engineering, Procurement and Construction (EPC) organization and should have executed, in the last 10 years, large industrial projects on an EPC basis (with or without civil works) in the area of power, steel, oil & gas, petro-chemical, fertilizer, Flue Gas Desulphurisation and / or any other process industry with the total value of such projects being INR 500 Crore or more. At least one of such projects (in single or multiple contracts) should have a total contract value of INR 200 Crore or more. Such project(s) should have completed successful operation for at least one (1) year prior to the date of Opening of Techno-commercial Bid (Part-I).

4.4.20A.4.2 In such a case, the Bidder should have a valid ongoing collaboration and technology transfer agreement with a QFGDM meeting requirements of clause 4.4.20A.1 on its own, valid minimum up to the end of the defect liability/warranty period of the contract. Such Bidder can either source the FGD System from such manufacturer or manufacture/get manufactured the FGD System as per the design and manufacturing drawings of such QFGDM.

4.4.20A.4.3 The Bidder shall furnish a Deed of Joint Undertaking (DJU) executed by it and the QFGDM, in which the executants of DJU shall be jointly and severally liable to the Purchaser for successful performance of the FGD System as per format enclosed with the bidding documents. The DJU shall be submitted at the time of placement of order on approved subvendor.

4.4.20A.4.4 In case of award, the QFGDM will be required to furnish an on demand bank guarantee for an amount of **INR One Hundred Million** in addition to contract performance security to be furnished by the bidder.

Notes for Clause 4.4.20A

1) Definitions

(i) “QFGDM" (Qualified Wet Limestone based Flue Gas Desulphurisation System Manufacturer) means a manufacturer meeting requirements stipulated at 4.4.20A.1

(ii) Whenever the term 'coal/lignite fired' is appearing above, "Coal/lignite" shall be deemed to also include bituminous coal/brown coal/ anthracite coal/lignite.

(iii) “Flue Gas Desulphurisation System” or “FGD System” wherever appearing above shall mean consisting of at least Absorber System.

(iv) The word “executed” in Clause 4.4.20A.2 / Clause 4.4.20A.3 means the Bidder should have:

- In case of Project(s), commissioned the project(s) specified in the Clause 4.4.20A.2 / Clause 4.4.20A.3 even if the contract has been started earlier and / or is not completed / closed.

- In case of Order(s), completed the scope of work under the order(s) specified in the 4.4.20A.2 / Clause 4.4.20A.3 even if the contract has been started earlier and / or is not closed.

2) Erection/Commissioning

Where erection / supervision of erection and commissioning / supervision of commissioning has not been in the scope of the Bidder as mentioned in clause 4.4.20A.1, 4.4.20A.2& 4.4.20A.3, the Bidder should have acted as an advisor for erection and commissioning. Necessary documents / certificates from the client, in support of above shall be furnished.

3) Direct / Indirect order

The Bidder/ QFGDM shall also be considered qualified, in case the award for executing the reference works has been received by the Bidder/ QFGDM either directly from owner of plant or any other intermediary organization. However, a certificate from such owner of plant or any other intermediary organisation shall be required to be furnished by the Bidder in support of the Bidder's/ QFGDM's claim of meeting the qualification requirement as per clause 4.4.20A.1, 4.4.20A.2, 4.4.20A.3&4.4.20A.4.1 above. Further, certificate from owner of the plant shall also be furnished by the Bidder for the successful operation as specified at clause 4.4.20A.1, 4.4.20A.2, 4.4.20A.3&4.4.20A.4.1 above.

4) **Holding Company as a Qualified Wet Limestone based Flue Gas Desulphurisation system Manufacturer**

(i) A Holding Company, singularly or collectively along with its Subsidiaries (held either directly or indirectly), meeting the requirements of clause 4.4.20A.1 above shall also be considered as QFGDM.

5) **Technology Transfer Agreement (Applicable for Clause 4.4.20A.2 a), 4.4.20A.3.1&4.4.20A.4.1)**

The bidder shall have a technology transfer agreement as on the original schedule date of Techno-commercial Bid (Part-I) opening between the Bidder & QFGDM which shall necessarily cover transfer of technological know-how for Wet Limestone based Flue Gas Desulphurisation System, in the form of complete transfer of design dossier, design softwares, drawings and documentation, quality system manuals and imparting relevant personnel training to the Bidder.

6) **Equity Lock in period**

Wherever equity lock in period requirement or subsidiary status requirement is indicated, the Bidder would be required to furnish along with its bid, a Letter of Undertaking from the promoter(s), supported by Board Resolution as per the format enclosed in the bid documents, for maintaining the required minimum equity for the specified lock in period.

Attachment-25

Incorporation of clause of Interest During Constructions (IDC) in NIT/ Bid Document of 1x800 MW Unit at DCRTPP, Yamuna Nagar- regarding

1. Clause No. 27.2 at Sheet 31 of 75 of ITB, Section-II, Volume-I, following will be inserted as Sr. No. (vi):

vi) The costs and factors on account of Interest during Construction (IDC) will be added to each Bidder's bid price in the evaluation using pricing information available to the Owner, in the manner and to the extent indicated in newly inserted sub clause 27.6 at sheet 32 of 75 of ITB, Section-II, Volume-I.

2. Clause No. 27.4 at Sheet 32 of 75 of ITB, Section-II, Volume-I will be replaced as under:

27.4 An illustrative method of evaluation as explained above is explained below:

Illustrative Method of Evaluation		
S. No.	**Description**	**Any Bidder (Equivalent INR)**
1.	Quoted Bid Price (after considering arithmetical errors)	
	(i) Price quoted in Schedule-1	M1
	(ii) Price quoted in Schedule-2	M2
	(iii) Price quoted in Schedule-3	M3
	(iv) Price quoted in Schedule-4	M4
	(v) Total Price	M = M1+M2+M3+M4
2.	Taxes & Duties (not included in S. No. 1 above)	
	(i) GST on Schedule 1	Q1
	(ii) GST on Schedules 2, 3 & 4	Q2
	(iii) Total	Q =Q1+Q2
3.	Adjustments for functional guarantees	S
4.	Interest during Construction (calculated on the basis of Schedule-10)	X
5.	Evaluated Bid Price	EP = M+Q+S+X

Note: Aforesaid method of evaluation shall be equally applicable for all bidders.

3. Newly inserted: Clause No. 27.6 at Sheet 32 of 75 of ITB, Section-II, Volume-I will be as under:

27.6 Pursuant to ITB Sub Clause 27.2, for the purposes of evaluation, following method will be followed:

(a) Interest during Construction (IDC)

Interest during construction shall be calculated on the month-wise payments quoted by the bidder in Cash Flow Statement from the month of payment upto the date of final taking over of the unit and the same shall be added to the EPC quoted price (including Taxes & Duties). Payments due on completion of Final Taking Over (FTO) i.e. 10% of Total Contract Price and Price Adjustments would not be considered in calculation of IDC.

Bidders are required to quote the cash drawdown schedule for Unit in the Schedule-10 (Book 2 of 3 Vol-I) in such a manner that for any year the cumulative cash drawdown quoted by bidder shall not be lesser than the cumulative minimum limit provided for each year from the date of LOI.

The cumulative minimum cash drawdown limit shall be 8%, 28%, 60% ,80% and 90% of total EPC Cost (i.e. Sum total of Price Schedule(s)- 1, 2, 3, 4, 7, 7A) for first, second, third, fourth and fifth year from LOI respectively.

If the bidders' quotes, the monthly cash drawdown schedule for Unit which is less than the cumulative minimum cash drawdown limit for any year as above, the differential percentage shall also be considered for IDC loading for evaluation considering the same has been drawn in the last month of that year. However, the payment shall be restricted as per the drawdown schedule quoted by the bidder.

During execution of the contract, Payments shall be released as per the Cash Flow Statement (Price Schedule -10 of Price Bid). Further, cumulative payment released till a particular month against each line item of Cash Flow statement shall not exceed the cumulative value of monthly payments quoted by the bidder in the cash Flow statement till that particular month.

The rate of interest to be considered for IDC Calculation during evaluation of bids, shall also be considered for IDC calculation during execution of contract, irrespective of the actual IDC incurred by HPGCL.

(b) Interest rate to be considered for calculating Interest during construction shall be 8.00%. Format for calculation of IDC is as under:

	Quoted by Bidder (Sum of Schedules - 1, 2, 3, 4, 7, 7A)					
Months from LOI	**USD**	**YEN**	**INR**	**Total (In Rupees)**	**Interest for Months**	**IDC Amount**
A	**B**	**C**	**D**	**E=B+C+D**	**F= (Completion of Final Taking Over of Unit) – (A)**	**G=E*F* Interest Rate/12**
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
…						
…						
51						
52						
Total IDC						

Attachment- 26

NEW ADDITIONAL CLAUSES

1. Negotiation Policy – Govt. of Haryana

In Clause No. 27.5 at sheet 32 of 75 of ITB, Section-II, Vol-I following will also be added: "Govt. of Haryana Circular No. 14/26/2023-6FA Dated: 10.05.2023 (Copy appended) along with any subsequent amendments thereupon should also be considered for finalization of tendering/ order placement".

2. Clause No. 20.5 at sheet No. 35 of 80 of GCC of Section IV, Vol.-I

Incentive for Early Completion: -

The Contractor will be entitled for incentive for early completion, if FTO is achieved at least 30 days prior to its scheduled date. No incentive is payable for first 30 days of early completion and it would be payable from 31st day onwards @ Rs 15 Lacs per day subject to ceiling of Rs10 Crores.

Government of Haryana
Finance Department

To be substitute bearing same number and dated

No. 14/26/2023-6FA

From

The Additional Chief Secretary to Government of Haryana,
Finance Department

To

1. All the Administrative Secretaries to Government Haryana.
2. All the Heads of Departments, Statutory Bodies, Boards and Corporations.
4. The Registrar General, Punjab & Haryana High Court, Chandigarh.
5. All the Commissioners of Divisions, Ambala, Karnal, Faridabad, Gurugram, Hisar and Rohtak.
5. All the Deputy Commissioners and Sub Divisional Officers (Civil) in Haryana.
6. All the Chief Principal Secretary, Principal Secretary and Additional Principal Secretary/Officers on Special Duty/Senior Secretaries/Secretaries/ Private Secretaries for the information of Hon'ble Chief Minister, Deputy Chief Minister and Ministers of Haryana State.

Dated:10.05.2023

Subject:- Negotiation policy of the State for execution of Works by Contracts.

Sir,

I am directed to invite your kind attention to the subject noted above and inform that the State Government in Finance Department Haryana vide notification bearing no.11/25/2023-1FR/2478 dated 03.02.2023 published in Haryana Government Gazette, had finalized Departmental Financial (Haryana Amendment) Rules 2023. Vide the said notification, clarity had been provided about the Competent Authority to whom powers are delegated, nature of power and extent of power for consideration and finalization of all type of works by contract.

1. Subsequently the State Govt. vide its order no. 14/26/2023-6FA dated 10.05.2023 had notified negotiation policy of the State for Procurement of Works by Contract.
2. The matter regarding providing uniformity of procedures with regard to price discovery on the basis of L_1 rates and negotiations, if any, required in respect of all types of procurements of Goods & Stores (both Fixed Purchase and Rate Contract), Turnkey, Services and Works by Contract being made by the State has been under consideration of the State Govt. ever since then.
3. The matter has been considered and the negotiation policy of the State for Procurement Works by Contract as notified vide order no. 14/26/2023-6FA dated 10.05.2023 is substituted as under:-

The price discovery for cases related to execution of Works by Contract by all Government Departments will be decided as under:-

Sr. No.	Nature of power and Extent	To whom delegated and to the extent as provided in Column No. 4 of the notification dated 03.02.2023	Procedure of negotiation in respect of procurements of Works by Contracts
1.	2.	3.	4.
1.	To accept tenders for the execution of all types of works by contract Up to Rs. 25.00 Lakh for each work	(i) Sub Divisional Engineer (ii) Executive Engineer (iii) Superintending Engineer	The price discovery for cases related to procurement of Works by Contract be determined based on the rates quoted by the L1 bidder if the quoted rates are found to be reasonable by the Indenting Department/ Organization, and negotiations, if any, held with the lowest bidder (L1) only. The competent authority will ensure the reasonability of rates while finalizing the procurement. *Note: Applicable for Sr. No. 1,2,3,4 and 5(i).*
2.	To accept tenders for the execution of all types of works by contract More than Rs. 25.00 Lakh but upto Rs.1.00 Crore for each work-	(i) Executive Engineer (ii) Superintending Engineer (iii) Chief Engineer	
3.	To accept tenders for the execution of all types of works by contract More than Rs. 1.00 Crore but upto Rs.3.00 Crore for each work-	(i) Superintending Engineer (ii) Chief Engineer (iii) Tender Allotment Committee consisting of Head of Department as Chairman, Chief Engineers and Chief Accounts Officer as its Members	
4.	To accept tenders for the execution of all types of works by contract More than Rs. 3.00 Crore but upto Rs.5.00 Crore for each work-	(i) Chief Engineer (ii) Head of Department (iii) Tender Allotment Committee consisting of Head of Department as Chairman, Chief Engineers and Chief Accounts Officer as its Members	

5.	To accept tenders for the execution of all types of works by contract More than Rs. 5.00 Crore but upto Rs.10.00 Crore for each work-	(i) Administrative Secretary	
		(ii) Committee consisting of Minister-in-Charge as Chairman, Administrative Secretary and Head of Department as its Members.	The price discovery for cases related to procurement of Works by Contract may be generally determined based on the rates quoted by the L1 bidder if the quoted rates are found to be reasonable by the Indenting Department/ Organization, and negotiations, if any, held with the lowest bidder. A. However, negotiation could be held upto four number of such bidder(s), in addition to L1 bidder in cases where there are bidders falling within 5% of the L1 bidder. In cases where the L1 bidder refuses to further reduce his offered price and any of the four bidders come forward to offer a price which is better than the price offered by L1 bidder, the bidder whose price is accepted becomes the L1 bidder. However, in such a situation, the original L1 bidder may be given one more opportunity to improve upon the discovered price. In case, the original L1 bidder further improve upon the price discovered during the negotiations, he would be treated as the L1 bidder. B. In cases where there is no bidder within 5% of the L1 bidder:- (i) L2 bidder will be invariably called for negotiation in addition to the L1 bidder. (ii) L3 bidder will also be called, if it is so decided by the Minister-in-Charge, in addition to L1, L2 bidders. *Note: Applicable for Sr. No. 5(ii), 6 and 7.*
6.	To accept tenders for the execution of all types of works by contract More than Rs. 10.00 Crore but upto Rs.15.00 Crore for each work-	(i) Minister-in-Charge	
		(ii) Committee consisting of Chief Minister as Chairman, Minister-in-Charge, Administrative Secretary and Head of Department as its members as notified vide order No. 14/16/2023-6FA (S&D) dated 05.04.2023.	
7.	To accept tenders for the execution of all types of works by contract More than Rs. 15.00 Crore for each work-	Committee consisting of Chief Minister as Chairman, Minister-in-Charge, Administrative Secretary and Head of Department as its members as notified vide order No. 14/16/2023-6FA (S&D) dated 05.04.2023.	

The above instructions may be brought to the notice of all concerned for its implementation with immediately effect.

Superintendent Finance Accounts,
for Additional Chief Secretary to Government of Haryana,
Finance Department.

Endst No.14/26/2023-6FA Dated 2/6/23

A copy is forwarded to the following for information and further necessary action:

1. The Principal Accountant General (A&E/Audit), Haryana, Chandigarh
2. The Director General, Supplies & Disposals Department, Haryana, Panchkula.
3. The Director, Treasuries and Accounts Department, Haryana, Chandigarh.

Superintendent Finance Accounts,
for Additional Chief Secretary to Government of Haryana,
Finance Department.

CC:-
In-Charge, Computer Cell (FD).

Attachment-27

BID FORM

BID FORM PART-II PRICE BID

Name of Package:	**EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,** **Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW**
BIDDER'S NAME	
Bid Proposal No	
Dated	

1.0	Having examined the Bidding Document No. **03/HPGCL/DCRTPP/EPC/800 MW** including subsequent amendments and clarifications if any, the receipt of which is hereby acknowledged, we the undersigned, offer to design, manufacture, test, deliver, construct, install and commission (including carrying out Guarantee Test) the facilities under the above-named Contract in full conformity with the said Bidding Documents for the sum (excluding taxes & duties indicated by us in Schedule-7 & 7A) as mentioned in Bid invitation at e-tender site **https:etenders.hry.nic.in** or such other sums as may be determined in accordance with the terms and conditions of the Contract.		
2.0	**ATTACHMENTS TO THE BID FORM PART-II (PRICE) BID:**		
2.1	In line with the requirements of the Bidding Documents, we enclose herewith the following Attachments & Price Schedules, duly filled-in as per your proforma:		
(a)	Attachment-1(P)	**Deleted**	
(b)	Attachment-2 (P)	A power of attorney duly notarized by a Notary Public indicating that the person(s) signing the bid have the authority to sign the bid and thus that the bid (price bid) is binding upon us during the full period of its validity in accordance with the ITB Clause No.13. As required, the Attachment-2(P) (i.e. Power attorney) has been furnished in physical form in a separate sealed envelope	
(c)	Attachment-3 (P)	Certificate of Compliance to all provisions of bid documents	
(d)	Attachment-4 (P)	Declaration regarding Import Content as per your format enclosed in the Bidding Documents	
(e)	Attachment-4A (P)	The declaration regarding Custom duty benefits for import of Construction Equipment considered in the Bid	
(f)	Attachment-5 (P)	**Deleted**	
(g)	Attachment-6 (P)	Declaration on Guaranteed value of parameters as per format in this Attachment for bid evaluation	
2.2	**PRICE SCHEDULES** In line with the requirements of the Bidding Documents, we enclose herewith the following Price Schedules, duly filled-in as per your proforma:		
(a)	Schedule1	Plant and Equipment including Type Test and Mandatory Spares to be supplied from Abroad	
(b)	Schedule2	Plant and Equipment including Type Test and Mandatory Spares to be supplied from within the Owner's Country	
(c)	Schedule3	Local Transportation including Port Handling, Port Clearance & Port Charges, Inland Transit Insurance and other local costs incidental to delivery of plant & equipment and mandatory spares at site.	
(d)	Schedule4	Installation Services [Erection, Civil, Steel Structural works (Site fabricated structures as permitted as per Specifications), Factory Fabricated Steel Structural Works (Erection) & Allied works] including insurance (other than transit insurance and other services as specified in the Bidding Documents).	
(e)	Schedule5	Grand Summary	
(f)	Schedule6	Recommended Spare Parts	
(g)	Schedule7	GST as applicable on schedule 2, 3 & 4, not included in Bid Price	
(h)	Schedule7A	GST as applicable on schedule 1, not included in Bid Price	
(i)	Schedule 8A & 8B	**Deleted**	
(j)	Schedule 9	**Deleted**	
(k)	Schedule10	Draw down schedule/Cash Flow Statement	
(l)	Schedule11	**Deleted**	
(m)	Schedule12	**Deleted**	
3.1	We are aware that the Price Schedules do not generally give a full description of the work to be performed under each item and we shall be deemed to have read the Technical Specifications, Drawings and other sections of the Bidding Documents to ascertain the full scope of work included in each item while filling in the rates and prices. We agree that the entered rates and prices shall be deemed to include the full scope as aforesaid, including overheads and profit.		
3.2	We declare that as specified in the General Conditions of Contract (Clause 14.1) prices quoted by us in the Price Schedule shall be subject to adjustment in accordance with Price Adjustment, Annexure-K (Price Adjustment) to the GCC.		
3.3	We understand that in the price schedules, where there are discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity, or between subtotals and the total price, (even in case of carry forward of prices) the unit or subtotal price shall prevail and the total price shall be corrected accordingly. Similarly, in case of any discrepancies between the total bid price and the summation of Schedule prices (price indicated in a Schedule indicating the total of that Schedule), the total bid price shall be corrected to reflect the actual summation of the Schedule prices.		
3.4	We declare that prices left blank in the Schedules will be deemed to have been included in the prices of other items. The TOTAL for each Schedule and the TOTAL of Grand Summary shall be deemed to be the total price for executing the Facilities in complete accordance with the Contract, whether or not each individual item has been priced.		
4.0	We confirm that except as otherwise specifically provided, our Bid Prices include all taxes, duties, levies and charges including GST, assessed on us, our Sub-Contractor / Sub-Vendor, or their employees by all Municipal, State or National Government authorities in connection with the Facilities, in and outside of India.		
4.1	**Deleted**		
4.2	"We further understand that notwithstanding 4.0 above, owner shall bear and reimburse to us GST applicable on: (a) Plant and Equipment (including Type Test Charges) and Mandatory Spares supplied from abroad specified in Schedule-1 and Recommended Spare Parts to be supplied from abroad and specified in Schedule-6 and also to be incorporated in the Facilities, by the law of country where the site is located, (b) Plant and Equipment (including Type Test Charges) and Mandatory Spares to be supplied from within the Owner's country specified in Price Schedule 2 (and also on locally supplied Recommended Spare Parts quoted in Price Schedule 6, when awarded) to be incorporated in the Facilities, by the law of country where the site is located, (c) local transportation & insurance, other local costs incidental to delivery of plant & equipment including mandatory spares specified in Price Schedule 3 (and also of locally supplied Recommended Spare Parts quoted in Price Schedule 6, when awarded) and (d) Installation Services including Erection, Civil & Allied Works and other services specified in Price Schedule 4. However, all other taxes, duties & levies as may be applicable on goods and services specified in Price Schedules 2, 3 & 4 and on the materials used for civil construction works and erection & commissioning shall be to our account and no separate claim in this regard will be entertained by owner.		
4.3	We confirm that we shall get registered as per relevant GST laws		
4.4	INCOME TAX We hereby declare that if any Indian Income Tax, surcharge on Income Tax and any other tax is attracted under the law, we agree to pay the same to the concerned authorities and you shall have no additional tax liabilities whatsoever irrespective of the mode of contracting.		

5.0		**COMPLIANCE TO THE PROVISIONS OF THE BIDDING DOCUMENTS**
	5.1	We have read all the provisions of the Bidding Documents and confirm that notwithstanding anything stated anywhere in our bid to the contrary, the provisions of the Bidding Documents are acceptable to us and we further confirm that we have not taken any deviation to the provisions of the Bidding Documents anywhere in our bid.
		We have furnished our compliance to the provisions of the Bidding Documents and its subsequent Amendment(s)/Clarification(s)/Addenda/Errata by submitting Attachment-3P (Certificate of compliance to all provisions of Bid Document).
		Submission of above Attachment-3P shall be considered as our confirmation that any deviation to the Provisions of Bidding Documents found anywhere in our Bid Proposal, implicit or explicit, shall stand unconditionally withdrawn, without any cost implication whatsoever to the Owner, failing which our bid security shall be forfeited.
	5.2	We further declare that additional conditions, variations, deviations, if any, found in the Price Bid, save those pertaining to any rebates offered, shall not be given effect to.
6.0		We declare that we have quoted the plant and equipment including spares to be supplied from abroad on CIF (Indian port-of-entry) basis.
	6.1	**For payments related to Erection/Civil/Site Fabricated Structural Works**
		We confirm that a single designated ESCROW account shall be opened by us in any scheduled bank of India under intimation to Owner. All payments related to Erection/Civil/Site Fabricated Structural works by the Owner due under the contract to us shall be released into above mentioned ESCROW account set up as per the Tri-Partite ESCROW Agreement between us, Owner, and Escrow Bank. The payment shall be disbursed in accordance with the mechanism set out in the Contract and Escrow Agreement. The purpose of the Escrow Account would be to ensure that payments received under the contract are solely used for implementation of the Contract. Under Tri-partite Escrow Agreement, the Escrow Bank will agree to ensure that amounts received in the ESCROW Account are utilized for making payments only to suppliers of goods and services related to Erection/Civil/Site Fabricated Structural Works, Statutory Authorities, establishment expenses etc. as may be required in the performance of the contract.
		We further confirm that all expenses/charges for opening/operation (including Annual Fee) of the Escrow Account shall be paid by us.
		The draft agreement as annexed as **Annexure-D , GCC** shall be followed for executing Escrow Account Agreement.
		The detailed Operative Procedure and Terms and Conditions of Escrow Account (Schedule-III of Draft agreement) shall be finalized between us, the Owner, and the Escrow Bank within 15 days of the placement of award.
7.0		We undertake, if our bid is accepted, to commence work on the facilities immediately upon your Letter of Intent (LOI) to us and to achieve **Trial operation, conduct Guarantee Tests and achieve Final taking Over** within the time specified in the Bidding Documents.
	7.1	We confirm that, in terms of the requirement of Clause 44.0 of Erection Conditions of Contract, Section-V, of Vol.-I, the 'Safety Plan' shall be submitted within 60 days from the **date of LOI** for approval of Owner.
	7.2	**Deleted**
8.0		**Deleted**
9.0		If our bid is accepted, we undertake to provide Advance Payment Security, Contract Performance Securities, Performance Securities for Phase manufacturing program and securities for Deed(s) of Joint Undertaking (as applicable) in the form and amounts and within the time specified in the Bidding Documents.
10.0		We agree to abide by this Part-II (Price) Bid for a **period of 225 days** from the date of opening of Techno - Commercial Bid (Part-I) as stipulated in the Bidding Documents and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period. Techno - Commercial Bid (Part-I) including this Price Bid (Part-II) shall remain valid and **open for acceptance for Two Hundred Twenty Five (225) days from the date of opening of Techno - Commercial Bid (Part-I).** Further, the prices of recommended spares contained in our Bid shall remain valid for a period of 18 months from the date of LOI.
11.0		Until a formal Contract is prepared and executed between us, this bid, together with your written acceptance thereof in the form of your Letter of Intent (LOI) shall constitute a binding contract between us.
12.0		We understand that you are not bound to accept the lowest or any other bid you may receive.
13.0		We confirm that cost of Special Tools & Tackles furnished by us in Attachment-4A of our Part-I (Techno-Commercial) Bid is included in lumpsum price quoted in this Price Bid.
14.0		We, hereby, declare that only the persons or firms interested in this proposal as principals are named here and that no other persons or firms other than those mentioned herein have any interest in this proposal or in the Contract to be entered into, if the award is made on us, that this proposal is made without any connection with any other person, firm or party likewise submitting a proposal, is in all respects for and in good faith, without collusion or fraud.

Name	
Designation	

		Attachment -1 (P)
	EPC Package for **"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,** **Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW**	
BIDDER'S NAME		**0**
	Deleted	

		Attachment -2 (P)
	EPC Package for **"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,** **Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW**	
BIDDER'S NAME		**0**
	POWER OF ATTORNEY **Bidder to Attach the Power of Attorney in accordance with Clause 2.1(b) of Bid Form Part-II (Price Bid)** **(To Be Submitted in PHYSICAL MODE)**	

Attachment -3 (P)	
EPC Package for **“1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR” HARYANA,** **Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW**	
Certificate of Compliance To All Provisions of Bid Document	
BIDDER'S NAME	**0**
(To Be Submitted in PHYSICAL MODE)	

Attachment -4 (P)

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

Declaration regarding Import Content

BIDDER'S NAME	**0**
1.0	**We confirm the details of CIF value of Import Content included in our bid in respect of Ex-works (India) price quoted in Schedule-2 are as follows:**
2.0	**These details are furnished for the purpose of issuance of Essentiality Certificate by the Owner as per Clause 10.6 Section-II, ITB. We further confirm that we shall be solely responsible for availing such benefits and benefits shall be restricted to the value indicated below.**

S.No.	**Description of item to be supplied**	**Quantity**	**Total Value**	
			USD	**YEN**
Name:				
Designation:				
Note				

1.0	Bidder can insert more rows, as required.
2.0	Bidders to note that the Plant & Equipment including Mandatory Spares quoted on CIF basis under Schedule-1, which are to be imported by the Owner directly, should not be included in the value of import content indicated in this Attachment. The value of import content to be indicated in this Attachment shall be only in respect of Ex-works (India) price quoted in Schedule-2.

Attachment -4A (P)

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

Declaration regarding Customs Duty Benefits for import of Construction Equipment

BIDDER'S NAME	**0**				
1.0	**We confirm that we are solely responsible for obtaining the Customs Duty Benefits for import of Construction Equipment which we have considered in our bid and in case of failure to receive such benefits, Owner will not compensate us in any manner whatsoever.**				
2.0	**We further confirm that we will not claim for adjustment in Contract Price on account of variation in or withdrawal of Custom Duty Benefits for Import of Construction Equipment.**				
3.0	**We are furnishing below the information required by the Owner for issue of relevant Certificates in terms of the Customs Act & Notification of the Govt. of India:**				
A	**CIF Value in figures (as per bid currency) of Construction Equipment to be imported by the Bidder/including its sub-contractor(s) of the Bidder**				
	USD		**YEN**		
	We further confirm that aforesaid CIF value has not been included in Attachment- 4(P).				
B	**Description and quantities of the Construction Equipment to be imported by the Bidder / sub-contractor(s) for deployment to site under the package.**				
S. No.	**To be imported by**	**Description of the item to be imported**	**Quantity (No.)**	**Value**	
				USD	**YEN**
(i)	Bidder				
(ii)	Sub-contractor(s)				
4.0	**We confirm that the Construction Equipment being imported as per 'B' above shall be deployed at the Project Site for the purpose of execution of subject Package.**				
Name:					
Designation:					
Note					
1	Bidder can insert more rows, as required				

Attachment -5 (P)

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

BIDDER'S NAME		**0**
	Deleted	

Attachment -6 (P)

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

BIDDER'S NAME	**0**

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 as specified in Clause No. 3.2 (Category-I) of Chapter 08 ,"FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES", Volume-II of the Bidding Documents, or reject the equipment/system and recover payments already made.

S. No.	Guaranteed Parameters	Guaranteed Figures	Units
a)	**Turbine Heat Rate** in kcal/kwhr under rated steam conditions at guaranteed optimized condenser pressure with zero make-up at 440MW Unit Load **(i.e. at 55% TMCR)**		kcal/kwhr
b)	**Turbine Heat Rate** in kcal/kwhr under rated steam conditions at guaranteed optimized condenser pressure with zero make-up at 800 MW Unit Load **(i.e. at 100% TMCR)**		kcal/kwhr
c)	**Efficiency of the Steam Generator at 55% TMCR (440 MW unit load)** with zero make up while firing the design coal at rated steam parameters, rated coal fineness and rated excess air at economizer outlet.		%
d)	**Efficiency of the Steam Generator at 100% TMCR (800 MW unit load)** with zero make up while firing the design coal at rated steam parameters, rated coal fineness and rated excess air at economizer outlet.		%
e)	**Turbine Generator Output of 800 MW (100% rated load)** under rated steam conditions, 70 mm Hg (abs) condenser pressure with 0% makeup.		kW
f)	**Condenser pressure in mm Hg (abs)** measured at 300 mm above top row of condenser tube at 840 MW of unit load, 1% make up, design CW inlet temperature & design CW flow as specified elsewhere.		mm Hg
g)	**Steam Generator Capacity** at rated steam parameters at Superheater outlet & rated steam temperature at reheater outlet (with any combination of mills working as per Owner's choice) with the coal being fired from within the range specified		T/Hr
h)	**ESP Effficiency**		%
i)	**Unit Auxiliary Power Consumption** comprising of all Unit Auxiliaries and Station Auxiliaries required for continuous Unit operation at 800 MW **(i.e. 100% rated load of the unit)** under rated steam conditions and at guaranteed optimized condenser pressure with 0% make-up		kW
j)	**SCR Efficiency** for control of NOx emission		%
k)	**Catalyst Life**		Hours
l)	**Ammonia Consumption Rate** (in kg/hr, 99.5 wt%) at 100% TMCR load		kg/hr
m)	**FGD - SO_2 Removal Efficiency**		%
n)	**Limestone Consumption Rate** of FGD system at 100% TMCR load		kg/hr
o)	**NDCT - Cold water temperature**		^{o}C
p)	**Transformer Losses** (Refer **Annexure-II to Attachment-6 (P)** for list of transformers)	0	kW
i	**Iron Losses** For every kW increase or part thereof from the Guaranteed value	0	kW
ii	**Copper Losses** For every kW increase or part thereof from the Guaranteed value	0	kW
iii	**Cooler Losses** For every kW increase or part thereof from the Guaranteed value	0	kW
Name:			
Designation:			
Note			
1	Bidder to furnish the breakup of the quoted Auxiliary Power Consumption and Transformer Losses as per **Annexure-I** and **Annexure-II to Attachment-6 (P)** respectively.		

Annexure- I to Attachment 6-(P)

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

Break up of Guaranteed Unit Auxiliary Power Consumption (Unit Auxiliaries & Station Auxiliaries)
Quoted as per S. No. (i) of Attachment-6 (P) of Bid Form

BIDDER'S NAME	**0**		
S. No.	**Name of Auxiliaries**	**Nos. in operation**	**Power Consumption (in kW)**
Note			
1.0	Bidder can insert more rows, as required		
Name:			
Designation:			

Annexure- II to Attachment 6-(P)

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

Transformer Losses (as per list below)
Quoted as per Sr. No. (p) of Attachment-6 (P) of Bid Form

BIDDER'S NAME	**0**

S. No	**Transformer**	**Quantity (No)**	**Iron Losses (Max)**		**Copper Losses (Max) at 75 °C & full load including IS tolerance**		**Cooler Losses (Max) including IS tolerance**	
			For 1 transformer	**For all transformers**	**For 1 transformer**	**For all transformers**	**For 1 transformer**	**For all transformers**
a)	Generator Transformer (GT)	4						
b)	Station Transformer (ST)	2						
c)	Unit Transformer (UT)	2						
d)	Interconnecting Transformer	2						
e)	Excitation Transformer (if applicable)	1						
f)	Auxiliary Power Transformers 11/6.9 KV	2						
i)	UAT	2						
ii)	SAT	2						
iii)	CHPAT	2						
iv)	AHPAT	2						
v)	BKTAT	2						
vi)	FGDAT	2						
vii)	DMPAT	2						
viii)	BWAT	2						
g)	Service Transformer	Lot						
	Total Losses (kW)		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Name:	
Designation:	

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

SCHEDULE OF RATES AND PRICES

BIDDER'S NAME	

SCHEDULE-1 : Plant and Equipment including Type Test and Mandatory Spares to be supplied from Abroad

Item	Description	Total Price CIF (Indian port of entry)	
1	2	3	
A	**Main Equipments**	**USD**	**YEN**
1	All Equipments for Steam Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]		
2	All Equipments for Steam Turbine Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]		
3	All Equipments for Balance of Plant (including FGD & Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]		
4	All Equipments for Electrical System and C&I Systems [For ONE(1) no. Power Generating Unit having rated output of 800MW]		
5	Any other Equipment(s) not covered in 1 to 4 above but required for the Scope of Work under the Package		
	Sub Total (A) [(1) + (2) + (3) + (4) +(5)]	**0**	**0**
B	MANDATORY SPARES [BOQ AS SPECIFIED IN Chapter-9, Vol II] (Bidder is required to fill the prices of all the items serially as specified in Chapter-9, Vol-II)		
	GRAND TOTAL (A+B) (In Figures)	**0**	**0**

NOTE

1	The details of main equipments under Sr. No. 1 to 5 comprises of the equipments / systems / facilities as detailed in various technical specifications (Refer Vol- II to VII). Any other system comprising of equipments in addition to above mentioned equipments which is required to complete the scope of work for one (1) no. power generating unit having rated output of 800MW and for its reliable operation shall be deemed to be included in the quoted prices.
2	**Interchangeability and Packings:** All spares supplied under this contract shall be strictly interchangeable with parts for which they are intended for replacements. These spares include all mounted accessories like components, boards, add or items, fitting, connectors etc. and complete in all respects so that the replacement of the main items by these spares does not require any additional item. The vendors must conform the pair to pair compatibility of each electrical spares modules with the modules supplied in the original package. All electronic modules shall be pre set and/or preprogrammed for ready use at site. Alternatively, suitable instruction sheet indicating the details of required PCB jumper position, BCD which is setting, EPROM/PROM listing etc., shall be packed along with each module. Also a caution mark sign should be put on all such module which needs pre-setting/pre-programming before putting them into service.The spare shall be treated and properly packed for long term storage.
3	**Identification:** Each spare shall be clearly marked and labeled on the outside of the packing with its description. When more than one spare part is packed in single case, a general description of the contents shall be shown on the outside of such case and a detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purpose of identification.
4	In case the description/ Quantity for any item mentioned in schedule is at variance from what has been stated in technical specifications and its subsequent amendments/ clarifications, the stipulations of technical specifications and its subsequent amendment and clarification shall prevail.
5	Schedule-1 and/or Schedule-2 & Schedule-4 shall cover all the requirement of supply & erection of factory fabricated steel structure & Site fabricated steel structure required for the complete 01 no. Power generating Unit having rated output of 800 MW.
6	Only factory fabricated items and not the raw material is quoted in Schedule-1 and/or Schedule-2.
7	The cost of all equipments & auxillaries mentioned against S.No. A1 to A5 above are inclusive of type test charges, if any.

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

SCHEDULE OF RATES AND PRICES

BIDDER'S NAME	**0**

SCHEDULE-2 : Plant and Equipment including Type Test and Mandatory Spares to be supplied from within the Owner's Country

Item	Description	Total Ex-works (India) Price (in INR)
1	**2**	**3**
A	**Main Equipments**	
1	All Equipments for Steam Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]	
2	All Equipments for Steam Turbine Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]	
3	All Equipments for Balance of Plant (including FGD & Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]	
4	All Equipments for Electrical System and C&I System [For ONE(1) no. Power Generating Unit having rated output of 800MW]	
5	Any other Equipments not covered in 1 to 4 above but required for the Scope of Work under the Package	
	Sub Total (A) [(1) + (2) + (3) + (4) +(5)]	**0**
B	MANDATORY SPARES [BOQ AS SPECIFIED IN Chapter-9, Vol II] (Bidder is required to fill the prices of all the items serially as specified in Chapter-9, Vol-II)	
	GRAND TOTAL (A+B) (In Figures)	**0**

NOTE

1	The details of main equipments under Sr. No. 1 to 5 comprises of the equipments / systems / facilities as detailed in various technical specifications (Refer Vol- II to VII). Any other system comprising of equipments in addition to above mentioned equipments which is required to complete the scope of work for one (1) no. power generating unit having rated output of 800MW and for its reliable operation shall be deemed to be included in the quoted prices.
2	**Interchangeability and Packings:** All spares supplied under this contract shall be strictly interchangeable with parts for which they are intended for replacements. These spares should include all mounted accessories like components, boards, add or items, fitting, connectors etc. and complete in all respects so that the replacement of the main items by these spares does not require any additional item. The vendors must conform the pair to pair compatibility of each electrical spares modules with the modules supplied in the original package. All electronic modules shall be pre set and/or preprogrammed for ready use at site. Alternatively, suitable instruction sheet indicating the details of required PCB jumper position, BCD which is setting, EPROM/PROM listing etc., shall be packed along with each module. Also a caution mark sign should be put on all such module which needs pre-setting/pre-programming before putting them into service.The spare shall be treated and properly packed for long term storage.
3	**Identification:** Each spare shall be clearly marked and labeled on the outside of the packing with its description. When more than one spare part is packed in single case, a general description of the contents shall be shown on the outside of such case and a detailed list enclosed. All cases,containers and other packages must be suitably marked and numbered for the purpose of identification.
4	In case the description/ Quantity for any item mentioned in schedule is at variance from what has been stated in technical specifications and its subsequent amnedments/ clarifications, the stipulations of technical specifications and its subsequent amendment and clarification shall prevail.
5	Schedule-1 and/or Schedule-2 & Schedule-4 shall cover all the requirement of supply & erection of factory fabricated steel structure & Site fabricated steel structure required for the complete 01 no. Power generating Unit having rated output of 800 MW.
6	Only factory fabricated items and not the raw material is quoted in Schedule-1 and/or Schedule-2.
7	The cost of all equipments & auxillaries mentioned against S.No. A1 to A5 above are inclusive of type test charges, if any.

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

SCHEDULE OF RATES AND PRICES

BIDDER'S NAME	0

SCHEDULE-3: Local Transportation including Port Handling, Port Clearance & Port Charges, Inland Transit Insurance and other local costs incidental to delivery of plant & equipment and mandatory spares at site.

ITEM	Description	Total Price INR
1	2	3
I.	MAIN EQUIPMENTS	
II.	MANDATORY SPARES	
TOTAL (I + II)		0

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

SCHEDULE OF RATES AND PRICES

BIDDER'S NAME	**0**

SCHEDULE-4: Installation Services [Erection, Civil, Steel Structural works (Site fabricated structures permitted as per Specifications), Factory Fabricated Steel Structural Works (Erection) & Allied works] including Insurance (other than transit insurance and other services as specified in the Bidding Documents).

ITEM	Description	Total Price (in INR)
1	2	3
A	**Installation/ Erection of Main Equipments**	
1	All Equipments for Steam Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]	
2	All Equipments for Steam Turbine Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]	
3	All Equipments for Balance of Plant (including FGD & Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]	
4	All Equipments for Electrical System and C&I Systems [For ONE(1) no. Power Generating Unit having rated output of 800MW]	
5	Any other Equipments not covered in 1 to 4 above but required for the Scope of Work under the Package	
	Sub Total (A) [(1) + (2) + (3) + (4) +(5)]	**0**
B	**Civil, Structural (Other than steel structures) & Architectural works**	
C	**Site Fabricated Steel Structures** Supply, fabrication & erection of site fabricated steel structural works (structural works other than factory fabricated structures) permitted for fabrication at site.	
D	**Training Charges (Refer Chapter-5, Vol-II, General Technical Requirements)**	
	GRAND TOTAL (A+B+C+D)	**0**

NOTE	
1	Only factory fabricated items and not the raw material is quoted in Schedule-1 and/or Schedule-2.
2	Schedule-1 and/or Schedule-2 & Schedule-4 shall cover all the requirement of supply & erection of factory fabricated steel structure & Site fabricated steel structure required for the complete 01 no. Power generating Unit having rated output of 800 MW.
3	The works related to Sr. No. A, B, C & D above shall include the equipments / systems / facilities as detailed in various technical specifications (Refer Vol- II to VII). Any other system comprising of equipments in addition to above mentioned equipments which is required to complete the scope of work for one (1) no. power generating unit having rated output of 800MW and for its reliable operation shall be deemed to be included in the quoted prices.

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

BIDDER'S NAME	0

SCHEDULE-5: Grand Summary

S. No.	Description	Currency	Total Price
1	2	3	4
1	SCHEDULE-1 : Plant and Equipment including Type Test and Mandatory Spares to be supplied from Abroad	USD	0
		YEN	0
2	SCHEDULE-2 : Plant and Equipment including Type Test and Mandatory Spares to be supplied from within the Owner's Country	INR	0
3	SCHEDULE-3: Local Transportation including Port Handling, Port Clearance & Port Charges, Inland Transit Insurance and other local costs incidental to delivery of plant & equipment and mandatory spares at site.	INR	0
4	SCHEDULE-4: Installation Services [Erection, Civil, Steel Structural works (Site fabricated structures permitted as per Specifications), Factory Fabricated Steel Structural Works (Erection) & Allied works] including Insurance (other than transit insurance and other services as specified in the Bidding Documents).	INR	0
5	SCHEDULE-7: Goods and Service Tax (GST), applicable on Schedule-2, 3 & 4	INR	0
6	SCHEDULE-7A: Goods and Service Tax (GST), applicable on Schedule-1	INR	0

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

SCHEDULE OF RATES AND PRICES

BIDDER'S NAME	**0**

SCHEDULE-6: Recommended Spare Parts

S. No.	**Item Description**	**Qty.**	**Unit Price**			**Total price**			**GST Amount**	**Local transportation charges (including inland insurance, port clearance & port charges)**
			CIF (Indian port of Entry) (For spares to be supplied from abroad)		**Ex-works (India) (For spares to be supplied from within the Owner's country)**	**CIF (Indian Port of Entry)**		**Ex-works (India)**		
			USD	**YEN**	**In INR**	**USD**	**YEN**	**In INR**	**In INR**	**In INR**
1	2	3	4	5	6	7=3x4	8=3x5	9=3x6	10	11

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

BIDDER'S NAME	**0**

SCHEDULE-7: Goods and Service Tax (GST), applicable on Schedule-2, 3 & 4

The details of Goods and Services Tax (as on seven (07) days prior to the last date for submission of bid applicable) on the price of goods and services quoted in Schedule-2, 3 & 4, not included in the Bid Price and which may be payable by the Owner in accordance with the provisions of Bidding Documents are as under:-

S. No.	Bid Price Component	GST Amount (INR)
1	2	3
1	Ex-Works-Main Equipment (Schedule-2)	
2	Ex-Works-Mandatory Spares (Schedule-2)	
3	F&I-Main Equipment (Schedule-3)	
4	F&I-Mandatory Spares (Schedule-3)	
5	Erection Services of Main Equipment including Factory Fabricated Steel structures (Schedule-4)	
6	Erection services for Civil, Structural (other than steel structures) and architectural Works (Schedule-4)	
7	Site fabricated Steel Structural works (Schedule-4)	
8	Training Charges (Schedule-4)	
	Total GST Amount	**0**

NOTE	
1	Bidder shall quote the GST as applicable in the Owner's country as on Seven (7) days prior to the last date of submission of Bid.
2	The GST shall be paid at actuals against documentary evidence subject to maximum Total GST amount indicated above.

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

BIDDER'S NAME	**0**

SCHEDULE-7A: Goods and Service Tax (GST), applicable on Schedule-1

The details of Goods and Services Tax (as on seven (07) days prior to the last date for submission of bids applicable) on the price of goods and services quoted in Schedule-1, not included in the Bid Price and which may be payable by the Owner in accordance with the provisions of Bidding Documents are as under:-

S. No.	Bid Price Component	GST Amount (INR)
1	**2**	**3**
1	CIF Main Equipment (Schedule-1)	
2	CIF Mandatory Spares (Schedule-1)	
	Total GST Amount	**0**

NOTE

1	Bidder shall quote the GST as applicable in the Owner's country as on Seven (7) days prior to the last date of submission of Bid.
2	The GST shall be paid at actuals against documentary evidence subject to maximum Total GST amount indicated above.

EPC Package for
"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/HPGCL/DCRTPP/EPC/800MW

BIDDER'S NAME	**0**

SCHEDULE-10: Draw down schedule/Cash Flow Statement

Bidder shall fill up the below given Monthly Cash Flow chart as per his monthly cash flow requirements for the entire scope of work as per bidding documents and Technical Specifications. Cash Flow pertaining to Price Ajustments shall not be quoted.

Month from LOI	**Total of Price Schedules-2, 3, 4, 7 & 7A**	**Total of Price Schedule-1**	
	Amount in Indian Rupees (INR)	**Amount in USD**	**Amount in YEN**
1	**2**	**3**	**4**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
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34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			
Total	**0**	**0**	**0**

NOTES

1	Payment shall be made in Indian rupees for Indian Portion and Foreign Currency as per the contract for imported portion.
2	Payments due on Final Taking Over (FTO) i.e 10 % of the Total Contract Price shall not be included in the aforesaid cash flow chart.
3	The aforesaid Cash Flow Chart should be in line with the detailed work schedule submitted by the Bidder alongwith its Bid.
4	Bidder should ensure the arithmetical accuracy of the aforesaid cash flow chart. The total of payments indicated above in each row should match with the total quoted price in respective schedules. During evaluation of the bid, in case arithmatical error is found in totalling against a row vis-a-vis price quoted in schedules, then the payments indicated in the respective row should be pro-rate adjusted to match the total quoted price.
5	Please refer Attachment-25 of "HPGCL response to Pre-Bid Queries" for other details regarding Interest During Construction (IDC).

Attachment-28

Plot plan shall be provided shortly

Attachment-29

Chapter -10, Vol-V, Maintenance and Calibration Equipment - Amendment

<table>
<tr><th>Sr. No / Page No.</th><th>Instruments</th><th>As per Tender Specs</th><th>To be read as:</th></tr>
<tr><td>10.02.00
Page 3 of 55</td><td>Electronic Test Bench</td><td>f) Multifunction calibrator shall be mounted on the test bench as per the below specifications:
……</td><td>The point (f) stands deleted,</td></tr>
<tr><td>3 /
Page 11 of 55</td><td>Digital Multimeter
For 7 1/2 digit multimeter</td><td>
<table>
<tr><th>Signal type</th><th>Range</th><th>Accuracy</th></tr>
<tr><td>DC voltage</td><td>100 mV to 1KV</td><td>+/- 0.025% Best</td></tr>
<tr><td>AC voltage</td><td>100 mV to 700V</td><td>+/- 0.025% Best</td></tr>
<tr><td>Direct Current</td><td>10 Micro A to
10 A</td><td>+/-0.2% Best</td></tr>
<tr><td>AC Current</td><td>1mA to 10A</td><td>+/-0.01% Best</td></tr>
<tr><td>Resistance</td><td>1 Ohms to 1 G ohms</td><td>+/-0.003% Best</td></tr>
</table>
</td><td>
<table>
<tr><th>Signal type</th><th>Range</th><th>Accuracy</th></tr>
<tr><td>DC voltage</td><td>3 mV to 1KV</td><td>+/- 0.002%</td></tr>
<tr><td>AC voltage</td><td>3 mV to 3KV</td><td>+/-0.08%</td></tr>
<tr><td>Direct Current</td><td>3 Micro A to 30 A</td><td>+/-0.2%</td></tr>
<tr><td>AC Current</td><td>-do-</td><td>+/-0.01%</td></tr>
<tr><td>Resistance</td><td>30 mOhms to 1 G ohms</td><td>+/-0.003%</td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>9 /
Page 16 of 55</td><td>Fluidized Temperature Bath (Microprocessor Based)</td><td>
<table>
<tr><td>Range</td><td>50°C to 650°C</td></tr>
<tr><td>Accuracy</td><td>+/- 0.1°C</td></tr>
<tr><td>Stability</td><td>+ 0.05°C to + 0.07°C</td></tr>
<tr><td>Power Supply</td><td>230/240 V AC, 50 Hz</td></tr>
<tr><td>Features</td><td>Temperature of furnace is set and controlled by self tuned PID controller with automatic super fine adjustment</td></tr>
<tr><td>Accessories</td><td>Set of test cables
Insertion tubes
Carrying case
Instructions for use</td></tr>
</table>
</td><td>
<table>
<tr><td>Range</td><td>50°C to 700°C</td></tr>
<tr><td>Accuracy</td><td>+/- 0.1°C</td></tr>
<tr><td>Stability</td><td>+ 0.02°C to + 0.03°C</td></tr>
<tr><td>Power Supply</td><td>230/240 V AC, 50 Hz</td></tr>
<tr><td>Display</td><td>Dual display indicator and controller</td></tr>
<tr><td>Protection</td><td>Fuses, overheating protection with low flow cutout, over pressure, alarms for low flow, blocked filter (with auto cutout) etc designed to eliminate powder loss.</td></tr>
<tr><td>Features</td><td>Sealed design of the bath with ceramic filter to ensure no alumina powder discharge / loss. The bath should also have capability to maintain Fixed Point Cells so as to check whether the RTD is suitable for undertaking the calibration or not.</td></tr>
<tr><td>Accessories</td><td>Set of test cables
Insertion tubes</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Sr. No / Page No.</th><th>Instruments</th><th>As per Tender Specs</th><th>To be read as:</th></tr>
<tr><td></td><td></td><td></td><td>Carrying case
Instructions for use
Reference sensor for comparison
Calibration: Pt100 (1/10DIN accuracy), (-)50 to 670degC.</td></tr>
<tr><td>9.1 /
Page 16 of 55</td><td>Portable Dry Block type Temperature Calibrators (low, medium and high)</td><td>Low Temp Portable Dry block type Calibrator
Accessory - Standard RTD traceable to International Standard.

Medium Temp Portable Dry block type Calibrator
Accessories - Standard Thermocouple traceable to International Standard

High Temp Portable Dry block type Calibrator
Accessories - Standard Thermocouple traceable to International Standard</td><td>Low Temp Portable Dry block type Calibrator
Accessory - Standard RTD traceable to International Standard, stirred liquid container kit, oil, TPW cell, Gallium Cell, surface sensor calibrator kit and black body target kit.

Medium Temp Portable Dry block type Calibrator
Accessories - Standard Thermocouple traceable to International Standard, surface sensor calibration kit, black body target kit.

High Temp Portable Dry block type Calibrator
Accessories - Standard Thermocouple traceable to International Standard, surface sensor calibration kit, black body target kit.</td></tr>
<tr><td>19 /
Page 22 of 55</td><td>-------</td><td>Sr. No 19 - Blank</td><td>AC Thermometry Bridge
This instrument shall be based on bridge technology and shall have three input channels to support : PRT, Thermistor and Thermocouple. Instrument shall have feature like Touch Screen, Zero Drift and Data Logging facility.
Parameter
<table>
<tr><td>Accuracy (25Ω SPRT)</td><td>0.5 ppm</td></tr>
<tr><td>Accuracy – RATIO 0.95 to 1.05 ratio</td><td>0.125ppm</td></tr>
<tr><td>Probes Supported</td><td>PRTs, Thermistors & Thermocouples</td></tr>
<tr><td>Channels</td><td>3</td></tr>
<tr><td>Resolution – milliK, nV</td><td>0.01millik, 10nanoV</td></tr>
<tr><td>Stability – ppm / yr.</td><td>0</td></tr>
<tr><td>TC (resistance ratio)– ppm/degC</td><td>0</td></tr>
<tr><td>Resistance Range - kohm</td><td>0 – 500kohm</td></tr>
<tr><td>Voltage range</td><td>+/- 125mV</td></tr>
<tr><td>Current Accuracy - %</td><td>±0.4%</td></tr>
</table>
<table>
<tr><td>Keep-Warm Current</td><td>Adjustable 0-10mA each channel,</td></tr>
</table></td></tr>
</table>

Sr. No / Page No.	Instruments	As per Tender Specs	To be read as:
			Internal Resistance Standards – ohm: 1, 10 ohm (TCR 0.6ppm/degC and 5ppm/year stability) 25, 100, 400 ohm (TCR 0.3ppm/degC and 5ppm/year stability) Measurement Time – sec: 1 Units: Ratio, V, Ω, °C, °F, K Switching Technology: Solid-state Other features: Temperature conversions : PRT's (ITS 90, Callendar-Van Dusen), Thermocouples (IEC584-1 1995), Thermistors (Steinhart-HART) Ratio range : Unlimited Interfaces : RS232, GPIB, USB Data storage – Internal Display Large 163mm/6.4 colour TFT LCD.
10.07.00 Page No. 52 of 55 (Sr. No.21)	---------	Bill of Material for M&C Sr. No. 21 – Blank	Sr. No 21 - AC Thermometry Bridge, Quantity – 1 No.
10.06.00/Page No. 24 of 55 (Sr. No. 24)	**Portable Flue gas Analyser**	Addition in Ranges:-	NO2 - 0-100 ppm
46 / Page No. 36 of 55	**Thermocouple Test Furnace**	**Thermocouple Test Furnace** Purpose: For testing & calibrating temp. sensors in particular thermocouples and resistance thermometers by comparative measurement. Holes drilled in the insertion section accept the test probe (min. 6 nos) and the reference sensors. The controller should be highly advanced with digital filter circuit ensuring high integrity of measurement correcting for drift, rejecting 50Hz pick-up and filtering out other sources of input noise. Insertion length - Upto 160 mm in a zone of constant temp. Accuracy - ±0.35 deg C at 1000 deg C 1. STANDARD 'S' TYPE THERMOCOUPLE Hot sheath temperature Range - 0degC to 1500degC Hot Junction measuring assembly - 6mm dia x 450mm long gas	**Thermocouple Test Furnace** Purpose: For testing & calibrating temp. sensors in particular thermocouples and resistance thermometers by comparative measurement. Specially shaped metal insertion pieces are matched to one another so that optimum temperature uniformity is achieved. Holes drilled in the insertion section accept the test probe (min. 6 nos) and the reference sensors. The controller should be highly advanced with digital filter circuit ensuring high integrity of measurement correcting for drift, rejecting 50Hz pick-up and filtering out other sources of input noise. Insertion length - Upto 180 mm in a zone of constant temp. Accuracy - ±0.25 deg C at 1000 deg C **1. STANDARD 'S' TYPE THERMOCOUPLE WITH COLD JUNCTION** Hot sheath temperature Range - 0degC to 1600degC Hot Junction measuring assembly - 7mm dia x 300mm long gas tight 99.7% recrystallized

Sr. No / Page No.	Instruments	As per Tender Specs	To be read as:
		tight 99.7% recrystallized alumina sheath Calibration Certificate: 5 point calibration from accredited lab with National/International Traceability. 2. ICE POINT REFERENCE SYSTEM FOR THERMOCOUPLES The Temperature Reference Unit should provide a stable and accurate 0°C suitable for referencing of upto 20 thermocouples. It should be a self-contained solid state unit utilising peltier technology which provides maintenance free operation and features rapid cool down from high ambient temperatures and becomes stable within 15 minutes from switch on. Accuracy : ±0.1°C Stability : ±0.03°C at 20°C ±10°C Stabilising Time : 15 minutes Thermocouple Capacity : Up to 20	alumina sheath Calibration Certificate : 6 point calibration from accredited lab with National/International Traceability Cold Junction: 4.5mm dia x 250mm long stainless steel sheath. **2. ICE POINT REFERENCE SYSTEM FOR THERMOCOUPLES** The Temperature Reference Unit should provide a stable and accurate 0°C or elevated Reference Temperatures between 45ºC and 70ºC for providing thermocouple referencing as per ISO9000 and should be suitable for referencing of upto 50 thermocouples. It should be a self-contained solid state unit utilising peltier technology which provides maintenance free operation and features rapid cool down from high ambient temperatures and becomes stable within 10 minutes from switch on. An alarm should be there which should get activated if the reference temperatures deviate by more than 0.2°C. Accuracy : ±0.03°C Stability : ±0.05°C at 20°C ±10°C Stabilising Time : 10 minutes from 44ºC Thermocouple Capacity : Up to 50 Double Junction Ambient Range °C : 2°C to 65°C. Alarm facilities : Non-latching relay rated 5 Amps, 240V
52 / Page No. 39 of 55	Test Temperature Detector	Minimum Length : 450mm Accuracy/ Stabaility : 0.3ºC Temperature Range : -80ºC to 400ºC	Minimum Length : 650mm Accuracy/ Stabaility : 0.03ºC Temperature Range : -0ºC to 1000ºC Outer Sheath Material – Ultra High Purity Quartz
71 / Page 47 of 55	--------	Sr. No 71 - Blank	**Resistance Thermometer Bridge** RTD elements and receiver instrumentation. The instrument shall be powered by internal battery and shall be provided with a galvanometer. The instrument shall provide automatic lead wire compensation for measuring the resistance of typical 3- wire and 4 – wire RTDs. This shall include coarse and fine control knobs. Instruments shall include safety switch and all necessary accessories. The instruments shall meet the following requirements as a minimum. a) Resistance Range 0-500 ohms b) Resolutions 0.0001 ohms c) Accuracy + 0.01% of reading d) Ambient Temperature 0-50 deg C

Sr. No / Page No.	Instruments	As per Tender Specs	To be read as:
			e) PC interface RS 232 with windows-based software for automatic multi-channel calibration.
10.07.00 Page No. 55 of 55 (Sr. No.74)	---------	Bill of Material for M&C Sr. No. 74 – Blank	Sr. No 74 - Resistance Thermometer Bridge, Quantity – 1 No.

Attachment-30

Chapter -15, Vol-V, Environment Monitoring Systems - Amendment

Sr. No / Page No.	Instruments	As per Tender Specs	To be read as:
15.01.09/ Page No. 11 of 26	Continuous Online Mercury Analyser	Measuring principle:- Cold Vapor Atomic Fluorescence	Measuring principle:- Atomic Absorption Spectrometry/ Cold Vapor Atomic Fluorescence

Attachment No. 31

In the provenness of Fire Detection and Protection System, first Para of Clause 4.4.5 of Ch-4 at Sheet 10 of 42 in Vol-II be read as:-

"The bidder/its sub-vendor should have designed, supplied, erected and commissioned at least two (2) numbers of Fire Protection Systems, each of contract value not less than INR 35 million or equivalent in foreign currency (exchange rate applicable as on date of Techno-commercial bid opening), in industrial installations of thermal power plants / fertilizer / steel / oil refinery / Sugar Mill". Each of the above fire protection systems should have comprised of:"

Attachment-32

Clause 8.1.1 (d), (e), (f), (g), (h), (i), (j), (k) at Sheet 9 of 75, ITB, Section-II, Vol-I, the following changes may be considered as Errata:

Sr. No.	Bid Specification	be ‘’Read as”
1.	Attachment 3A10	Attachment 3A11
2.	Attachment 3A11	Attachment 3A12
3.	Appendix-A to Attachment 3A12	Appendix-A to Attachment 3A13
4.	Appendix-B to Attachment 3A12	Appendix-B to Attachment 3A13
5.	Appendix-C to Attachment 3A12	Appendix-C to Attachment 3A13
6.	Appendix-A to Attachment 3A13	Appendix-A to Attachment 3A14
7.	Appendix-B to Attachment 3A13	Appendix-B to Attachment 3A14
8.	Appendix-C to Attachment 3A13	Appendix-C to Attachment 3A14

ARIHANT ANALYTICAL LABORATORY PVT. LTD.

AN ISO 9001:2015, ISO 14001:2004, ISO 45001:2018 CERTIFIED LABORATORY

272, Phase-IV, Sec-57, HSIIDC, Kundli, Sonepat-131028 (Haryana)

Ph. : 7082301442, 9250014551 Email : aalkundli@gmail.com

Website : www.aalkundli.com

Attachment-33

TEST CERTIFICATE

Issued To: **M/s Deenbandhu Chhotu Ram Thermal Power Projects**
Haryana Power Generation Corporation Ltd.
Yamuna Nagar (Haryana)

Sample Description: **Ash Sample**

Report No. AAL MIS-20230615004
Date of Receiving: 15/06/2023
Date of Starting: 15/06/2023
Date of Completion: 20/06/2023
Date of Reporting: 20/06/2023
Sample Submitted By: Customer

TEST RESULT

S. No.	Test parameters	Unit	Results	Test Method
1	Moisture Content	% by mass	0.11	IS 1727-1967
2	Loss of Ignition	% by mass	1.33	IS 1727-1967
3	Chlorides (as Cl)	% by mass	0.16	IS 1727-1967
4	Sulphate (as SO_3)	% by mass	1.72	IS 1727-1967
5	Silica (as SiO_2)	% by mass	55.98	IS 1727-1967
6	Aluminium (as Al_2O_2)	% by mass	28.40	IS 1727-1967
7	Iron Oxide (as Fe_2O_2)	% by mass	5.06	IS 1727-1967
8	Calcium Oxide (as CaO)	% by mass	2.12	IS 1727-1967
9	Magnesium (as MgO)	% by mass	1.16	IS 1727-1967
10	Sodium oxide (Na_2O)	% by mass	0.16	IS 54032-1985
11	Potassium Oxide (K_2O)	% by mass	1.82	IS 54032-1985
12	Phosphorus Pentaoxide (P_2O_5)	% by mass	0.05	IS 1727-1967
13	Titanium Dioxide (TiO_2)	% by mass	0.61	IS 1727-1967
14	Others (Reminder)	% by mass	1.32	By Calculation

****End of Report****

Dr. D. R. SHARMA
Gen. Manager (Q&T)

Authorised Signatory

Note:
1. The Result Indicated above refer to the tested sample and listed test parameters only, endorsement of products is neither inferred not implied.
2. Total liability of our laboratory is limited to the invoice amount.
3. This report shall not be reproduced wholly or in part without written consent of the laboratory.
4. This report shall not be used in any advertising media or as evidence in the court of law without prior written consent of the laboratory.
5. The non-perishable sample received shall be destroyed after one month and perishable sample shall be destroyed after one week from the date of issue of report unless specified.