GVK RATLE HYDRO ELECTRIC PROJECT PRIVATE LIMITED
850MW (4X205 MW + 1X30 MW) RATLE HYDRO ELECTRIC PROJECT
PRE-BID TECHNICAL QUERIES OF THE BIDDERS & OWNER's RESPONSE

DATE: 08.02.2012

Sl. No.	Tender Reference	Tender Stipulation	Pre Bid Clarifications/Queries	Owner's response
1	**General Information:**		Equipments for colony is not in BHEL scope. Any 11 KV OH line is not in BHEL scope. Please Confirm.	11kV line from 400kV pothead yard to Dam & Colony (as per drawing 71.2133.08.902) transformers are in the scope of bidder's.
2	i) Vol-I / Section-1 – Information for bidders ii) Vol-II – Instruction to bidders – A1 - General	As per (i) EPC contract package for 810 MW (4X195MW + 1 X 30 MW). As per (ii) The generating capacity ……. 850 MW…. 4 units of 205 MW and one unit of 30 MW.	It is understood from the tender document that there are four units of 205 MW each. Hence please correct (i) accordingly.	There are 4 units of 205MW each and 1 unit of 30MW.
3	i) Clause 1.5.2 ii) Clause 1.5.4	i) At 40% of rated power output. ii) Curves of turbine efficiency…. 40% of maximum output……	Francis turbines normally operate up to 50% of rated output. Below this, the machine operation may have pressure pulsation and turbulence. Please confirm acceptance.	Generally, Francis turbine can run between 40% to 50% of rated discharge and may be designed accordingly.
4	i) Clause 1.1.1 ii) Clause 1.13.1	i) The runner shall be in one piece (integral), forged/ cast fabricated. ii) The runner…… forged or cast fabricated and in one piece (integral).	Please confirm that one piece (integral) fully cast runner is also acceptable.	As per specifications only.
5	Clause 1.5.9	Excessive pitting…. 0.3 D2 / 8000 kg of metal per operating hour……	0.3D2/ 8000 kg. of metal per operating hour is not clear. We propose to follow IEC 60609.	As per specifications.
6	i) Vol-VI / Section 1/ Clause 1.4 ii) Vol-VI / Section 32/ Clause 32.4	i) & ii) Design pressure and test pressure for all under water parts including transients = 11 bar and 16.5 bar.	The design pressure is equal to = Maximum static head x Pressure rise So, for (i) it should be = 114.7 x 1.30 = 149.110m For (ii) it should be = 112 x 1.3 = 145.6 Please review.	Scope entitles you for complete design & calculate pressure and speed rise and arrive at the design & test pressure.
7	Vol-VI / Section 1/ Clause 1.10.1	The spiral …… approx. 6020mm.	The spiral case inlet diameter shall be as per manufacturer design. Please confirm.	Scope entitles you for complete design.
8	General		Please furnish i) Maximum allowable transport dimensions and weight. ii) Silt data like PPM and petrographic analysis.	i) The Bidders shall be deemed to have undertaken a visit to the Site and be aware of all information that may be necessary for preparing the bid and entering into Contract(s). The bidder shall assess and satisfy himself as to the adequacy of the local conditions & adequacy of site data and verify the inputs provided by the Owner. ii) The Dulahasti Project - Daily suspended sediment data for Oct 2011 at Intake and near Radial gate no. 4 and Test Certificate of water (reservoir) by Sriram Institute for Industrial Research attached at Annexure - Ia, Ib & Ic. Additiona data as and when available, shall be shared informed to the bidders.
9	Sheet No- 23, Clause No. 1.5 & Sub clause 1.5.5	**Technical performance and other guarantees & Guaranteed Maximum Momentary Pressure :** "Compliance with the guaranteed maximum momentary pressure rise values shall be proved by respective calculations and verified by model tests."	As per IEC 60193 Clause no. 4.1.1"In general, it is not possible to simulate on the model the prototype transient operating sequences, the data for which can only be derived from a series of steady-state operations" Hence Model test results to be used for calculations only. Therefore clause may be modified as **"Compliance with the guaranteed maximum momentary pressure rise values shall be proved by respective calculations."**	Agreed

10	Sheet No- 24,Clause No. 1.5 & Sub clause 1.5.8	**Technical performance and other guarantees &Cavitation Guarantees :** "The Contractor shall guarantee cavitation-free operation in the whole turbine operating range defined in section 1.4.2.1. In accordance with IEC 60193, the Incipient Thoma Number (σi) and the Plant Thoma Number (σPL) shall be used. Basically, a safety margin in terms of a safety factor (k) between the Incipient Thoma Number (si) and the Plant Thoma Number (σPL) have to be guaranteed, where **σPL = k * σi.** The safety margin shall be at the highest possible level, k > 1.0. When operating under temporary conditions, (about 100 hours per year, at loads outside the continuous operating range), only the Plant Thoma Number (σPL) shall be higher than the model test so (called "Thoma number zero" and defined in IEC 60193), based on maximum water temperature stated in Clause 1.4.2, "Hydraulic conditions" of this Section 1.	As per international practice, Thoma number zero (so) is used for guarantee purposes, therefore Incipient Thoma Number (σi) should be replaced by Thoma number zero (so) for guarantee in the equation. **σPL = k * σo**	As per specifications. However, bidder may please submit the report of two projects where this practice has been adopted for our review.
11	Sheet No-24,Clause No. 1.5 & Sub clause 1.5.8.1	**Technical performance and other guarantees, & Cavitation Guarantees Verified on Turbine Model Test :** "For the following operating points the supplier has to specify the Incipient Thoma Number (si) and to guarantee the safety factor k"	Refer our comment no. 2 on tender document Sub clause 1.5.8.1 Cavitation Guarantees. Cavitation guarantees should be given with respect to Thoma number zero (so) and not Incipient Thoma Number (σi). Therefore the clause should be modified as **" For the following operating points the supplier has to specify the Thoma number zero (so) and to guarantee the safety factor k.**"	As per specifications. However, bidder may please submit the report of two projects where this practice has been adopted for our review.

12	Sheet No-98 , Clause No. 1.19 & Sub clause 1.19.3	**Model Acceptance Tests & Model Performance Data :** Pressure pulsations in spiral case and draft tube, between runner and wicket gates, between head cover and runner crown for various unit speed and in all the range of plant sigma, and for guide vane openings from 30 % to full opening, spaced at 10 % interval minimise pressure pulsations (i.e. air admission), an additional set of curves shall be given.	As per the general practice and in line with strong recommendations of IEC 60193 Clause no. 4.3.3.1, Pressure pulsations are recorded in spiral case and draft tube for various unit speeds and in all the operating range of plant sigma. As these are sufficient for ensuring smooth operation of prototype. Therefore, clause to be modified as "**Pressure pulsations in spiral case and draft tube for various unit speed and in all the range of plant sigma ..... shall be given.**"	Bidders may take deviation if required.
13	Sheet No- 98 Clause No. 1.20.4 & Sub clause 1.20.4.5	**Tests On Completion & Verification of Model Test Results by Field Test:** "....When designing the turbines, the Contractor shall make the necessary provisions for testing on all units. The relevant drawings shall be submitted to the Engineer."	Clause specifies "..... Index tests and power output tests will be conducted on each unit .....". Which implies Field efficiency test is to be done on one unit in line with international practice. Clause to be modified as "..... When designing the turbines, the Contractor shall make the necessary provisions for testing on all units. The relevant drawings shall be submitted to the Engineer. However Field Efficiency Test will be conducted on one unit selected by the Owner. "	Please refer clause 1.5.4 of Section1 Turbine
14	Sheet No- 109 Clause No. 1.20.4 & Sub clause 1.20.4.5	**Tests On Completion & Verification of Model Test Results by Field Test :** "The details of the methods of measurement, of the conditions and conduct of these tests at site shall be mutually agreed between Engineer and Contractor, ..."	Plan view of Water conductor system of the project is given in Drawing no. 71.2133.00.003 Title "Project Area General Layout". However drawing of elevation view of the water conductor system is not given with the tender document. Therefore drawing of elevation view of the water conductor system (205MW) may given for checking the suitability of various methods of discharge measurement.	Relevant Drawing is attached at Annexure-II.
15	Cl. No.1.16.7.1 Page 78/110	Scope and Limit of Supply -Speed measurement and monitoring system with 3 speed sensor. - Leakage oil tank	We propose speed measurement and monitoring system with 2 speed sensor. Governor actuator leakage is directly connected to Oil Sump Tank through drain. As such, Leakage Oil Unit is not required.	As per specifications only. Shall be clarified during detail engineering.
16	Cl. No.1.16.7.6 Page 83/110	Oil Pressure Unit	We propose common OPU for Gov & MIV and also The size of tank…..to operate the guide vanes 3 times(2 "C" +1"O") & one stroke(1"O") for MIV servomotor with a safe margin.	As per specifications only.
17	Cl. No.1.16.7.6.3 Page 84/110	Governor Oil Pumps -For the pressure oil supply, 2 screw pumps - The pump shall be ……and each shall have a capacity of at least 3 times the total guide vane servomotor volume per minute.	We propose screw type / vane type / gear type pump. Oil pump capacity equal to servomotor volume is sufficient to cater the oil flow requirement for OPU system of Governor.	As per specifications only.
18	Cl. No.1.18.2 Page 94/110	Specified spare parts For the Governor system - 1 complete electronic speed signal detector including speed signal transmitter	We offer speed sensors only and not complete signal detector.	As per specifications only.
19	Drawing Volume	General	Please furnish drawing of water conductor system from Surge shaft to power house showing full details (like length & dia. of each section, bends, radius etc.) for calculation of GD2.	Relevant Drawing attached at Annexure-III.
20	Clause 2.3	Design pressure = 11 bar	Design pressure is maximum static head multiplied by pressure rise. Therefore, for B.F.Valve of 205 MW, it should be 149.1m. And for B.F.Valve of 30 MW it should be145.6m.	Scope entitles you for complete design.
21	Clause 2.7	Material specified for various components of Butterfly valves.	Please allow ASTM /BIS materials also.	Agreed

23	Page No 47/97 Clause No 3.14.1.1 Line No 3 Page No 50/97 Clause No 3.14.2.1 Line No 6 Page No 64/97 Clause No 3.16.2.1	The excitation system shall be equipped with an auxiliary system with external AC power supply for dynamic braking. Reference is made to Clause 3.16.2.1, electrical dynamic braking system. **One (1) electrical braking cubicle** suitable for bus-duct connections. **Electrical Dynamic Braking System**	Dynamic Breaking system is required only for pelton type of Turbine. As the Ratle HEP is having Francis turbine, Electrical Dynamic Braking System is not applicable.We request deletion of dynamic braking requirement.	Dynamic Breaking system is to be provided.
24	Page No 48/97 Clause No 3.14.1.3 Line No 10	Range of manual voltage adjustment 0% (at no load) to 110% of generator Ur (at maximum set point shall reset to zero excitation automatically)	Manual range of 0-110% is possible for testing & Commissioning purpose only (due to field flashing requirement. Manual normal range will be around 80% to 110% Ifo)	As per specifications only.
25	Page No 54/97 Clause No 3.14.3.2.3 Line No 1 Page No 58/97 Clause No 3.14.3.2.4 Line No 9	The AC undervoltage device shall differentiate between failure of the secondary voltage system and the depression of primary voltage due to short-circuit conditions. Suitable overvoltage protection on AC and DC side of rectifier shall be provided.	AC voltage protection of excitation system is provided by Generator over voltage relay. Hence separate over voltage relay is not required in excitation system. Please confirm acceptance (Two overvoltage relays can lead to confusion).	As per specifications only.
26	Page No 55/97 Clause No 3.14.3.2.3 (e) Line No 21 Page No 57/97 Clause No 3.14.3.2.3 (f) Line No 4	Generator excitation circuit earth fault protection function rotor ground fault protection relay	Generator field earth fault detector and rotor earth fault protection are part of Generator Protection. Please delete the same from excitation specification.	As per specifications only.
27	General	Water analysis report	Please furnish water analysis report for design of air and oil coolers	Please refer Owner's reply at Sl. No. 8 above
28	General	Transport limitation	Please specify transport limitation in terms of L x W x H & weight for assessment of design suitability of generator parts for transportation..	Please refer Owner's reply at Sl. No. 8 above
30	Clause 3.4	SCR is specified as not less than 1.1.	For modern excitation & voltage control system, higher SCR is not necessary. In our opinion, SCR value of not less than 1 is suitable. Please confirm the acceptance.	As per specifications only.
32	Clause 3.16.2.1	Dynamic Braking	As the turbine is Francis type , dynamic braking system is not applicable, in view of high water churning torque which retards the machine quickly. Dynamic braking system is required only for large rating pelton turbine based generator units.	As per specifications only.
33	Clause 3.1, page -7/97 and 8/97,	Oil coolers for combined thrust and lower guide bearing	External Oil coolers (without external pumps) is mentioned for combined thrust and lower guide bearing. We propose plug-in-type oil coolers for combined thrust and lower guide bearing also. Please confirm the acceptance.	As per specifications only.
34	Clause 3.1, Page-8/97	DC standby HP Lub. Pump	DC standby HP lub pump is required. As HP lubrication system is used only during start and stop, In our opinion DC standby pump is not necessary. A.C standby pump can be considered. Please confirm the acceptance.	As per specifications only.
35	Clause 3.6.3.5 & 3.10.1.3	Dielectric strength	In clause 3.6.3.5 & 3.10.1.3, dielectric strength of ≥ 20 kv/mm (AC test voltage) is specified. This requirement seems to be very high. Please clarify the same.	As per specifications only.
36	Clause 3.6.3.5 & 3.10.1.3	Field strength	In this clause, field strength 4.5 mm/kv is specified. The requirement is not clear. In our opinion, it should be 4.5 kv/mm. Please review the same.	Insulation thickness not to exceed 4.5mm/kV

37	Clause 3.20.1.2.11	Tan delta test	As per specification clause 3.20.1.2.11, tan delta test is to be conducted in steps up to 1.4 Ur . It may be noted that as per international standards i.e. VDE-0530/IEC-60894 tan delta test is conducted only up to 1.0Ur. As per BHEL practice tan delta test is conducted up to 1.2 Ur. Hence it is proposed that requirement of tan delta test should be limited in steps up to 1.2 Ur only. Please confirm acceptance. Please note that ten delta test will be done on 100% bars and partial discharge will be done on sample basis.	As per specifications only.
38	Clause 3.20.1.2.11	High voltage test	In this clause high voltage test up to 4 Ur is specified. This requirement is on higher side. As per IEC/IS this test voltage should be 2 Ur+1 KV. Please review the same.	Yes. Agreed.
39	Clause 3.17.1	RTD's of 4-wire type	In this clause RTD's of 4-wire type is specified. Please note that this is old practice and nowadays RTD's of 6-wire type is used. 3-wire goes to chartless recorder and another 3-wire goes to SCADA. Please confirm the acceptance for RTD's of 6-wire type.	Agreed.
40	Clause 3.17.2(3),	Schedule of instruments - Flow meter/ Flow switch	Flow meter/ Flow switch In our opinion flow meter at outlet of each air cooler is not necessary and flow from air cooler is being measured at common discharge point of air coolers. In place of flow meter, visual flow indicator will be provided at outlet of each air cooler. However flow meter in common discharge pipe of air coolers and oil coolers will be provided .	As per specifications only.
41	Clause 3.17.2(5),	Schedule of instruments - On line Air gap monitoring system	The Air-gap monitoring system is required to be quoted, but detail specification of the same is not available. Hence please provide the same. No. of air gap sensors is not specified. As per our standard practice, we provide 8 no. capacitive sensors per generator, 4 no. on drive end side and 4 no. on non-drive end side , spaced 90° from each other. Please confirm acceptance of the same.	As per your best practice.
42	Clause 3.17.2(5),	Schedule of instruments - On line vibration monitoring system	The Vibration monitoring System is required to be quoted, but detail specification of the same is not available. Hence please provide the same. As per our standard practice, we provide following sensors - - 2 no. proximity sensors per bearing(total 6 no.) - 1 no. velocity probe on each bracket(total 3 no.) - 1 no. synchronization probe for phase reference. Please confirm acceptance of the same.	As per your best practice.
43	Clause 3.17.2(5),	Schedule of instruments - Partial discharge monitoring system	The Partial discharge analyzer is required to be quoted, but detail specification of the same is not available. Hence please provide the same. As per our standard practice, we provide one capacitive coupler per phase per parallel path. The above coupler shall be permanently mounted inside generator and high voltage cable will be terminated on PD termination box. A common portable PD analyzer with carrying case will be provided for measurement of partial discharge in any of the machine periodically. Please confirm acceptance of above.	As per your best practice.
44	Clause 3.20.1.2.1	Material Tests	Manufacturer's and Mill's TCs shall be furnished. No test shall be performed in BHEL lab. Please confirm the acceptance.	As per specifications only.

45	Clause 3.20.3.2,	Determination of values for Xd, Xq, X'd, X'q, X"d , X"q , Xp and time constants T'do, T'qo, T'q, T'd, T"d & Ta and Instantaneous short-circuit at 100% of rated voltage, short circuit to be applied at HV side of unit transformer	Determination of values for Xd, Xq, X'd, X'q, X"d , X"q , Xp and time constants T'do, T'qo, T'q, T'd, T"d & Ta and Instantaneous short-circuit are specified. For determination of above parameters we need to conduct Sudden short-circuit test. In our opinion this test is an invasive test; hence we do not recommend this test. The same may be deleted. Calculated value of reactance's and time-constants will be furnished. However please note that if insisted upon, this test will be conducted at HV end of generator transformer at 50% rated voltage, using HV line side circuit breaker. Please confirm the acceptance.	As per specifications only.
46	Clause 3.20.3.2	Run-away speed test	Being a detrimental test, we do not recommend this test. The same may be deleted.	As per specifications only.
47	Clause 3.5.3 & 3.20.3.4.2, and Clause 3.5, Vol-7(3) GTP	Part load efficiencies	in clause 3.5.3, factors for calculation of weighted average efficiency are specified as 110%, 100%, 50% & minimum output. However In clause-3.20.3.4.2 and clause 3.5 of GTP, factors specified are 110%, 100%, 60% and 40% continuous rated output. Please clarify & amend these clauses of GTP & particular technical specification suitably.	Factors for calculation of weighted average efficiency shall be as per PTS clause 3.5.3
48	Clause 3.12.3,	Air and oil coolers material	In this Clause coolers are specified to be made of stainless steel material. Tube material of Cupro-Nickel is specified. Composition of the same is not specified. As per present normal practice material of coolers shall be as follows - Tubes : 90/10 Cu-Ni having good excellent heat conductivity and anti corrosive properties. Tube plates : Mild steel Fins : Cu - Ni Above has been used in large no. of generators which are running successfully. Please confirm of acceptance of above material.	Agreed.
49	General	Insulation and Temperature rise limits.	The temperature rise at rated load (227.78 MVA) are not specified. (At voltage and frequency variation specified in spec). In our opinion the limits of temp. rise may be taken as specified in IEC-34-1/IS-12802 , which are reproduced as follows (Zone B operation of voltage and frequency range) At rated output(227.78 MVA) - Stator winding : 85°K (ETD) - Rotor winding : 90°K (Resistance) For overload condition the temp. rise limits may be taken as 15°K more than above temp. rise limits. It may please be noted that above limits are (on rated load) for class B temp. rise , while our insulation system is class F , which has 155°C temp. limit . Hence above limits are in safe zone with adequate safety margins.	As per specifications only.
50	General		Transport limitation and wt. of heaviest package is to be informed. Dimension of transformer cavern is to be informed	Please refer Owner's reply at Sl. No. 8 above

51	Cl. 6.8.6	Steel structure	Please specify the type of structure required(Lattice or pipe) for 400kV Pothead yard equipment.	During detail engineering.
52	General	-	Please specify the route length between 1. 400kV Pothead yard and power house 2. 400kV GIS hall and transformer hall.	As per drawings.
53	Clause No. 8.5.1		(A) Current rating of delta and tap-off is not given the same is required for design purpose. (B) Short circuit levels/ peak value for Main, Delta, tap-off sections required for design purpose. (C) Temperature rise limits above ambient temp. 40oC shall be in line with IS-8084, as below- 1). Enclosure- 40oC 2). Conductor- 50oC	As per specifications only.
54	Clause No. 8.7.1		(A) Expansion joints for the conductors shall be welded/bolted to the conductors. (B) We shall provide neoprene rubber bellows in the expansion joints of the enclosure instead of metallic bellows. (C) Bus conductor shall be made of Aluminium alloy. (D) Degree of protection of busduct shall be as per appendix-F of IS-8084.	As per specifications only.
55	General		Design and testing of Isolated phase bus duct and all the associated equipments shall be as per relevant IS.	As per specifications only.
56	Clause 9.2.1 & 9.2.2, page:2/10		Kindly note that Transformer shall be provided with off circuit bolted links for tap changing, which will be manually operated on all three phases. Please note that tap changer with links are operated by changing the position of bolted links manually which is our standard arrangement for cast resin dry type transformer.	During detail engineering.
57	Clause 9.5.1.1, Sl No-19, page:5/10		Kindly note that transformer shall be provided with class of insulation 'F' against requirement of class 'H'. We have supplied many transformers to all our customers i.e NTPC,NHPC,ONGC,SEB's with class 'F' insulation and they are running satisfactorily. Class 'F' insulated transformer are preferred all over world. Please confirm acceptance of class F insulation.	As per specifications only.
58	Clause 9.5.1.1, Sl No-19, page:5/10		Kindly note that the efficiency of transformer shall be >99% (approx) at 50% of full load (approx.) and upf .	As per specifications only.
59	Clause 9.7.1, Page :7/10		For Thermal protection we shall provide a digital temperature scanner along with RTD (PT-100) per phase embedded in the LV coil. The scanner shall display the temperature of all the 3 phases sequentially and also record the maximum temperature attained by the windings during operation and shall also generate the alarm and trip signals in case of overheating of the coils. Hence Thermostat are not required.	During detail engineering.
60	Clause 9.7.1, Page: 8/10		Kindly note that UAT and SST ,Dry type transformer shall be provided with Bi-Directional rollers for smooth movement without damaging the floor itself.Hence skid is not required.	During detail engineering.
61	Clause 9.7.1, Page: 8/10		The enclosure shall be made with the thickness of 2.0 mm approx(14 gauge) sheet steel which is sufficient for this rating transformer.We have already supplied many transformers with 2.0 mm thickness enclosure sheet steel for rating upto 5.2 MVA transformers and are running satisfactorily.	2mm thickness of the enclosure is acceptable.

62	Page No 22/57 Clause No 12.7.3 Line No 7	Real time, full duplex data transmission rate, of at least 1Giga Bytes per second shall be provided.	Power plant control system requires 100MBps network only and this is in-line with the systems implemented for other power projects (including major thermal and hydro power projects). Gigabit networks are used only when hundreds of computers are connected. Gigabit network components are non-standard, expensive and not widely available. Please confirm that 100MBPS control system network and Plant LAN can be proposed.	As per specifications only.
63	Page No 34/57 Clause No 12.7.10	**Energy Meters**	We request Purchaser to specify the acceptable make/ type of energy meter(energy meters are available in the market with widely varying features and prices).	The list of vendors / sub supplier for Energy Meters shall be furnished by the bidder alongwith the bid. However, if any vendor/sub supplier is not acceptable to the Owner, the bidder will not consider the same vendor / sub supplier during procurement. Additional vendors/ sub suppliers after the award of Contract shall not be considered by the Owner. Please also refer our reply against point no.30 of commercial query.
64	Drawing No. 71.2133.08.906	**DAM MMI** POWER MONITORS ARMAC (GATES)	Please confirm the following: * Is communication link/media(like cable) between Dam and power house is included in EM bidder scope. * If yes, please provide cable route length, type of cable and method of transmission (underground, PLCC etc). * Is AMRAC included in Control System supplier scope? * If yes, please provide detailed specification for AMRAC. * Drawings shows Power Monitors, please define what is power monitor and the application of the same at Dam.	Except ARMAC every thing is in the bidder's scope. Panel - Civil + HM in coordination with E&M.
65	Page No 5/15 Clause No 13.3.1 Line no 16	Each set of battery bank of 220V DC and 48V DC shall be capable of supplying successfully total loads of 220V and 48V DC systems respectively for at least ten (10) hours without any assistance from the charger	We request review of 10 hours back up time as normally only 10 hour discharge rate (C/10 rating) is specified.10 our back will require huge battery sizing considering the total loads connected	As per specifications only.
66	Clause No. 13.3.1	However, each set of battery bank of 220V DC and 48 V DC shall be capable of supplying successfully the total loads of 220 V and 48 V DC systems respectively for at least 10 hours without any assistance from the charger and without its terminal voltage falling below 193 V in case of 220V battery and 42V in case of 48V battery.	If the battery back time is required to be 10 hours then the rating of the batteries will have to be increased. As a standard practice, battery backup for 2 hours is generally considered, which may please be confirmed by Purchaser. Ampere-hour rating of the batteries shall be considered as per tender document, which may please be confirmed by Purchaser.	As per specifications only.

67	Clause No. 14.3.1.2	**Outdoor Lighting** • Approach road up to penstock erection area and adit. • Downstream Surge shaft area and approach road upto 150 m. • Main approach road to power house up to 150m. • Pothead yard area. • Tail race outfall. • Parks and landscaping around Power House. • Dam area lighting including approach roads upto 125 m.	Illumination drawings for outdoor lighting for mentioned areas are not given in tender drawing. The same is required for preparation of offer.	Design as per given Lux level.
68	Clause No. 14.3.2.2	**Emergency Lighting**	As per standard practice, time for emergency lighting shall be 2 hours, which may please be confirmed by Purchaser. Temporary illumination for construction work is not in BHEL scope, which may please be confirmed by Purchaser.	During construction the illumination requirement is given in GTS.
69	Cl. 14.3.3.2, Page 9 of 19	"Lux Levels"	Please confirm the requirement of 100lux level for 400kV Pothead yard.	As per specifications only.
70	General		Nolighting transformer has been envisaged. As per system, the same shall be required for fault isolation, which may please be confirmed by Purchaser.	Design as per best design practice.
71	General		For mounting illlumination fittings,we are considering the use of towers in potheadyard. Please confirm if it is acceptable.	During detail engineering.
72	Clause No. 15.8.3	Stainless steel cable trays shall be provided for humid premises and the area prone to water dripping and spray.	Stainless steel cable trays are not required. As a standard practice MS galvanised cable tray is adequate for hydro power stations, which may please be confirmed by Purchaser.	20% of Total Tray requirement.(Where water dripping on trays should be of stainless steel)
73	Cl. 15.11.2, Page 17 of 21	" Cable Routing"	Please specify type of cable trays required(ladder or perforated) for 400kV Switchyard.	During detail engineering.
74	Clause No. 16.7.5.6	Fuel system.	No main fuel tank has been envisaged. The same shall not be provided. Only a day tank of 990 litres shall be provided. Purchaser shall confirm the same.	Yes. Confirmed.
75	Cl.17.2, page 3 of 10	"Scope of work"	1.Please confirm that only supply of PLCC system for remote end and no ETC work shall be in the scope of contractor. 2. Please clarify whether 48V DC system, 400 kV Wave trap & CVTs for remote end PLCC system is in the scope of contractor.	As per specifications and details during detailed engineering.
76	Clause No. 18.3.1	As per major areas to be covered given in the PTS.	As mentioned in the tender document, not more than 25 CCTV cameras shall be provided, same shall be confirmed by the Purchaser.	Quantity may increase during detail engineering.
77	Clause No. 18.7.7	Minimum 25 CCTV cameras shall be provided and connected to atleast 5 monitors at different locations.		
78	Clause No. 19.2.1	The value of soil resistivity has not been given.	Soil resistivity shall be considered to be in the medium range (600 Ω-m) for calculation purposes and preparation of offer, which may please be confirmed by Purchaser.	Soil resistivity - 4000 Ω-m may be considered.
79	Clause No. 19.2.1	Flexible copper braided connections of ground points of equipment to grounding network.	Flexible copper braided connections are not requires. As a general practice normal cable shall be used, which may please be confirmed by Purchaser.	As per specifications only.
80	Clause No. 19.7.2	The embedded earthing system shall be interconnected and formed by MS electrode, rods/flats and copper conductors of suitable size.	The earthing grid shall be formed by MS electrode, rods/ flats, which may please be confirmed by Purchaser.	As per specifications only.
81	General	All connections of the embedded earthing conductors shall be thermo welded.	As per standard practice, normal welding will be done, which may please be confirmed by Purchaser.	As per specifications only.
82	General		Drilling for electrode and other civil work is not in E&M Contractor's scope, which may please be confirmed by Purchaser.	Yes. Confirmed.
83	General	-	Pleae specify soil resistivity for 400kV GIS area and 400kV Pothead yard.	Soil resistivity - 4000 Ω-m may be considered.

84	Vol-VI / Section-20 i) Clause 20.4 ii) Clause 20.11.1 iii) Clause 20.1 iv) Drg.71.2133.08.908	i) Duplex strainers…… capacity for 30 MW unit. ii) The strainers……. Automatic self back flushing. iii) Automatic backwash duplex filters two nos. (one for each tapping….) iv) The drawing shows two nos. simplex automatic backwash filter.	Please clarify your requirement of filters whether duplex filters are required which are not automatic and are changed manually or simplex type with single basket which are automatic. Please also specify the quantity for each unit.	As per specifications only. Two automatic back wash filters are for each unit.
85	Cl. No. 24.13.4	it has been specified that " The load, cradle and slings for full load and 25 % overload test compatible with same loading orientation is likely to be encountered during rotor lowering shall be arranged by the contractor".	It may please be noted that overload testing of EOT Crane shall be conducted by using dead weight at site. Since this Hydro site is located in remote area, hence arranging load at site shall be very difficult, therefore customer is requested to provide 'Test Load" in the form of RCC blocks, steel plates etc. at site (free of all charges) for conducting overload testing of EOT crane at site. Kindly confirm.	As EPC contractor it is in the scope of the bidder. For test load bidders has to co-ordinate with the civil & HM contractor.
86	Clause No.26.04.24, 26.04.26	AC vibrating reeds frequency meter	Frequency range: 45-55 Hz Proposed Vender - Meco-V, Nippen, Beemet, AE, Any other reputed make. Please Confirm.	It may be discussed at later stage during detailing.
87	Clause No.26.04.24, 26.04.26	Insulation tester (Megger) upto 1000V DC	Test voltage- Up to 1000V DC, Resistance range: 100GΩ, Accuracy: ± 5% Proposed Vender - Kusam meco, Rishabh, Meco, Kyoritsu, Motwane, Any other reputed make Please Confirm.	
88	Clause No.26.04.24, 26.04.26	Ground resistance tester	Resistance range: up to 2000 ohm, 3 pole, digital indication Proposed Vender - Kusam meco, Kyoritsu, Taurus, Metravi, Scope T&M, Motwane, Any other reputed make Please Confirm.	
89	Clause No.26.04.24, 26.04.26	Insulated sticks for LV, system grounding	Discharge rod, up to 1 kV Proposed Vender - Technology product, Motwane,Beimco, Pactil, Any other reputed make Please Confirm.	
90	Clause No.26.04.24, 26.04.26	Insulated sticks for MV, system grounding	Discharge rod, up to 11 kV Proposed Vender - Technology product, Motwane,Beimco, Pactil, Any other reputed make Please Confirm.	
91	Clause No.26.04.24, 26.04.26	Voltage indicating rod for LV system	Voltage detector, up to 1 KV Proposed Vender - Technology product, Motwane, Beimco, Pactil, Any other reputed make Please Confirm.	
92	Clause No.26.04.24, 26.04.26	Time clocks (Stop watch)	Resolution: 1/100 sec. Please Confirm.	
93	Clause No.26.04.24, 26.04.26	Standard tools with checks complete	Electrical tool kit consist of following items.	
			9" Lineman Plier	
			71/2" Diagonal Cutting Plier	
			7" Needle Nose Plier	
			6" Mini Flashlight	
			30-200 In - Lb Torque Wrench 3/8: Sq Dr	
			3/8" Sq Sr Lever Control Reversible Ratchet	
			3", 6 " Extension Bars 3/8" Sq Dr	
			Deep Wall Sockets: 3/8", 7/16", 1/2". 9/16", 5/8", 11/16", 3/4", 13/16" w/3/8" Sq Dr	
			Geared Box End Wrenches: 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4", 13/16"	
			Cushion Grip: Cabinet Tip Screwdrivers: 9/16" x 2", 3/16" x4", 1/4" x 6"	
			Phillips Tip Screwdrivers: #1 x 3", #2 x 4". Please Confirm.	
		Single core test cables with pin, length 2 mtr	Single core test cables with banana plug, length 2 m	
		Single core test cables with pin, length 1 mtr	Single core test cables with banana plug, length 1 m	
		Single core test cables with pin, length 0.5 mtr	Single core test cables with banana plug, length 0.5 m	
		Single core test cables with pin, length 0.2 mtr	Single core test cables with banana plug, length 0.2 m	
		Life safer box	First Aid Box	
		Insulating gloves upto 15kV	Insulating gloves upto 15kV	

		Insulating shoes upto 15kV	Insulating shoes upto 15kV	
94	Clause No.26.04.24, 26.04.26, 26.04.31	DC rectiformer	**For Stator:** Current rating: 10000 amp, test voltage: 0-100V **For Rotor:** Current rating: 1500 amp, test voltage: 0-400V **Please confirm that DC rectiformer is used for stator only or rotor also. if used for both then quanitity should be 2 Nos. instead of 1 No.** Proposed Vender - AE, Ajit, ETM, RE, Voltamp, Apollo, Jindal Electric, Any other reputed make. Please Confirm.	It may be discussed at later stage during detailing.
95	Clause No. 26.04.26, 26.04.31	Motorised portable oil test set	Test voltage: 0-100kV Proposed Vender - RE, Ajit, Udeyraj, Sivananda,Scope T&M, Motwane, Any other reputed make. Please Confirm.	
96	Clause No.26.04.24, 26.04.26, 26.04.31	Megger (Digital) 5kV	Test voltage: up to 5 kV, Resiatance range: up to 100 G ohm, Accuracy: ± 5% Proposed Vender - Kusam meco, rishabh, motwane, kyoritsu, Shivananda, Any other reputed make Please Confirm.	
97	Clause No.26.04.24, 26.04.26, 26.04.31	Digital multimeter	DC/AC voltage: 0-600V, Current : 0-10A, Resistance: 0-50KΩ Proposed Vender - Motwane, Kusam Meco, Rishabh, Kyoritsu, Meco, Aplab, Any other reputed make Please Confirm.	
98	Clause No.26.04.24, 26.04.26, 26.04.31	Tong tester	Voltage Range:up to 600V, Current range: up to 60A Proposed Vender - Motwane, Kusam Meco, Rishabh, Kyoritsu, Meco, Any other reputed make . Please Confirm.	
99	Clause No.26.04.24, 26.04.26, 26.04.31	Phase sequence indicator	Frequency range: 40-60 Hz Proposed Vender - AE, Motwane, Fluke, Kusam Meco, Any other reputed make. Please Confirm.	
100	Clause No.26.04.24, 26.04.26, 26.04.31	Auto transformer three phase 4kVA	input voltage: 415V, Output voltage: 0-415V, O/P current: 10Amp Proposed Vender -AE, Green Dot, Voltamp, Any other reputed make. Please Confirm.	
101	Clause No.26.04.24, 26.04.26, 26.04.31	Auto transformer Single phase 2kVA	input voltage: 240V, Output voltage: 0-270V, O/P current: 10Amp Proposed Vender -AE, Green Dot, Voltamp, Any other reputed make. Please Confirm.	
102	Clause No.26.04.24, 26.04.26, 26.04.31	Primary current injection kit	Input voltage: 230V, 1 phase Output current: up to 2500 A, Duty cycle: 90 sec Proposed Vender - RE, AE, Ajit, Udeyraj, Scope T&M,ETM, TP, Any other reputed make Please Confirm.	
103	Clause No.26.04.24, 26.04.26, 26.04.31	AC high voltage test set (0-40kV)	Test voltage range: 0-45 kV, Output current: 15 A Input supply: 2 phase out of 3 phase Proposed Vender - ETM, RE, Udeyraj, Ajit, Neo-Tele Tronix, Shivananda, Udeyraj, Any other reputed make Please Confirm.	It may be discussed at later stage during detailing.
104	Clause No.26.04.24, 26.04.26, 26.04.31	Portable universal bridge	Resistance: 100mΩ-10MΩ, Inductance:1µH-100H, Capacitance:10pF - 1µF, Frequency: 120Hz & 1 KHz Proposed Vender - Aplab, Motwane, Kusam Meco, Rishabh, Kyoritsu, instek, Any other reputed make Please Confirm.	
105	Clause No.26.04.24, 26.04.26, 26.04.31	Current & potential transformer analyser	CT ratio range: up to 2500, measure burden, phase angle, voltage, current, polarity test etc. Proposed Vender - Radian research, ISA, Any other reputed make. Please Confirm.	

106	Vol VI, Section 26, Clause No.26.04.24, 26.04.26, 26.04.31	Digital mechanical revolution counter	Range: 0-15000 rpm, Proposed Vender - Motwane, Kusam Meco, Meco, Kyoritsu, Line seiki, Lutron, Any other reputed make Please Confirm.	
107	Clause No.26.04.24, 26.04.26, 26.04.31	Digital winding resistance measurement meter	Test current: up to 10A, Range: 0-100Ω, Proposed Vender - Motwane, Scope T&M, Shivananda, Prestige electronics, Any other reputed make. Please Confirm.	
108	Clause No.26.4.23	Electric Oven	Temprature rang: up to 300ºC, Size: 0.3m x 0.3m x 0.3m Proposed Vender - Classic Scientific, Hamco,Haridas, AMI, Any other reputed make. Please Confirm.	It may be discussed at later stage during detailing.
109	Clause No.26.4.14	Workbench with vice	Adequte length, hight-850mm with vice, 10 earthed electric socket, drawer,etc. Please Confirm.	
110	Clause No.26.4.16	Tool cabinet - 3 Nos.	Please confirm the quantity as in detail specification (26.4.16) it is 1 set mentioned.	
111	Clause No.26.4.25	Tool set	As per GVK specification	
112	Clause No.26.4.17.3	Universal rack (total length- 11 mtr)	hight: 2.3m, Width: 0.8 m. Please Confirm.	
113	Clause No.26.4.17.4	Universal rack (total length- 27 mtr)	hight: 2.3m, Width: 0.8 m. Please Confirm.	
114	Clause no. 26.4.13	Welding table	Welding table ,Table size = approx 1200 (L) x 1000 (W) x 800 (H) mm. Please Confirm.	
115	Clause no. 26.4.14	Work benches with vice	Work Table with 3 drawers, 400 mm wide and 250 mm high on one side of the table. Table size = approx 1200 (L) x 1000 (W) x 800 (H) mm with 6" vice. Please Confirm.	
116	Clause no. 26.4.19	Tube vice with stand	Tube Vice with stand to hold upto 50 mm dia pipes. Tube Stand to stack tubes of length upto 2000 mm. Matl. of construction : 40x40 x 6 mm steel angle. Please Confirm.	
117	Clause no. 26.4.22.3	Precision mechanical revolution counter	Contact type, RPM 15000 approx. Please Confirm.	
118	Cl. 30.2, Page 3 of 11	Scope of supply	Please specify size and length of 400kV XLPE cable required for connection between 400kV GIS and 400kV pothead yard.	As per specifications only.
119	Vol-VI/ Section-32/ Clause 32.4.2.1	Values of efficiencies in the clause.	The turbine efficiency values mentioned are very much on a higher side for such a small turbine. Please review.	As per specifications only.
120	i) Clause 32.5.2 ii) Clause 32.5.4	i) At 40% of rated power output. ii) Curves…… 110%....., 40% of maximum output……	Francis turbines operate normally operate upto 50% of rated output. Below this, the machine operation may have pressure pulsation and turbulence. Please confirm acceptance.	Generally, Francis turbine can run between 40% to 50% of rated discharge and may be designed accordingly.
121	i) Clause 32.1.1 ii) Clause 32.13.1	i) The runner shall be in one piece (integral), forged/ cast fabricated. ii) The runner…… forged or cast fabricated and in one piece (integral)	Please confirm that one piece (integral) fully cast runner is also acceptable.	As per specifications only.
122	Clause 32.5.9	Excessive pitting…. 0.3 D2 / 8000 kg of metal per operating hour……	0.3D2/ 8000 kg. of metal per operating hour is not clear. We propose to follow IEC 60609.	As per specifications only.
123	Clause 32.4.2.1	Values of outputs against heads.	The values of outputs against various heads (Pg.12/110) are not matching with the figure and chart on Pg.13/77 in the same clause. Please check & confirm.	The values of outputs against various heads on Pg.12/77 are same with respect to the figure and chart on Pg.13/77.
124	Clause 32.10.1	The spiral case inlet ….. diameter of approx 2400mm.	The spiral case inlet diameter shall be as per manufacturer design. Please confirm.	Scope entitles you for complete design.

125	Sheet No-24 Clause No. 32.5 & Sub clause 32.5.8	**Technical performance and other guarantees,& Cavitation Guarantees :** The Contractor shall guarantee cavitation-free operation in the whole turbine operating range defined in section 32.4.2.1. In accordance with IEC 60193, the Incipient Thoma Number (σi) and the Plant Thoma Number (σPL) shall be used. Basically, a safety margin in terms of a safety factor (k) between the Incipient Thoma Number (si) and the Plant Thoma Number (σPL) have to be guaranteed, where sPL = k * si. The safety margin shall be at the highest possible level, k > 1.0. When operating under temporary conditions, (about 100 hours per year, at loads outside the continuous operating range), only the Plant Thoma Number (σPL) shall be higher than the model test so (called “Thoma number zero” and defined in IEC 60193), based on maximum water temperature stated in Clause 32.4.2, "Hydraulic conditions” of this Section 32.	As per international practice, Thoma number zero (so) is used for guarantee purposes, therefore Incipient Thoma Number (σi) should be replaced by Thoma number zero (so) for guarantee in the equation. **σPL = k * σo**	As per specifications. However, bidder may please submit the report of two projects where this practice has been adopted for our review.
126	Sheet No- 22 Clause No. 32.5 & Sub clause 32.5.8.1	**Technical performance and other guarantees,& Cavitation Guarantees Verified on Turbine Model Test :** "For the following operating points the supplier has to specify the Incipient Thoma Number (si) and to guarantee the safety factor k"	Refer our comment no. 6 on tender document Sub clause 1.32.8.1 Cavitation Guarantees. Cavitation guarantees should be given with respect to Thoma number zero (so) and not Incipient Thoma Number (σi). Therefore the clause should be modified as **" For the following operating points the supplier has to specify the Thoma number zero (so) and to guarantee the safety factor k.**"	As per specifications. However, bidder may please submit the report of two projects where this practice has been adopted for our review.
127	Sheet No- 77 Clause No. 32.19 & Sub clause 32.19.3	**Model Acceptance Tests &Model Performance Data :** Pressure pulsations in spiral case and draft tube, between runner and wicket gates, between head cover and runner crown for various unit speed and in all the range of plant sigma, and for guide vane openings from 30 % to full opening, spaced at 10 % interval. Frequency analysis of pressure pulsations shall be included. If any device is adopted to minimise pressure pulsations (i.e. air admission), an additional set of curves shall be given.	As per the general practice and in line with strong recommendations of IEC 60193 Clause no. 4.3.3.1, Pressure pulsations are recorded in spiral case and draft tube for various unit speeds and in all the operating range of plant sigma. As these are sufficient for ensuring smooth operation of prototype. Therefore clause to be modified as "**Pressure pulsations in spiral case and draft tube for various unit speed and in all the range of plant sigma ..... shall be given.**"	IEC 60193 will be studied and communicated at the time of approving the contents.
128	Sheet No- 77 Clause No. 32.20.4 & Sub clause 32.20.4.5	**Tests On Completion,& Verification of Model Test Results by Field Test :** "The details of the methods of measurement, of the conditions and conduct of these tests at site shall be mutually agreed between Engineer and Contractor, ..."	Plan view of Water conductor system of the project is given in Drawing no. 71.2133.00.003 Title "Project Area General Layout". However drawing of elevation view of the water conductor system is not given with the tender document. Therefore drawing of elevation view of the water conductor system (30MW unit) is to be given for checking the suitability of various methods of discharge measurement.	Relevant drawings are attached at Annexure-III.
129	Cl. No.32.18.2.2 Page 77/77	Specified spare parts For the Governor system - 1 complete electronic speed signal detector including speed signal transmitter	We offer speed sensors only and not complete signal detector.	As per specifications only.
130	**General**	Water Analysis Report	Please furnish water analysis report for design of air and oil coolers	Please refer Owner's reply at Sl. No. 8 above
131	**General**	Transport Limitation	Please specify transport limitation in terms of L x W x H & weight for assessment of design suitability of generator parts for transportation..	Please refer Owner's reply at Sl. No. 8 above
132	**Clause 33.1**	Interconnected damper windings	In this clause, Interconnected damper windings are specified . As per our practice damper winding are connected within the pole not between the pole. The same construction may be accepted.	As per specifications only.

133	**Clause 33.4**	Range of voltage and frequency variation	It is specified that ΔV = ± 10%, ΔF = -5% + 3 % while the generator can be designed for both these limits individually but total ΔV + ΔF should also be limited to ± 10% for economic design of generator. It is also worth mentioning that as per IEC-60034-1 , total limit is defined as not more than 8% (Class 'B' operation). (Please refer to clause 7.3, page 65 of IEC-60034-1) Please confirm acceptance.	At the time of detail engineering, IEC 60034 Zone-B may be considered in conjunction with other standards.
134	**Clause 33.4**	SCR	SCR is specified as not less than 1.1. For modern excitation & voltage control system, higher SCR is not necessary. In our opinion, SCR value of not less than 1 is suitable. Please confirm the acceptance.	As per specifications only.
135	**Clause 33.5.3,**	Percentage of operation at minimum output is not specified.	Please specify the requirement of minimum output in terms of percentage of rated output.	As per turbine operation range.
136	**Clause 33.16.2.1**	Dynamic Braking	As the turbine is Francis type , dynamic braking system is not applicable, in view of high water churning torque which retards the machine quickly. Dynamic braking system is required only for large rating pelton turbine based generator units.	As per specifications only.
137	**Clause 33.1, page - 6/96 and 7/96**	Oil coolers for combined thrust and lower guide bearing	External Oil coolers (without external pumps) is mentioned for combined thrust and lower guide bearing. We propose plug-in-type oil coolers for combined thrust and lower guide bearing also. Please confirm the acceptance.	As per specifications only.
138	**Clause 33.1,** **Page-7/96,**		DC standby HP luburication pump is required. As HP lubrication system is used only during start and stop, In our opinion DC standby pump is not necessary. A.C standby pump can be considered. Please confirm the acceptance.	As per specifications only.
139	**Clause 33.6.3.5 & 33.10.1.3**	Dielectric strength	In clause 33.6.3.5 & 33.10.1.3, dielectric strength of ≥ 20 kv/mm (AC test voltage) is specified. This requirement seems to be very high. Please clarify the same.	As per specifications only.
140	**Clause 33.6.3.5 & 33.10.1.3,**	Field strength	In this clause, field strength 4.5 mm/kv is specified. The requirement is not clear. In our opinion, it should be 4.5 kv/mm. Please review the same.	insulation thickness is 4.5 mm/kv.
141	**Clause 33.20.1.2.11**	Tan delta test	As per specification clause 3.20.1.2.11, tan delta test is to be conducted in steps upto 1.4 Ur . It may be noted that as per international standards i.e. VDE-0530/IEC-60894 tan delta test is conducted only upto 1.0Ur. As per BHEL practice tan delta test is conducted upto 1.2 Ur. Hence it is proposed that requirement of tan delta test should be limited in steps upto 1.2 Ur only. Please confirm acceptance. Please note that tan delta test will be done on 100% bars and partial discharge will be done on sample basis.	As per specifications only.

142	**Clause 33.20.1.2.11**	High voltage test	In this clause high voltage test upto 4 Ur is specified. This requirement is on higher side. As per IEC/IS this test voltage should be 2 Ur+1 KV. Please review the same.	Yes. Agreed.
143	**Clause 33.17.1**	RTD's of 4-wire type	In this clause RTD's of 4-wire type is specified. Please note that this is old practice and nowadays RTD's of 6-wire type is used. 3-wire goes to chartless recorder and another 3-wire goes to SCADA. Please confirm the acceptance for RTD's of 6-wire type.	As per your best practice.
144	**Clause 33.17.2(3),**	Schedule of instruments - Flow meter/ Flow switch	**Flow meter/ Flow switch** In our opinion flow meter at outlet of each air cooler is not necessary and flow from air cooler is being measured at common discharge point of air coolers. In place of flow meter, visual flow indicator will be provided at outlet of each air cooler. However, flow meter in common discharge pipe of air coolers and oil coolers will be provided .	As per specifications only.
145	**Clause 33.17.2(5),**	Schedule of instruments - On line Air gap monitoring system	The Air-gap monitoring system is required to be quoted. However, we feel that Air-gap monitoring system is not required for this size of the machine. Therefore, we recommend for deletion of the requirement. In case it is required then please furnish the detailed specification for the same No. of air gap sensors is not specified. As per our standard practice, we provide 8 no. capacitive sensors per generator, 4 no. on drive end side and 4 no. on non-drive end side , spaced 90° from each other.	As per specifications only.
146	**Clause 33.17.2(5),**	Schedule of instruments - On line vibration monitoring system	The Vibration monitoring System is required to be quoted, but detail specification of the same is not available. Hence please provide the same. As per our standard practice, we provide following sensors - - 2 no. proximity sensors per bearing(total 6 no.) - 1 no. velocity probe on each bracket(total 3 no.) - 1 no. synchronization probe for phase reference. Please confirm acceptance of the same.	As per your best practice.
147	**Clause 33.17.2(5),**	Schedule of instruments - Partial discharge monitoring system	The Partial discharge analyzer is required to be quoted, but detail specification of the same is not available. Hence please provide the same. As per our standard practice, we provide one capacitive coupler per phase per parallel path. The above coupler shall be permanently mounted inside generator and high voltage cable will be terminated on PD termination box. A common portable PD analyzer with carrying case will be provided for measurement of partial discharge in any of the machine periodically. Please confirm acceptance of above.	As per your best practice.
148	**Clause 33.20.1.2.1,**	Material Tests	Manufacturer's and Mill's Test Certificates shall be furnished. No test shall be performed in BHEL lab. Please confirm the acceptance.	As per specifications only.

149	**Clause 33.20.3.2,**	Determination of values for Xd, Xq, X'd, X'q, X"d , X"q , Xp and time constants T'do, T'qo, T'q, T'd, T"d & Ta and Instantaneous short-circuit at 100% of rated voltage, short circuit to be applied at HV side of unit transformer	Determination of values for Xd, Xq, X'd, X'q, X"d , X"q , Xp and time constants T'do, T'qo, T'q, T'd, T"d & Ta and Instantaneous short-circuit are specified. For determination of above parameters we need to conduct Sudden short-circuit test. In our opinion this test is an invasive test; hence we do not recommend this test. The same may be deleted. Calculated value of reactance's and time-constants will be furnished. However please note that if insisted upon, this test will be conducted at HV end of generator transformer at 50% rated voltage, using HV line side circuit breaker. Please confirm the acceptance.	As per specifications only.
150	**Clause 33.20.3.2**	Run-away speed test	Being a detrimental test, we do not recommend this test. The same may be deleted.	As per specifications only.
151	**Clause 33.5.3 & 33.20.3.4.2, and Clause 3.5, Vol-7(33) GTP**	Part load efficiencies	in clause 3.5.3, factors for calculation of weighted average efficiency are specified as 110%, 100%, 50% & minimum output. However In clause-3.20.3.4.2 and clause 3.5 of GTP, factors specified are 110%, 100%, 60% and 40% continuous rated output. Please clarify & amend these clauses of GTP & particular technical specification suitably.	Factors for calculation of weighted average efficiency shall be as per PTS clause 3.5.3
152	**Clause 33.4, 33.5.3 & 33.20.3.4.2, and Clause 3.5, Vol-7(33) GTP**	Clarification on maximum output	Since in clause 33.4, maximum output specified is 108%. and in clause 33.5.3 , maximum output specified is 110%. Please clarify the above mentioned contradictory.	Max. O/P of generator = 35MVA
153	**Clause 33.12.3**	Air and oil coolers material	In this Clause coolers are specified to be made of stainless steel material. Tube material of Cupro-Nickel is specified. Composition of the same is not specified. As per present normal practice material of coolers shall be as follows - Tubes : 90/10 Cu-Ni having good excellent heat conductivity and anti corrosive properties. Tube plates : Mild steel Fins : Cu - Ni Above has been used in large no. of generators which are running successfully. Please confirm of acceptance of above material.	Same as 205 MW machine.
154	**General**	Insulation and Temperature rise limits.	The temperature rise at rated load (227.78 MVA) are not specified. (At voltage and frequency variation specified in spec). In our opinion the limits of temp. rise may be taken as specified in IEC-34-1/IS-12802 , which are reproduced as follows (Zone B operation of voltage and frequency range) At rated output(227.78 MVA) - Stator winding : 85°K (ETD) - Rotor winding : 90°K (Resistance) For overload condition the temp. rise limits may be taken as 15°K more than above temp. rise limits. It may please be noted that above limits are (on rated load) for class B temp. rise , while our insulation system is class F , which has 155°C temp. limit . Hence above limits are in safe zone with adequate safety margins.	As per specifications only.

155	**General**	Core building	It may be noted that normally for generators of this size and rating core is built in sections at works and stator segments are shipped to site after partial winding. Wound stator is prepared at site by completing winding at joints. Therefore, we propose core building at our works. Please confirm.	Agreed.
156	**Clause 33.11.2 & 33.11.3**		As per clause 33.11.2, rotor spider to be directly coupled to thrust block flanged of lower generator shaft and flanged of upper shaft. And as per clause 33.11.3, lower generator shaft shall have integrally forged thrust block on upper end and integrally forged coupling flange on lower end is specified. Since generator is of top bracket type, where thrust block is positioned above the rotor spider and shrink fitted with top shaft. Please review the Clause 33.11.2 & 33.11.3 accordingly.	It will be according to design of suspended type M/c.
157	Volume 5, General Technical specifications, Clause no. 2.4.2 and Clause no. 1.0	For shipment of material and equipment and transport limitations indicative information is given in Introduction in clause 1.0 of GTS……..	The Transport limitations in terms of weight and Dimensions are not been specified in General Technical Specifications. Hence, Request you to Kindly provide the trabnsport limitations(dimensions and weight) excluding Trailor.	Please refer Owner's reply at Sl. No. 8 above
158	Volume 7, Technical data sheets	Tenchnical Data sheets	Kindly provide the Technical data sheets in editable form(either in MS - word or MS - excel).	No.
159	Volume 9, Tender Drawings	Tender Drawings	Kindly provide the AutoCAD version of the Drawings.	No.
160	Volume 6 and Volume 5		Kindly provide the silt data, Petrographic and chemical analysis of river water.	Please refer Owner's reply at Sl. No. 8 above
161	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.1.1 & 1.16.5 Page no. 7/110 & 75/110	1 Compressed Air Supply System for draft tube air admission in accordance with Clause 1.16.5 of this Section 1. In the first instance, the model test shall prove if air admission is required and if it can be admitted by means of natural aspiration through a pipe system in the draft tube	Alternatively air admission through shaft is also acceptable. Please confirm.	Agreed.
162	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.4 Page no. 11/110		Please see the below calculation of design & test pressure. Static head =1029-914.3 = 114.7 m Design pressure = 114.7 * 1.3 = 149.11 m = 14.59 Bar Test pressure = 149.11*1.5 = 223.67 m = 21.88 Bar Kindly confirm the design & test pressure.	Scope entitles you for complete design & workout pressure and speed rise and arrive at the design & test pressure.
163	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.4 Page no. 10 & 11/110		With reference to DWG. No.71.2133.08.023 draft tube invert level is 901 m & minimum tail water level is 919.84 m. Please confirm the correct levels.	Minimum TWL is 920.19m
164	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.4.2 Page no. 12/110	Minimum draw down level MDDL m.a.s.l 1015.86	With reference to DWG. No.71.2133.00.003 MDDL is 1014 m. Please confirm the correct levels.	MDDL is 1015.86
165	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.4 Page no. 11/110	Permissible pressure rise related to the pressure under maximum flood level % ≤ 30 (Approx.) Permissible speed rise for turbine load rejection related to the rated speed % ≤ 50 (Approx.)	We understand that permissible pressure rise is 30% of static head. Please confirm. We propose permissible speed rise 55% of rated speed for Ratle HEP. Please confirm the same.	As per specifications.
166	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.4.2.1 Page no. 13/110 Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.5.3 Page no. 22/110	(f) 92.5 MW at 105.79 m Discharge of 102 m3/sec i.e 40% of maximum discharge (g) Min. 77.5 MW at 88.61 m Discharge of 102 m3/sec i.e 40% of maximum discharge The Contractor has to guarantee a minimal turbine discharge of 102 m3/s (equivalent to 40% of maximum discharge, which is supposed to be the minimum safe load for Francis turbine) between a net head of 97.37 m and 105.79 m for a period of approximately 30 days per year.	Please fix up either minimum discharge or minimum output.	Discharge is fixed.

167	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.4.9 Page no. 20/110 Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.18.2.1 Page no. 95/110	The Contractor shall critically study the impact of this type of silt on turbine parts and provide suitable special coating. HVOF Tungsten carbide protective coating on parts prone to abrasion i.e. runner, guide vanes, labyrinth and facing plates is to be provided. For the turbines: · 2 runners complete with moving labyrinth seals, runner cone and fixing bolts · ½ set of guide vanes with stems completely machined with levers and links.	We understand that HVOF coating will be required on spares (componets which is given here and if ask in spares) also.	Yes, spares will also be HVOFcoated.
168	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.5.4 Page no. 22/110		Kindly fixed the minimum output as percentage of rated output.	Maximum, Rated and Minimum fixed. (% not required)
169	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.9.4 Page no. 52/110	Pressure test of the pressure oil system of governor, including servomotor. The system shall be tested for one hour at double the normal operating pressure.	Oil pressure unit will be tested at 1.5 times the maximum working pressure. Please confirm.	Same as normal operating pressure is 75% of maximum pressure.
170	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.10.3 & 1.11.1 Page no. 57/110 & 61/110 Volume 7, Section 01, TURBINES AND GOVERNORS TDS	Cooling water connections for labyrinth seals needs to be included in the bottom ring. Cooling water connections for labyrinth seals needs to be included in the head cover.	Please confirm the requirement of synchronous condenser mode and if it is not applicable to this project then cooling water for labyrinth seals is not required. Please confirm the requirement of cooling water for labyrinths.	Synchronous condenser operation is not applicable.
171	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.10.4 Page no. 58/110	The draft tube shall be of the elbow type constructed in concrete with steel lining extending to a section where the average velocity at maximum discharge has reduced to less than 3.5 m per second.	We propose steel lining extending to a section where velocity at maximum discharge is 4.5 m/sec Please confirm. In any case, the draft tube liner shall include the draft tube elbow.	As per specifications only.
172	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.13.1 Page no. 66/110	The torque transmission from the runner to the turbine shaft shall be by friction.	Alternatively stud & pin type coupling should also be acceptable. Kindly review and confirm. Friction coupling is applicable in case of high speed machine mainly on pelton turbines.	As per specifications only.
173	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.13.2 Page no. 67/110	The run out of the shaft including runner shall be checked initially in the Contractor's workshop.	We propose the runout of the shaft including runner will be carried out at site and not in shop. Kindly review and confirm. We use the templates for making coupling holes in order to achieve alignment at site.	The run out of the shaft including runner shall be checked at the site.
174	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.13.3.1 Page no. 69/110	For 30 minutes at rated speed and for 15 minutes at steady state runaway speed without cooling water supply, if an oil heat exchanger is provided	We propose 2 minutes at steady state runaway speed without cooling water supply. Kindly review and confirm. In line with generator requirement.	As per specifications only.
175	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.16.7.6.3 Page no. 85/110	For the pressure oil supply, 2 screw pumps (2 x 100%; permitted max. speed 1'500 rpm) shall be installed in the sump tanks	Alternatively accept the gear/axial piston pump. Please confirm.	As per specifications only.
176	Volume-7_TDS, Section 01, TURBINES AND GOVERNORS Page no. 4 & 5/22		We propose only Weighted average efficiency is to be guaranteed according to particular clause given in PTS. Point by point efficiency for different head is for information only.	Agreed.
177	Volume 6, Section 02, BUTTERFLY VALVES (MIVs), Clause no. 1.16.7.6.3 Page no. 85/110	Design pressure 11bar Hydrostatic test pressure 16.5bar	Design pressure for MIV will remain same as turbine shown in Sl. No. 2 above.	Please refer our reply at sl. No. 2 above.
178	Volume 6, Section 02, BUTTERFLY VALVES (MIVs), Clause no. 2.6.1 & 2.9.11 Page no. 10/30 & 21/30	The upstream sections connect the pressure shaft steel lining with the main inlet valve BFV. The section would comprise of the taper piece, make up piece, dismantling joint, expansion joint and further liner towards the upstream side. The BFV meant for 205MW unit shall be provided with an upstream taper piece of min. ø 6200 mm – dia. of BFV inside diameter of adequate length.	We understand that upstream connection to MIV comprises taper piece from diameter 6.6 m to 6.1 m, & make up piece of adequate length. Please confirm.	Mateching taper piece shall be provided by the bidders.
179	Volume 6, Section 02, BUTTERFLY VALVES (MIVs), Clause no. 2.9.5 Page no. 15/30	The service seal shall be of rubber type. The maintenance seal shall be movable, fixed seal rings and fixations elements shall be made of stainless steel and erosion resistant material. Bolts shall be pre-stressed and firmly locked by gluing. The movable seal rings shall be designed of sliding form. The maintenance seal shall be operated by decanted and filtered water from the upstream connecting pipe.	Seal design & construction should be left to manufacturer's best practice and proven method. Please confirm.	As per specifications only.

180	Volume 6, Section 02, BUTTERFLY VALVES (MIVs), Clause no. 2.9.6.2 Page no. 17/30	The oil hydraulic pumping set consisting of two electric driven oil pumps, one of them acting alternatively as standby unit, together with all control valves, oil strainers and a hand operated piston oil pump for emergency operation shall be mounted on top of an oil reservoir dimensioned for not less than 150% of the total oil volume in the servo motors and piping	Given criteria for the oil pump capacity is on higher side. Kindly review and confirm the requirement.	As per specifications only.
181	Volume 6, Section 02, BUTTERFLY VALVES (MIVs), Clause no. 2.13 Page no. 26/30	At least the following parts of the BFV shall be assembled at the contractor workshop and be presented to the engineer for the purpose of inspection and testing: • Complete assembly of BFV with operating mechanism • Complete assembly of bypass system • Complete assembly of air relief valve • Complete assembly of control cabinet Pressure and tightness test of the entire bypass system with the same pressure and times as indicated above. Pressure test of the control piping with double the normal working pressure as far as practicable. The welding seams of the connection pipe, the upstream inlet pipes with its tapping and the downstream pipe as well as the connecting pipe shall be 100 % UT tested (in case of doubt tested by X-ray). This test will be carried out by the BFV Contractor.	We propose only MIV (Body + disc) shall be assembled and pressure tested. Functional test of complete valve will be done without servmotor. Kindly review and confirm.	As per specifications only.
182	Volume 6, Section 02, BUTTERFLY VALVES (MIVs), Clause no. 2.15.1 Page no. 28/30	In case of disassembly of the BFV due to transport purpose, the pressure and leakage tests need to be repeated at site.	We propose pressure test will be carried out at shop only, not at site. Kindly review and confirm.	As per specifications only.
183	Volume-9_Drawings		Kindly furnish the 1. L section of water conductor system frm intake to tail race. 2. Cross section & layout of downstream surge chamber 3. Cross section showing PH cavern, Transformer cavern & downstream surge chamber.	Relevant drawings are attached at Annexure-II, Annexure-IV & Annexure-V.
184	Volume-9_Drawings		Kindly provide the PH cross section & layout drawing in AutoCAD format.	No. Only in PDF format.
185	Vol 4_ PCC Clause 9.4, Page no.37/63	The Contractor shall pay to the Owner for each turbine not achieving the guaranteed efficiency a penalty of Rs. 17.80 million per m/c for each 0.1 % by which the measured weighted average efficiency is below the guaranteed value	Likewise penalty please confirm the evaluation loading on turbine efficiency at tendering stage.	Evaluation loading shall be same. The penality amount mentioned on W.A.E. is applicable for 205 MW unit. For 30 MW unit the penality amount shall be Rs.6.8 Millions if efficency is less by 0.1%.
186	Volume 6, Section 01, TURBINES AND GOVERNORS Clause no. 1.9.2.3, Page no. 45/110	On each test plate shall be performed (for important parts i.e. runner – if not cast steel, spiral casing and head cover: (C, D)): Radiographic check of the welds. 2 bend tests (one transverse face and one transverse root test). 2 tensile tests with parallel bars. 3 Charpy V – notch tests in the heat transition zone at -20ºC. 3 Charpy V-notch tests in the cover layer at -20ºC. Required minimum test values:	We propose charpy impact value 27 joules at -20ºC. Please review & confirm.	Agreed.
187	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.16.5 Page no.74/77	In the first instance, the model test shall prove if air admission is required and if it can be admitted by means of natural aspiration through a pipe system in the draft tube	Alternatively air admission through shaft is also acceptable. Please confirm.	Agreed.
188	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.4 Page no.9/77 Clause no. 32.4.2.1 Page no.12/77 Clause no. 32.4.4 Page no.14/77 Clause no. 33.4 Page no.10/96 Clause no. 33.4.3 Page no.13/96	Turbine output at max. net head 103.73 m and rated discharge of 33.45 m3/s - 32.04 MW 33.03 MW at 103.73 m (ηturbine = 0.942) - 33.45 m3/sec [rated discharge] Generator Characteristics Max. continuous power output MVA 36.7 Max. continuous power output-36 MVA Maximum turbine output at net head 103.73 m and maximum discharge-33 MW	Kindly review and confirm the maximum turbine output and generator output.	It is typing mistake. The Max. turbine output is 32.04MW and corresponding generator O/P is 31.45 MW or 35MVA.

189	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.4 Page no.10/77		Please see the below calculation of design & test pressure. Static head =1029-917 = 112 m Design pressure = 112 * 1.3 = 145.6 m = 14.56 Bar Test pressure = 145.6*1.5 = 218.4 m = 21.84 Bar Kindly confirm the design & test pressure.	As per bidder's design & calculation.
190	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.4.9 Page no. 18/77 Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.18.2.1 Page no. 76/77	The Contractor shall critically study the impact of this type of silt on turbine parts and provide suitable special coating. HVOF Tungsten carbide protective coating on parts prone to abrasion i.e. runner, guide vanes, labyrinth and facing plates is to be provided. For the turbines: · 1 runner complete with moving labyrinth seals, runner cone and fixing bolts · ¼ set of guide vanes with stems completely machined with levers and links.	We understand that HVOF coating will be required on spares (componets which is given here and if ask in spares) also.	Agreed.
191	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.4.2.1 Page no.12/77 Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.5.3 Page no.20/77	(d) 12.70 MW at 90.15 m (ηturbine = 0.86) - 16.72 m3/sec [50% discharge of (a)] (e) 14.62 MW at 103.73 m (ηturbine = 0.86) - 16.72 m3/sec [50% discharge of (a)] The Contractor has to guarantee a minimal turbine discharge of 16.72 m3/s (equivalent to 50% of rated load, which is supposed to be the minimum safe load for Francis turbine) between a net head of 90.15 m and 103.73 m for a period of approximately 10 days per year.	Please fix up either minimum discharge or minimum output.	Discharge is fixed.
192	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.5.4 Page no.20/77		Kindly fixed the minimum output as percentage of rated output.	Not clear. Please clarify.
193	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.5.4 Page no.20/77	At the option of the Owner, full scale field efficiency tests shall be performed on this unit. The Contractor shall indicate the method to be used for such tests in his Bid and shall specify corresponding costs in the Price Schedules.	Kindly review and confirm that field efficiency test for 30 MW turbine is also required with the absolute efficiency test method as per IEC 60041. We propose relative efficiency test for the small machine as per IEC 60041.	As per specifications only.
194	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.9.4 Page no. 52/77	Pressure test of the pressure oil system of governor, including servomotor. The system shall be tested for one hour at double the normal operating pressure.	Oil pressure unit will be tested at 1.5 times the maximum working pressure. Please confirm.	As per specifications only.
195	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.10.4 Page no. 56/77	The draft tube shall be of the elbow type constructed in concrete with steel lining extending to a section where the average velocity at maximum discharge has reduced to less than 3.5 m per second.	We propose steel lining extending to a section where velocity at maximum discharge is 4.5 m/sec Please confirm. In any case, the draft tube liner shall include the draft tube elbow.	As per specifications only.
196	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.13.1 Page no. 64/77	The torque transmission from the runner to the turbine shaft shall be by friction.	Alternatively stud & pin type coupling should also be acceptable. Kindly review and confirm. (Friction coupling is applicable in case of high speed machine mainly on pelton turbines.)	As per specifications only.
197	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.13.2 Page no. 66/77	The run out of the shaft including runner shall be checked initially in the Contractor's workshop.	We propose the runout of the shaft including runner will be carried out at site and not in shop. Kindly review and confirm. (We use the templates for making coupling holes in order to achieve alignment at site.)	As per specifications only.
198	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.13.3.1 Page no. 67/77	The guide bearing shall be preferably of the oil lubricating self-pumping white metal lined pad type with individual adjustment of the position of each pad and adjustment of alignment.	Kindly confirm alternatively shell type bearing is also acceptable. (For small size of machine shell type bearing is more suitable compare to pad bearing.)	As per specifications only.
199	Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.13.3.2 Page no. 68/77	For 30 minutes at rated speed and for 15 minutes at steady state runaway speed without cooling water supply, if an oil heat exchanger is provided	We propose 2 minutes at steady state runaway speed without cooling water supply. (In line with generator requirement.)	As per specifications only.
200	Volume 6, Section 01, TURBINES AND GOVERNORS, Clause no. 1.19.1 Page no. 96/100 Volume 6, Section 32, (Turbine & Governor (30MW Unit)), Clause no. 32.19 Page no. 77/77	In case the Contractor has at his disposal a turbine model that he considers suitable for the designs of the turbine subject to these Specifications and this model has been already tested, the Bidder shall include in his Bidder, for information, the model test report relevant to the existing model. MODEL ACCEPTANCE TESTS Same as specified in Section 1.	Kindly confim the requirement of model test. We propose model transposition report instead of model test for 30MW machine.	Same as 205 MW machine.

201	Volume 6, Section 02, BUTTERFLY VALVES (MIVs), Clause no. 1.16.7.6.3 Page no. 85/110	Design pressure 11bar Hydrostatic test pressure 16.5bar	Design pressure for MIV will remain same as turbine shown in Sl. No. 2 above.	Same as 205 MW machine.
202	Volume 6, Section 02, BUTTERFLY VALVES (MIVs), Clause no. 2.1.2 Page no. 4/30	2.1.2 Description The scope of supply includes · Five (5) BFVs with by-pass pressure balancing, installed before the inlet of spiral case of each unit. Each BFV shall be actuated by two oil servomotors for opening and counterweights for closing, · Five (5) oil pressure system and control equipment for individual valves.	We propose common Oil pressure system for the turbine and MIV for 30 MW machine. Pl confirm.	Same as 205 MW machine.
203	Volume-9_Drawings		Kindly furnish the 1. L section of water conductor system from intake to tail race.	Relevant drawings are attached at Annexure-II.
204	Volume 4, Package 2, Clause 9.4, Page no. 37/63	Evaluation loading	Please provide evaluation loading critera for guaranteed WAE, if any.	As discussed during the pre-bid meeting, it shall be same as LD values.
205	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.4, Page no. 11/97	Voltage Variation: +/- 10% & Frequency Variation : -5% to 3%	We understand combined voltage and frequency variation is +/-10%. Please confirm.	At the time of detail engineering, IEC 60034 Zone-B may be considered in conjunction with other standards.
206	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.4, Page no. 11/97 Volume 6, Section 3 Generator and Auxiliaries, Clause 3.6.3.5, Page no. 22/97	Permissible temperature rise referred to rated power in consideration of IEC 34-1 : Class B The maximum permissible temperature rise of the gneerator when operated at continuous output rating, with voltage and rated frequency taking into account the voltage variation and (at the same time) the frequency variation stipulated in cl 3.4 as well as all power factors from rated to 1.0 overexcited and 1.0 to 0.9 under excited shall be in accordance with IEC 60034-1, Section 5 at temeprature rise Class B	We understand that with above ambient temperature of 43 deg C and cooling water inlet temperature of 15 deg C, temperature rise allowed at rated output 227.78 MVA Stator : 85 deg C Rotor : 90 deg C Temperature rise at maximum output 268.4 MVA Stator : 95 deg C Rotor : 100 deg C Please review and confirm.	Temperature limits should be for max continuous power.
207	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.4, Page no. 11/97	Short Circuit ratio not less than 1.1	The requirement of short circuit ratio is on higher side considering modern excitation system with faster response time. We suggest to reduce SCR requirement to 1.0. Please review.	As per specifications only.
208	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.4.1, Page no. 12/97 Volume 6, Section 3 Generator and Auxiliaries, Clause 3.11.3, Page no. 40/97	The shaft and thrust block shall be in single piece. The lower generator shaft shall have integrally forged thrust block on upper end and integrally forged coupling flange on lower end.	It should be left to bidder's design requirement. Please review and confirm	As per specifications only.
209	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.4, Page no. 11/97 Volume 6, Section 3 Generator and Auxiliaries, Clause 3.5.2, Page no. 16/97 Volume 6, Section 3 Generator and Auxiliaries, Clause 3.6.3.1, Page no. 21/97	Rated Power : 227.78 MVA Maximum Power : 250.55 MVA Each generator shall have a rated output of 227.78 MVA and max. continuous power output of 268.4 MVA. All mechanical parts of the generators shall be determined for a rated power factor cosphi = 1, i.e. for 268.4 MW, even if the turbine is not able to produce this active power	As there is discrepancy in all clauses, we understand that generator is to be designed at rated power of 227.78 MVA & maximum power of 268.4 MVA (i.e overload of 17.8%) , pls confirm.	Agreed.

210	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.5.2, Page no. 16/97 Volume 6, Section 3 Generator and Auxiliaries, Clause 3.20.3.4.2, Page no. 96/97 Volume 7. TDS, Section 3 , GENERATOR, Clause 3.5 , Page no. 4/17	**Weighted Average Efficiency Formula :** Measurement of generator load losses for load points of 40 %, 60 %, 100 % and 110 % of continuous output rating, in order to verify compliance with weighted average efficiency. Efficiency at continuous output rating ,at rated voltage, ratd frequency at loads 40%,60%,100% & 110%	As there is discrepancy in part load efficiency , pls clarify the same for calculation of WAE formula. Weighted average efficiency will be only guaranteed. Efficiency at different loads (i.e 110%,100%,60% & 40%) given in WAE formula will be provided as an informative data.Please confirm.	3.20.3.4.2 should be according to 3.5.3
211	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.6.3.3, Page no. 22/97 Volume 6, Section 1 Turbine and Governors, Clause 1.6.3.3, Page no. 31/110	According to these assumptions the first critical bending speed of the rotor shall be at least 25% higher than the specified runaway speed of the generator According to these assumptions the first critical bending speed of the rotor has to be at least 20 % higher than the specified runaway speed of the generator	As there is discrepancy in both the clause , please confirm critical speed requirement.	125% of run away speed.
212	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.6.3.5, Page no. 22/97	Electrical Design Criteria: The dielectric strength of the stator winding main insulation shall be better than 20kV/mm of insulation thickness.	Dielectric strength requirement of 20 kV / mm is on higher side. The choice of dielectric strength should be left to bidder's based on winding design technology criteria. Please confirm.	No, as per specifications.
213	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.8.2.7, Page no. 33/97	The magnetic core of the stator shall be made of silicon-alloyed dynamo steel sheet according to the Contractor's experience.	Please note that Dynamo steel sheets (CRGO) is used for transformer application, for generators cold rolled non grain oriented steel sheets(CRNGO) of 0.5 mm thick shall be used.	No, as per specifications.
214	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.10.1.4, Page no. 37/97	The top cover shall have access openings to facilitate removal of air coolers during operation of the unit and shall be provided with overpressure relief device(s) which will automatically open in case of water discharge and shall be provided with anti-slip surface matching the machine-hall floor.	We do not recommend to replace air-water coolers during generator in operating condition.Please review.	Yes, Radiator will be removed during shut-down period.
215	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.11.4.1, Page no. 41/97	The poles shall be built of thin steel laminations bolted under high pressure together with sturdy end pieces. Dovetails shall be provided to fit and match with corresponding slots of the rotor rim.	It should be left to bidder's design practice. Please review and confirm	As per specifications only.
216	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.12.2, Page no. 43/97	The combined thrust and guide bearing shall be designed to operate under the following conditions: • Continuous operation between 40% and 110% of rated speed. During continuous operation, the maximal temperature in the bearing pads shall not exceed 70° C.	Based on our expercience on babbitt material ,we recommend maximum operating temperature of thrust bearing pad as mentioned below : Maximum permissible operting temperature: : 80 degC & accordingly alarm & trip temperature will change. Please review	Agreed.
217	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.12.2, Page no. 43/97	The combined thrust and guide bearing shall be designed to operate under the following conditions: • For 30 minutes at rated speed and for 15 minutes at steady state runaway speed without cooling water supply.	We recommend operation of bearing for 2 minutes at runaway speed without cooling water. Please review and confirm.	As per specifications only.
218	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.12.2, Page no. 43/97	The bearings shall be designed to permit frequent shutdown without brakes.	Please clarify the requirement.	This is requirement. No clarification required

219	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.12.2, Page no. 44/97	The thrust bearing shall have a removable runner ring and shall be arranged such as to permit adjustment, dismantling, and assembly without disturbing the rotor, other than jacking the load from the bearing. The vertical side of the thrust bearing runner ring shall not be used as the journal surface for the guide bearing.	It should be left to bidder's design practice. Please review and confirm	As per specifications only.
220	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.13, Page no. 46/97	Air Coolers : Tubes of Copper	We recommend cooler tubes of Cupro-Nickel material having composition of 90::10. pelase confirm	Air Coolers tubes of 90/10 Cu-Ni may be used.
221	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.16.2.1, Page no. 64/97	Electrical Dynamic Braking System	For such type of rating & speed of machine electrical dynamic braking is not required. Mechanical brakes are good enough to suffice the purpose. Kindly review the requirement.	As per specifications only.
222	General	Coolers	Please provide water Analysis report	Please refer Owner's reply at Sl. No. 8 above
223	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.14.1.3, Page no. 49/97	Excitation system ceiling voltage not less than 200 % of rated load excitation voltage Excitation system ceiling current not less than 200 % of rated load excitation current	Please furnish ceiling duration.	Sealing current (200%) of rated current for 1 min.
224	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.14.1.3, Page no. 49/97	The excitation Manufacturer shall co-operate with the generator Manufacturers to determine the rated excitation current and voltage. At least 10 % higher voltage and 20 % higher excitation current over the rated values shall be provided, as required for the generator operation under rated conditions.	As voltage and current are linked with each other & resistance is a constant value, please confirm for which value we need to design excitation system i.e 10% higher voltage or 20% higher current over the rated load.	Excitation system shall be designed for 20% higher current over the rated load.
225	Volume 4, Package 2, Clause 9.4, Page no. 37/63	Evaluation loading	Please provide evaluation loading critera for guaranteed WAE, if any.	Please refer our reply above
226	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.4, Page no. 10/96	Rated Power : 33.33 MVA Rated Voltage : 13.8 kV+/-10%	For such type of rating of machine we recommend generator voltage of 11kV +/-10% . Please review and confirm.	As per specifications only.
227	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.4, Page no. 10/96	Voltage Variation: +/- 10% & Frequency Variation : -5% to 3%	We understand combined voltage and frequency variation is +/-10%. Please confirm.	As per specifications only.
228	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.4, Page no. 10/96 Volume 6, Section 33 Generator and Auxiliaries, Clause 33.6.3.5, Page no. 21/96	Permissible temperature rise referred to rated power in consideration of IEC 34-1 : Class B The maximum permissible temperature rise of the gneerator when operated at continuous output rating, with voltage and rated frequency taking into account the voltage variation and (at the same time) the frequency variation stipulated in cl 33.4 as well as all power factors from rated to 1.0 overexcited and 1.0 to 0.9 under excited shall be in accordance with IEC 60034-1, Section 5 at temeprature rise Class B	We understand that with above ambient temperature of 43 deg C and cooling water inlet temperature of 15 deg C, temperature rise allowed at rated output 33.33 MVA Stator : 85 deg C Rotor : 90 deg C Temperature rise at maximum output 36 MVA Stator : 95 deg C Rotor : 100 deg C	As per specifications only.
229	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.4, Page no. 10/96	Short Circuit ratio not less than 1.1	The requirement of short circuit ratio is on higher side considering modern excitation system with faster response time. We suggest to reduce SCR requirement to 1.0. Please review.	As per specifications only.
230	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.4.1, Page no. 11/96 Volume 6, Section 33 Generator and Auxiliaries, Clause 33.11.3, Page no. 39/96	The shaft and thrust block shall be in single piece. The lower generator shaft shall have integrally forged thrust block on upper end and integrally forged coupling flange on lower end.	It should be left to bidder's design requirement. Please review and confirm This unit is suspended type arrangement , hence thrust block will be on upper shaft.	OK. Confirmed.

231	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.5.2, Page no. 16/96 Volume 6, Section 33 Generator and Auxiliaries, Clause 33.20.3.4.2, Page no. 95/96 Volume 7. TDS, Section 3 , GENERATOR, Clause 33.5 , Page no. 4/17	Weighted Average Efficiency Formula : Measurement of generator load losses for load points of 40 %, 60 %, 100 % and 110 % of continuous output rating, in order to verify compliance with weighted average efficiency. Efficiency at continuous output rating ,at rated voltage, ratd frequency at loads 40%,60%,100% & 110%	As there is discrepancy in part load efficiency , pls clarify the same for calculation of WAE formula. Weighted average efficiency will be only guaranteed. Only Efficiency at different loads (i.e 110%,100%,60% & 40%) given in WAE formula will be provided as informative data.Please confirm.	As per PTS clause 33.5.2 only.
232	Volume 6, Section 3 Generator and Auxiliaries, Clause 33.6.3.3, Page no. 21/96 Volume 6, Section 1 Turbine and Governors, Clause 32.6.3.3, Page no. 28/77	According to these assumptions the first critical bending speed of the rotor shall be at least 25% higher than the specified runaway speed of the generator According to these assumptions the first critical bending speed of the rotor has to be at least 20 % higher than the specified runaway speed of the generator	As there is discrepancy in both the clause , please confirm critical speed requirement.	25% higher than specified runaway speed.
233	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.6.3.5, Page no. 22/96	Electrical Design Criteria: The dielectric strength of the stator winding main insulation shall be better than 20kV/mm of insulation thickness.	Dielectric strength requirement of 20 kV / mm is on higher side. The choice of dielectric strength should be left to bidder's based on winding design technology criteria. Please confirm.	As per specifications only.
234	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.8.2.7, Page no. 32/96	The magnetic core of the stator shall be made of silicon-alloyed dynamo steel sheet according to the Contractor's experience.	Please note that Dynamo steel sheets (CRGO) is used for transformer application, for generators cold rolled non grain oriented steel sheets(CRNGO) of 0.5 mm thick shall be used.	As per specifications only.
235	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.10.1.4, Page no. 37/96	The top cover shall have access openings to facilitate removal of air coolers during operation of the unit and shall be provided with overpressure relief device(s) which will automatically open in case of water discharge and shall be provided with anti-slip surface matching the machine-hall floor.	We do not recommend to replace air-water coolers during generator in operating condition.Please review.	OK. Agreed.
236	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.11.4.1, Page no. 40/96	The poles shall be built of thin steel laminations bolted under high pressure together with sturdy end pieces. Dovetails shall be provided to fit and match with corresponding slots of the rotor rim.	It should be left to bidder's design practice. Please review and confirm	As per specifications only.
237	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.12.2, Page no. 42/97	The combined thrust and guide bearing shall be designed to operate under the following conditions: • Continuous operation between 40% and 110% of rated speed. During continuous operation, the maximal temperature in the bearing pads shall not exceed 70° C.	Based on our expercience on babbitt material ,we recommend maximum operating temperature of thrust bearing pad as mentioned below : Maximum permissible operting temperature: : 80 degC & accordingly alarm & trip temperature will change. Please review	As per specifications only.
238	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.12.2, Page no. 42/97	The combined thrust and guide bearing shall be designed to operate under the following conditions: • For 30 minutes at rated speed and for 15 minutes at steady state runaway speed without cooling water supply.	We recommend operation of bearing for 2 minutes at runaway speed without cooling water. Please review and confirm.	As per specifications only.
239	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.12.2, Page no. 42/97	The bearings shall be designed to permit frequent shutdown without brakes.	Please clarify the requirement.	This is requirement. No clarification required.

240	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.12.2, Page no. 43/96	The thrust bearing shall have a removable runner ring and shall be arranged such as to permit adjustment, dismantling, and assembly without disturbing the rotor, other than jacking the load from the bearing. The vertical side of the thrust bearing runner ring shall not be used as the journal surface for the guide bearing.	It should be left to bidder's design practice. Please review and confirm	As per specifications only.
241	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.13, Page no. 45/96	Air Coolers : Tubes of Copper	We recommend cooler tubes of Cupro-Nickel material having composition of 90::10. pelase confirm	Air Coolers tubes of 90/10 Cu-Ni may be used.
242	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.16.2.1, Page no. 63/96	Electrical Dynamic Braking System	For such type of rating & speed of machine electrical dynamic braking is not required. Mechanical brakes are good enough to suffice the purpose. Kindly review the requirement.	As per specifications only.
243	General	Coolers	Please provide water Analysis report	Please refer Owner's reply at Sl. No. 8 above
244	Volume 6, Section 33 Generator and Auxiliaries, Clause 33.14.1.3, Page no. 48/96	Excitation system ceiling voltage not less than 200 % of rated load excitation voltage Excitation system ceiling current not less than 200 % of rated load excitation current	Please furnish ceiling duration.	Sealing current (200%) of rated current for 1min.
245	Volume 6, Section 3 Generator and Auxiliaries, Clause 3.14.1.3, Page no. 49/97	The excitation Manufacturer shall co-operate with the generator Manufacturers to determine the rated excitation current and voltage. At least 10 % higher voltage and 20 % higher excitation current over the rated values shall be provided, as required for the generator operation under rated conditions.	As voltage and current are linked with each other & resistance is a constant value, please confirm for which value we need to design excitation system i.e 10% higher voltage or 20% higher current.	Excitation system shall be designed for 20% higher current over the rated load.
246	Volume 6, Section 04, GSU Transformer, Clause no. 4.4.1 and Clause no. 4.4.2, Page no. 9/32 and Page no. 11/32	**Rating and Functional characteristics:** Maximum temperature rise with a reference maximum ambient temperature of 40°C -Top oil (Measured by thermometer) - 40°C - Winding (Measured by resistance method) - 50°C	We propose for temperature rise of top oil and windings as per IS 2026 / IEC 60076. Kindly confirm.	As per specifications only.
247	Volume 6, Section 04, GSU Transformer, Clause no. 4.2.2, Page no. 5/32 and	One (1) set of piping required for oil water separator and soak pit	We understand that the civil work related to contruction of oil water separator and soak pit shall be in the scope of Civil contractor. Kindly confirm.	Yes
248	Volume 6, Section 04, GSU Transformer, Clause no. 4.5.2, Page no. 13/32 and Volume 4, Particular conditions of contract, Clause no. 9.4	following penalties will be applied for each transformer that does not achieve the guarantees. no-load losses Rs. 1.74 Lac per kW load losses Rs. 87,000 per kW auxiliary losses Rs. 87,000 per kW However the maximum penalty shall not exceed 10 % of the Contract Price	Kindly clarify whether there is any capitalization of losses for the purpose of evaluation of Bids or not.	Yes
249	Volume 6, Section 04, GSU Transformer, Clause no.4.13.1, Page no. 31/32	The contractor is required to carry out all type tests, including temperature-rise test on one unit and routine tests on all units and submit the reports to the owner……. The dielectric test shall be done on complete transformer including HV bushing..... Short circuit test (IEC-76) shall be carried out as a type test……..	We propose for the acceptance of type test and short circuit test reports of similar rating Transformer instead of conducting the same. Kindly confirm.	As per specifications only.
250	Volume 6, Section 05, 400 kV Gas insulated switchgear, Clause no. 5.2.4, Page no. 6/39 and Tender Drawing no. 71.2133.08.901	**420 kV Transmission Line Feeder Bay Modules :** Two (2) nos. : 3-phase, single-pole, group-operated isolator switches, complete with manual and motor driven operating mechanisms	There is some discrepancy in the quantity of Disconnectors for transmission line feeder bay as the same has been specified as 2 nos. in the Technical specifications while as per Tender Drawing no. 71.2133.08.901 the quantity of disconnectors are 3 nos.	Please considere the tender drawing.
251	Volume 6, Section 05, 400 kV Gas insulated switchgear, Clause no. 5.2.4, Page no. 6/39	**420 kV Transmission Line Feeder Bay Modules :** One (1) no. : 3-phase, single pole, high-speed fault make grounding switch, complete with group operated manual and motor driven operating mechanisms	Kindly confirm the quantity of High speed earthing switches.	1 No. each for 3 No.line circuits.but this 1 No. earth switch shall be integrated type disconnecting line & simultaneously earthing line & GIS.
252	Volume 6, Section 05, 400 kV Gas insulated switchgear, Clause no. 5.2.5, Page no.7/39 and Tender Drawing no. 71.2133.08.901	**420 kV Bus Reactor Circuit Breaker Bay Module:** Two (2) sets : Two sets of CTs comprising three number cores in each set for protection and metering. (Single-phase current transformers)	Kindly confirm the no. of cores of Current Transformer of Bus reactor bay as there is discrepancy between Tender Drawing no. 71.2133.08.901(four cores) and Technical specifications Clause no. 5.2.5 (three cores).	Four cores. SLD to be referred.
253	Volume 6, Section 05, 400 kV Gas insulated switchgear, Clause no. 5.5.2, Page no. 13/39	**System Requirements** Rated normal current at 50 Hz, - 4000 A rms (for all bays as well as double bus bars).	Kindly check the rated current requirement for all bays and confirm.	All same rating.
254	Volume 6, Section 05, 400 kV Gas insulated switchgear, Clause no.5.5.3.12 , Page no. 16/39	Closing Time : Less than or equal to 50 ms Opening Time : Less than or equal to 30 ms	The closing and opening time specified in the technical specifications seems to be on lower side. Hence, We propose for the closing and opening time of Circuit Breaker as < 100 ms and < 50 ms respectively.	As per specifications only.

255	Volume 6, Section 05, 400 kV Gas insulated switchgear, Clause no.5.5.6.7, Page no. 19/39 and Tender Drawing no. 71.2133.08.901	The voltage transformers shall conform to IEC-60044-2 and shall have the following ratings, in addition to those mentioned in Clause 5.5.2.: Type Inductive type, single phase, two core	Kindly confirm the no. of cores of Potential Transformers as there is some discrepancy between the Clause no. 5.5.6.7 of technical specifications (specified 2nos.) and Tender Drawing no. 71.2133.08.901 (shown 3 nos.)	As per SLD
256	Volume 6, Section 06, 400 kV Pothead yard Equipments, Clause no. 6.2.1, Page no. 3/13 and 4/13	**Equipments:** Fifteen (15) nos. - 420 kV single phase capacitance voltage transformers with three secondary windings, complete with supporting structures. Nine (9) are for Ratle HEP end, two (2) are for Dulhasti HEP end and four (4) for Kishenpur end. · Twelve (12) nos. – 0.5 mH Wave traps complete with supporting structure. Six (6) are for Ratle HEP end, two (2) are for Dulhasti HEP end and four (4) for Kishenpur end. · Twelve (12) nos. – Line matching units complete for each line. Six (6) are for Ratle HEP end, two (2) are for Dulhasti HEP end and four (4) for Kishenpur end.	Kindly confirm that only supply of CVTs, Wave Traps and LMUs for kishenpur and Dulhasti shall be in the scope of Bidder while erection and commissioning shall be in the scope of Customer.	This shall be decided at a later stage. However the bidder should consider erection and commissioning also in its scope by co-ordinating with PGCIL.
257	Volume 6, Section 07, 11kV Switchgear system, Clause no. 7.2, Page no.3/15 and Tender Drawing no. 71.2133.08.902.	**SCOPE OF SUPPLY:** Four (4) outgoing panel for future use equipped with VCB.	Kindly confirm the no. of spare outgoing feeders as the same has been specified as 4 nos. in Clause no. 7.2 of technical specifications while as per Tender Drawing no. 71.2133.08.902. the no. of spare outgoing feeders are 2 nos and 2 nos for Colony.	4 spare feeders are required, including 2 No. feeders for colony.
258	Volume 6, Section 07, 11kV Switchgear system, Clause no. 7.3.2.1 (6), Page no. 5/15	**Parameters and Ratings** **11kV Panel** Bus-Bar rated short time withstand current (rms) for 1 Sec : 50 kA	Kindly check and confirm the rated short time withstand current of Busbar.	As per specifications only.
259	Volume 6, Section 08, Isolated Phase Bus Duct, Clause no. 8.5.1, Page no. 7/15	**PERFORMANCE CRITERIA AND GUARANTEE** **8.5.1 Rating** Rated short circuit current (kA) - 40 kA for 1 sec.	We understand that the short circuit current capacity specified as 40 kA for 1 sec shall be for main Bus duct of Both 205 MW units and 30 MW unit Kindly check and confirm.	Yes
260	Volume 6, Section 08, Isolated Phase Bus Duct, Clause no. 8.5.1, Page no. 7/15	PERFORMANCE CRITERIA AND GUARANTEE 8.5.1 Rating	Kindly provide the short circuit current capacity of Tap-off Bus ducts also.	Detailed design stage.
261	Volume 6, Section 09, Auxiliary Transformers, Clause 9.13.1, Page no.	Following tests shall be performed as minimum: · Type tests on one transformer of each type · Routine tests on all transformers of each type. All tests shall be recorded and a test report shall be issued by the Contractor for approval of the Engineer. The cost of performing these tests shall be included in the Bid Price.	Kindly accept type test reports instead of conducting the same.	As per specifications.
262	Volume 6, Section 13, DC system, Clause 13.2.4, Page no. 4/15	Miscellaneous items · One (1) set of suitable capacity UPS, using 220V DC supply, along with its distribution board for control room and office area computers. · One (1) set of suitable capacity inverter, using 220V DC supply, along with its distribution board for power house emergency illumination.	We understand that there is requirement of two inverters using 220 V DC supply from the DC board(Power house). Kindly confirm.	As per specifications only.
263	Volume 6, Section 13, DC system, Clause 13.12.1, Page no. 14/15 and 15/15	Shop Assembly and Tests	Kindly accept the type test certificates instead of conducting the same.	As per specifications only.
264	Volume 6, Section 15, Cabling system, Clause 15.4.2.3.1 , 15.4.2.3.2, Page no. 6/21 and 7/21	These cables shall be at least 1100 volts grade, heavy duty, single core, stranded aluminium / copper conductor, HR-PVC insulated (Type C- confirming to IS5831) and PVC outer sheathed (Type ST2- confirming……..	Kindly accept XLPE insulated Low voltage Power cables also.	No, as per specifications.
265	Volume 6, Section 16, DG set, Clause 16.3, Page no. 4/16	SPECIFIC PARAMETERS AND LAYOUT CONDITIONS	Kindly provide the drawings showing the location of DG set for Power house and Dam.	Please refer Drg. No. 71.2133.08.903.
266	Volume 6, Section 16, DG set, Clause 16.2, Page no. 3/16	SPECIFIC PARAMETERS AND LAYOUT CONDITIONS	Kindly provide the details for Day tanks and main tank for the DG sets.	Day tank is already included in the specifications viz DG set 910kVA complete with fuel system. Main tank is the substitute of portable fuel drums.
267	Volume 6, Section 16, DG set, Clause no. 16.13.1, Page no. 15/16 and 16/16	TESTING AND INSPECTION 16.13.1 Shop Tests	Kindly accept the type test cetificates instead of conducting the same.	No, as per specifications.
268	Volume 6, Section 19, Grounding system, Clause no. 19.2.1, Page no.3/10	Earthing network	Kindly provide the soil resistivity for each location i.e. for power house, Pothead yard, Transformer cum GIS cavern, Dam etc.	To be measured by the contractor.
269	Volume 6, Section 19, Grounding system, Clause no. 19.7.1, Page no.6/10	Design and construction: General: The earthing conductors shall be of minimum 32 mm dia MS rods. The risers shall be of GI with minimum size of 75 x 12 mm.	We propose that the size of GI flats for surface and embedded in concrete shall be decided during detail engineering for which the calculations shall be submitted. Kindly confirm.	Refer specifications.

270	Volume 6, Section 30, 400 kV XLPE Cables, Clause no. 30.5(5), Page no. 5/11	**Specific Parameters and Layout conditions:** Continuous current carrying capacity (A) - 2500 Amps	Kindly check and confirm the current rating of the 400 XLPE cable.	As per specifications only.
271	Volume 6, Section 30, 400 kV XLPE Cables, Clause no. 30.5(19), Page no. 5/11	**Specific Parameters and Layout conditions:** Metallic sheath - Seamless extruded corrugated Aluminium sheath	We propose to accept Laminated Aluminium sheath as well. Kindly confirm.	As per specifications only.
272	Volume 6, Section 34, Bus Reactor, Clause 34.2.2, Page no.3/25	**Other items:** One (1) set of piping required for oil water separator and soak pit.	Kindly confirm that the civil work related to contruction of oil water separator and soak pit shall be in the scope of Civil contractor.	As per specifications.
273	Volume 6, Section 34, Bus Reactor, Clause 34.2.1, Page no.3/25	One (1) no. of continuous on-line moisture and dissolved gas analyzing system for indicating, monitoring and data acquisition and integration with plant SCADA system for prevailing quality of gas.	We propose to supply only one no. Portable type online moisture monitoring and one no. portable type dissolved gas analyzing system which shall be used for GSU transformer and Bus Reactor both package. Kindly confirm.	Please provide as per specifications
274	Volume 6, Section 34, Bus Reactor, Clause 34.4.1, Page no.6/25	**Rating and Functional characteristics:** Maximum temperature rise with a reference maximum ambient temperature of 40°C -Top oil (Measured by thermometer) - 40°C - Winding (Measured by resistance method) - 50°C	We propose for temperature rise of top oil and windings as per IS 2026 / IEC 60076. Kindly confirm.	As per specifications.
275	Volume 6, Section 34, Bus Reactor, Clause 34.7.4.1, Page no.9/25	**Construction:** The tank and the cover shall be bell type and of bolted construction.	We propose to accept the conevntional type construction of the Tank. Kindly confirm.	As per specifications.
276	Volume 6, Section 34, Bus Reactor, Clause 34.13.1, Page no.24/25	Shop Tests The contractor is required to carry out all type tests, including temperature-rise test and…… The dielectric test shall be done on complete bus reactor including HV bushing…….. The Dielectric test shall be done as per method 2. IEC Publication..... Short circuit test (IEC-76) shall be carried out as a type test and FRA (Frequency Response Analysis).....	We propose for the acceptance of type test and short circuit test reports of similar rating Equipment instead of conducting the same. Kindly confirm.	As per specifications.
277	Volume 6, Section 20, Cooling water system, Clause no. 20.1, Page no. 4/25	Automatic Backwash Duplex Filters two (2) nos. one for each tapping comprising strainer, steel strainer less than 0.15 mm…. Refer Power house cooling water system drawing no. 71.2133.08.908, it is indicated 1 no. duplex filter for each tapping.	Since there is discrepancy in drawing & tender specification regarding quantity of duplex filters, kindly confirm number of duplex filters to be provided for each tappings.	Two duplex filters are required for each tapping.
279	Volume 6, Section 20, Cooling water system, Clause no. 20.11.4, Page no. 20/25	Gate Valves The valve body and Casing shall be of steel, cast steel or of grey cast iron. Refer clause no, 20.8.1, it is indicated that Cast iron Valves will not be accepted.	Kindly confirm whether Cast iron valves shall be acceptable or not.	Cast iron not allowed.
280	Volume 6, Section 21, Drainage & Dewatering system, Clause no. 21.4.5, Page no. 11/33	For Dewatering system, discharge of all pumps indicated as Exit into river at EL. 925.0 m For Drainage system, discharge of all pumps indicated as Exit into river at EL. 946.50 m	Exit into river at EL. 925.0 m & EL. 946.50 m not clear. Kindly confirm the location, where the drainage / dewatering pump shall discharge.	Please go through the drawings.
281	Volume 6, Section 22, Fire Fighting system, Clause no. 22.3.1, Page no. 5/20.	Fire tank shall be filled from two sources namely cooling water header of the power house and the pipe drawn from two number submersible pumps installed near PH intake in the upstream of dam.	Kindly confirm the route distance between the submersible pump house near PH intake & Fire water storage tank to estimate the pipe length.	Please refer the drawings.
282	Volume 6, Section 23, HVAC system, Clause no. 23.2.4, Page no. 4/17	Air Washer units Two (2) nos. air washer units, each having capacity of 20,000m3/hour, for transformer hall and GIS hall.	Kindly confirm the working & standby arrangement for Air washer units.	Please quote according to your design.
283	Volume 6, Section 23, HVAC system, Clause no. 23.2.5, Page no. 4/17	AHUs · Suitable number of AHUs for control block, machine hall floors and erection bay areas Refer clause no. 23.2.4, It is indicated Air washer unit of sufficient capacity for different floors of machine hall, erection bay and different floors of control block	We understand that AHU's shall be provided for control block, machine hall floors and erection bay areas. Air washer units shall be provided only for Transformer & GIS hall. Kindly confirm. Also confirm working & standby arrangement of AHU's.	As per specifications.
284	Volume 6, Section 23, HVAC system, Clause no. 23.2.5, Page no. 4/17	Design consideration	Normally, the mean max temperature shall be considered for designing the Air conditioning and ventilation system. Please confirm the mean max temperature & humidity conditions to be consider for power house region.	Please take into account the human comfort temperatures.

285	Volume 6, Section 23, HVAC system, Clause no. 23.2.5, Page no. 4/17	Rest of the areas in the powerhouse shall be maintained at an approximate temperature of 28° C to 32° C in summer and twenty degree Celsius in winter at relative humidity not exceeding 65 %	We understand that Air washer units shall be provided for Transformer hall & GIS hall. It is not possible to maintain humidity in ventilated areas by using Air Washer Units. Please review & confirm.	Please take into account the human comfort temperatures.
286	Volume 6, Section 23, HVAC system, Clause no. 23.7.5, Page no. 11/17	Ducts All ducts for the ventilating and air conditioning systems shall be of galvanized sheet metal in accordance with DIN 1946 and DIN 2415	Ducts in accordance with relevant Indian Standard shall also be acceptable. Please confirm.	No, as per specifications.
287	Volume 6, Section 24, EOT Crane, Clause no. 24.5, Page no. 6/32	It is indicated Crane span for GIS hall - 12.8 m approx. Refer Power house General arrangement typical unit transverse section drawing no. 71.2133.08.023, it is indicated crane span for GIS hall crane - 14.2 m	Kindly confirm the crane span to be consider for GIS hall crane.	Crane span to be considered as per drawing.
288	Volume 6, Section 24, EOT Crane, Clause no. 24.13.14, Page no. 32/32	The load, cradle and slings for full load and 25 % overload test compatible with same loading orientation is likely to be encountered during rotor lowering shall be arranged by the contractor.	Please confirm that the necessary load for conducting site test for all cranes (at 125 % rated capacity) shall be made available by customer.	Test load shall be co-ordinated with Civil EPC contractor.
289	Volume 6, Section 25, Elevators, Clause no. 25.1.2, Page no. 4/15	**Dam Elevator** The elevator machine shall be located above the elevator shaft. Reference is made to dwg. no. 71.2133.03.003, Dam - General Arrangement U/S view	The General layout drawing mentioned is not available in tender drawings. Please furnish us the same.	Relevant drawing is attached at Annexure-IIa
290	Volume 6, Section 25, Elevators, Clause no. 25.1.2, Page no. 4/15	**Standards: -** In addition, the Contractor shall respect the requirements of the German Standards "Technische Regeln f r Aufz ge (TRA 200)" or any equivalent national standards for elevators	The elevator as per relevant Indian Standard shall also be acceptable. Please confirm.	No
291	Volume 6, Section 27, Lubrication Oil Purification and Transfer system, Clause no. 27.1, Page no. 3/13	**SCOPE OF WORK:** Oil tanks are not mentioned against scope of work. Refer clause no. 27.4, Design conditions, It is indicated Mobile type oil tanks.	Kindly confirm the scope of Mobile type oil tank & its quantity.	As per specifications.
293	Volume 6, Section 28, Insulating Oil Purification Plant, Clause no. 28.5.1.1, Page no. 4/10	Insulating Oil handling system: - The purifier shall be capable of processing the oil on single pass basis at rated flow…..	Please confirm that multi pass is acceptable as per manufacturers' standard.	As per specifications.
294	Volume 6, Section 12, Control & Data Acquisition System, clause 12.2 page no: 5/57 & clause12.6.2, page no: 16/57 & SCADA system architecture drg no: 71.2133.08.906 (Rev 0)	Optical fiber communication between power house and Dam	1) Please provide the details like possible routes & route length between the Dam and Power house for the Optical fiber communication. 2) Please confirm that all civil Works (poles/ trenches/ concreting as applicable) and its installation etc. associated for the laying will not be in E&M scope. 3) Please confirm that all cabling for connecting to HM contractor's equipment to RTU (E&M) shall not be in E&M scope.	Insulation Oil purification is a cyclic process which depends on the quality of inlet oil(dirty oil). As dirty oil quality varies accordingly passes required for purification will vary. Ans-No
295	Volume 4, PCC Clause no.13.8	ADJUSTMENTS FOR CHANGES IN COST Delete the text of this Sub-clause in its entirety and substitute the following: " No adjustment is admissible. Price shall be firm and fixed."	We Propose the following Price variation Clause for E&M packages : 1) For Mechanical Equipments : P1 = Po*(0.15+**0.35** L1/L0 + **0.50** S1/S0) - P0 2) For Electrical Equipments **other than Generator Transformer :** P1 = Po*(0.15 + **0.35** L1/L0 + **0.40** S1/S0 + 0.10 C1 / C0) - P0 3) For Generator Transformer : As per IEEMA formula 4) For Installation of Plant & equipment: P1 = Po*(0.20+0.6 L1 / L0+0.15 F1/F0+ 0.05 M1/M0) - P0 Where :- P0 : 90 % of Contract Price P1 : Adjustment amount payable to Contractor S0 & S1 : World Carbon Steel Price Index of HR plates. C0 & C1 :Prices of copper as published by London Metal Exchange	Not Acceptable.

			L0 & L1 :All India Average Consumer Price Index for Industrial Workers, General Index as published in the Indian Labour Journal of 'Labour Bureau', Ministry of Labour, Govt. of India F0 & F1 :Actual all inclusive price of diesel at Delhi as fixed by Indian Oil Corporation Name of Indices : For Material : **Steel:** http :// www.meps.co.uk (For Steel - Hot Rolled Plates), **Copper:** http://www.lme.com/copper.asp Fuel : Price of Diesel at Delhi as fixed by Indian Oil Corporation For Labour : Consumer Price Index (CPI) of India, http://www.labourbureau.nic.in/indexes.html Please Confirm.	
296	Volume 5, GTS Clause no.6.2	SITE ACCOMMODATION AND STORAGE	Kindly clarify that Leveled area near to project site for contractor (Site facilities, colony, storage area for contractor) will be in Employer scope.	Sufficiently plain area will be provided on "as is where is basis". If the contractor envisages, it can further develop the area . If the contractor envisages for some additional area , it can procure the additional area. For best interest of the project, the contractor can keep a transit land at Jammu.
297	Volume 6, PTS, 1.4, Page no. 11/110	Design pressure for all parts under water pressure,including transients : 11 bar Permissible pressure rise related to the pressure under maximum flood level : <= 30 %(Approx.)	Maximum static head indicated is 108.81 m FRL - maximum flood level = 1029 - 945.6 = 83.4 m 30% allowable pressure rise = 1.3 X 83.4 = 108.42 m which is close to Maximum static head. We understand that 30% pressure rise is allowed over maximum static head i.e FRL-M/C C/l = 1029 - 914.3 = 114.7 m and allowable pressure rise = 114.7 * 1.3 = 149.1 m Kindly clarify.	Scope entitles you for complete design & workout pressure and speed rise and arrive at the design & test pressure.
298	Volume 6, PTS, 1.4, Page no. 11/110 Volume 9, Drawings, Power house general arrangement drawing	Design Conditions: Draft tube invert m.a.s.l. 897.5 (Approx.)	In the drawing Draft tube invert level is mentioned as 901.00 m.Please clarify	Draft tube invert level is 901.00 m.
299	Volume 6, PTS, 1.4.2, Page no. 12/110 Volume 9, Drawings, Project area general layout plan dwg no : 71.2133.00.003	In the PTS MDDL mentioned is as 1015.86 while in the drawing MDDL elevation is mentioned as 1014.00	Kindly clarify the discrepancy in Elevations.	MDDL is 1015.86m
300	Volume 6, PTS, 1.4.9, Page no. 20/110	Sand Erosion Consideration: Irrespective of study, under water parts shall be coated with HVOF Tungsten carbide with a minimum thickness of 150 microns.	Please provide petrographic analysis report alongwith water quality report.	Please refer Owner's reply at Sl. No. 8 above
301	Volume 6, PTS, 1.10.3, Page no. 57 & 58/110 Clause no. 1.11.1.2.3 Page no. 62/110	Cooling water connections for labyrinth seals needs to be included in the bottom ring. Labyrinth Seal Water Supply Suitable connections shall be provided for cooling water, required by the labyrinth seal rings during dewatered operation e.g. synchronous condenser operation.	Please clarify whether condensor mode operation is also required	Synchronous condensor mode is not required.
302	Volume 6, PTS, 1.13.3.1 Page no. 67/111	Design: The guide bearing shall be suitable for continuous shaft rotation up to maximum turbine runaway speed.	The guide bearing shall be suitable for continuous operation up to maximum power output not up to maximum turbine runaway speed.Please confirm.	As per specifications only.
303	Volume 6, PTS, 32.10.5.1, Page no. 59/77	Two portable chain hoists with a capacity of not less than 5 tons each and trolleys shall be provided in the turbine pit for maintenance of components in the pit and disassembly of the turbines.	For 30 MW unit one(1) no. portable chain hoists with a capacity of 1 ton will be sufficient for maintenance of components in the pit and disassembly of the turbines.Please confirm.	As per specifications only.
304	Volume 6, PTS, 32.4.2.1(b), Page no. 12/77	Turbine output at max. net head 103.73 m and rated discharge of 33.45 m3/s : 32.04 MW 33.03 MW at 103.73 m - 33.45 m3/sec [rated discharge]	We understand that the output at 103.73 m head corresponding to 33.45 cumecs discharge shall be 32.04 MW.Kindly confirm.	It is typographical error. The output at 103.73 m head corresponding to 33.45 cumecs discharge shall be 32.04MW.
305	Volume 6, PTS, Section 32	30MW Turbine PTS	Please confirm that the aforementioned Queries which are common in Turbine specifications for 205 MW & 30 MW unit, same clarification shall also be applicable for 30 MW unit.	Yes
306	Volume 5, GTS, 2.4.2, Page no. 19/130	For shipment of material and equipment and transport limitations indicative information s given in Introduction in clause 1.0 of GTS.	Please provide the Transport limitations/dimesnions	Please refer Owner's reply at Sl. No. 8 above

307	Volume 5, GTS, 1.8, Page no. 10/130 Volume 9, Drawings, Project area general layout plan dwg no : 71.2133.00.003	Pressure Tunnel (Diameter : 6.6 m and 3.0 m)	We understand that the shapes of pressure / auxilary pressure tunnel are Circular.Kindly confirm.	Each unit has it's independent pressure shaft which is circular in shape.
308	Volume 5, GTS, 1.9.1, Page no. 11/130 Volume 9, Drawings, Power house general arrangement dwg no : 71.2133.00.023	MIV diameter for 205 MW unit is indicated as 6.1 m in GTS while in the drawing it is shown as 6.2 m.	Kindly clarify the discrepancy in value.	The tentative diameter shall be 6.2m. However the final dia. of the valve shall match with the dia. of spiral inlet which will be worked out by the bidder.
309	Volume 5, GTS, 1.11, Page no. 12/130	Surge chamber	Kindly furnish drawings/details regarding the downstream surge chamber as description in GTS is not clear.	Relevant drawings are attached at Annexure-IV.
310	Volume 5, GTS, 1.12.2, Page no. 13/130 Volume 9, Drawings, Project area general layout plan dwg no : 71.2133.00.003	Length of TRT for auxilary plant is indicated as 290 m in GTS while in the drawing same is indicated as 270.92m.	Kindly clarify the discrepancy in value.	Length of TRT for auxilary plant shall be 270.92m.
311	Volume 6, PTS, 2.3, Page no. 7/30	MAIN CHARACTERISTICS OF THE BFV AND INFORMATION PROVIDED BY THE OWNER: Design pressure 11bar Hydrostatic test pressure 16.5bar	As explained above in point no. 1 of turbine queries that Design pressure should be more than 11 bar. In line with the calculations shown in point no.1 of turbine queries, design pressure should be :14.61 bar and Hydrostatic test pressure shall be: 21.92 bar	The pressure rise given as 30% in our specifications is for down stream surge tank in relation to maximum flood level. For pressure rise in spiral, bidder is to calculate the rise and workout the design head which we feel should not be 30%.
312	Volume 6, PTS, 2.9.6.1, Page no. 17/30	Servomotors The Contractor shall furnish both manual and **automatic mechanical locking devices** and locking position switch to transfer the position signal to the BFV control panel	Automatic mechanical locking devices is not recommended from safety point of View. Some time due to sudden failure of this arrangement leads to the incomplete closing of butterfly valve. This may lead to worst effects in penstock water way.	Please follow the specifications.
313	Volume 6, PTS, 2.13, Page no. 27/30	e) Pressure and leakage test Test on BFV, Service seal- open	In Butterfly Valve service seal is made up of Rubber so it is not possible to open the service seal during testing. It is recommended to open the Valve Body drain valve to check the Maintenance seal leakage.	This is the subject of detail design & test procedure will not affect the quote for the equipment. Specifications are to be adhered to.
314	Volume 6, PTS, 3.4.7, Page no. 15/97	The maximum shaft vibration as measured near the turbine and generator guide bearings shall be within ISO 7919-5, zone "A" (Mechanical vibration of non-reciprocating machines – Measurements on rotating shafts and evaluation criteria), when operating at rated speed and any load.	The maximum shaft vibration as measured near the turbine and generator guide bearings shall be as per border line B/C defined in the latest edition of ISO 7919-5 and ISO 10816-5 . Please confirm.	As per specifications only.
315	Volume 6, PTS, 3.7.2.2, Page no. 24/97	Design Calculations	Design calculations being proprietary in nature, please note that during detailed engineering calculation reports which are jointly agreed shall be submitted.	Design calculations of every system is to be submitted.
316	Volume 6, PTS, 3.11.2, Page no. 39/97	Punched steel segments shall be free of any brows	The rotor rim segments may be with laser cutting instead of punched steel segments	By what ever process the rotor rim segments are made of, it should be free of burrs.
317	Volume 6, PTS, 3.11.3, Page no. 40/97	The Contractor shall supply for each generator a lower generator shaft for connection to the turbine shaft.	It is proposed that the lower shaft is same for turbine and generator i.e. lower shaft may be single piece without any coupling. The shaft arrangement should be left on bidder's design practice.	As per specifications only.
318	Volume 6, PTS, 3.11.3, Page no. 40/97	This lower generator shaft shall have integrally forged thrust block on upper end and integrally forged coupling flange on lower end.	The lower generator shaft and thrust block may be separated and it should be left on bidder's design practice. kindly confirm.	As per specifications only.
319	Volume 6, PTS, 3.12.2, Page no. 43/97	• For 30 minutes between 110% of rated speed and steady state runaway speed. • For 30 minutes at rated speed and for 15 minutes at steady state runaway speed without cooling water supply.	We propose the following operating conditions for the bearings 1) For 15 minutes between 110% of rated speed and steady state runaway speed. 2) For 15 minutes at rated speed and for 5 minutes at steady state runaway speed without cooling water supply. Kindly confirm.	As per specifications only.

320	Volume 6, PTS, 3.20.3.2, Page no. 93/97	• Determination of the no-load characteristic • Determination of the short-circuit characteristic • Determination of the values for: Xd, Xq, Xd', Xq', Xd", Xq'', Xp, Tdo',Tqo', Tq', Td',Td", H and short circuit ratio • Instantaneous short-circuit test at 100 % of the rated voltage, short circuit to be applied at high voltage side of unit transformer	Determination of direct axis and quadrature axis transient, sub-transient reactance's and time constants,short-circuit withstand test are specified. For determination of above parameters , we need to conduct Sudden short-circuit test. In our opinion this test is an detrimental test; hence we do not recommend this test. The same may be deleted. Calculated value of reactance's and time-constants will be furnished. However please note that if insisted upon, this test will be conducted at HV end of generator transformer at 50% rated voltage, using HV line side breaker. Please confirm the acceptance.	As per specifications only.
321	Volume 6, PTS, 3.20.3.2, Page no. 94/97	• Runaway speed test might be performed at the option of the Owner, giving the maximum runaway speed under the maximum operating net head for a duration of 5 minutes	We do not recommend to carry out runaway test at site and request you to delete the same. Please confirm.	As per specifications only.
322	Volume 6, PTS, Section 33	30MW Generator PTS	Please confirm that the aforementioned Queries which are common in Generator specifications for 205 MW & 30 MW unit, same clarification shall also be applicable for 30 MW unit.	Yes
323	Volume 6, PTS, 12.6.1.2, Pg No. 13/57	These data storage devices shall be used for temporary storage of data when the plant control network is out of order.This data shall be automatically updated to the database of main data storage system in the central control room, when the plant control network is restored or repaired.	Local Storage will be performed when the main network is down , but the automatic updation to main Database is not possible even after the network link is restored.	As per specifications only.
324	Volume 6, PTS, 12.7.14, Pg No. 35/57	The devices shall be connected to the data servers and shall operate on different principles.	Redundant Central Archive System will be provided.	As per specifications only.
325	Volume 9, Drawings, Scada System Architecture	3 Computers & Link for Real Time Monitoring At Head office and two other Places is shown and written in drawing	Please Clarify the requrement	Project site-1 Gurgaon Office- 1 H.O hydrabad- 1 , to monitor plant data in real time.
327	Volume 6, PTS, 1.16.7.4, Pg No. 81/110	Actuating elements (push-buttons) for manual change-over from parallel operation with the system to isolated operation (speed control) respectively vice versa, manual actuation of start-up control system, etc., with the corresponding signal lights shall be mounted visibly inside the cabinet	Please note that generally door Mounted Operator Panel is provided, in which all the commands can be easily performed.	As per specifications only.
328	Volume 6, PTS, 1.16.7.5, Pg No. 83/110	The Contractor shall deliver minimum 3 speed signal transmitter of 4 to 20 mA type	Inductive Speed sensors with Pulse Output are also acceptable. Kindly confirm.	As per specifications only.
329	Volume 6, PTS, 1.17.3.2, Pg No. 93/110	A creep speed detector shall be provided which becomes activated once the unit has come up to rest and the mechanical brakes have been applied. This detector shall be equipped with one alarm contact for signalisation of any further slow motion shaft movement and one contact to effect starting and stopping of the jacking oil pump if on automatic control.	Creep Detection and Actions will be efficiently managed by Digital Governor PLC in coordination with SCADA PLC, which is an inbuilt function of our system. Hence no separate device is required.	As per specifications only.
330	Volume 6, PTS, 1.10.1.1, Pg No. 55/110	For each turbine a set of minimum 4 stainless steel tappings shall be provided for head measurement. These tappings shall be connected by pipe work to isolating valves or cocks at a convenient location.	Instead of 4 stainless steel tappings, we propose to provide one pressure transmitter for Head Measurement. Kindly confirm	As per specifications only.
331	Volume 6, PTS, 1.16.7.2, Pg No. 79/110	Reservoir level supervision	Please specify the scope of level sensor for reservoir level supervision.	Please refer specifications of SCADA
332	Volume 6, PTS, 1.17.3.4, Pg No. 93/110	The monitor with its control accessories shall be located in each Unit Control Board. Turbine Contractor supplies the detectors for the parts of the turbine. Detectors for the generator will be supplied, installed and commissioned by the Contractor of the generator.	Please note that we provide a separate Unitized Panel/Cubicle for Monitoring & Diagnosis system which is placed adjacent to Unit Control Board.	Noted.
333	Volume 6, PTS, 3.17.2, Pg No. 69/97	Periodic-on-line for >=100MW Continuous-on-line for <100MW	We propose single Periodic-on line Partial Discharge measurement system which is common for all the five units (4x205+1x30)MW. Please confirm.	As per specifications only.
334	Volume 6, PTS, 3.14.3.2.4, Pg No. 57/97	Thyristor rectifiers shall contain a number of thyristors connected in parallel so rated that continuous operation of the generator at rated load shall be maintained despite failure of one-third of the paralleled thyrisrors.	We propose to consider redundant Thyristor rectifier so that if one fails other will be working.Please confirm.	As per specifications only.

335	Volume 6, PTS, 4.2.1, Pg No. 4/32	Thirteen (13) nos., 90 MVA, 13.8 / 400 /Sqrt.3 kV, OFWF single phase generator step-up (GSU) transformers, complete with all necessary items such as off-load tap changers, bushings, undercarriage, current transformers, cooling arrangements, instrumentation, conservator, control panel, local cables, valves, piping, mounting plates, hardware, fittings, accessories etc.,	In the technical specifications rating is mentioned as 90MVA while in the Protection,metering & monitoring diagram (Drg no. 71.2133.08.901) rating is of GT mentioned 85MVA. Please clarify what rating should be considered.	Please consider rating as 90MVA.
336	Volume 6, PTS, 4.4.1 & 4.4.2, Pg No. 9/32 & 11/32	Maximum temperature rise with a reference maximum ambient temperature of 40°C -Top oil (Measured by thermometer) 40°C - Winding (Measured by resistance method) 50°C	As per IS 2026, Part-2, clause 3.2 Table-IV top oil temperature can be 55°C and winding temperature can be 60°C. Please confirm.	As per specifications only.
337	Volume 6, PTS, 4.13.1, Pg No. 31/32	Short circuit test (IEC-76) shall be carried out as a type test and FRA (Frequency Response Analysis) test shall be carried out along with routine test as per IEC 76 before and after this test.	As per IEC60076,part-1,short circuit test is a special test.Generally suppliers do not recommend to do the short circuit test. Please confirm.	As per specifications only.
338	Volume 6, PTS, 7.2, Pg No. 3/15	One (1) outgoing panel for 400 kVA pothead yard transformer equipped with disconnecting switch / fuses. Two (2) outgoing panel for 630 kVA Dam transformer equipped with disconnecting switch / fuses.	As per the single line diagram Drg no. 71.2133.08.902 all the feeders are breaker feeder. Please confirm.	As defined in PTS.
339	Volume 6, PTS, 10.2.5, Pg No. 5/23	One (1) no. – 800A, MCCB: One main MCCB shall be fed from pothead yard transformer. · One (1) no. – 630A, MCCB: As standby MCCB shall be fed from pothead yard DG set.	As the pothead yard transformer rating is 400kVA, in view of that 630A Breaker is also sufficient. We propose to consider 630A ACB for both incomming feeder from porthead yard transformer and from DG set. Please confirm.	As per specifications only.
340	Volume 6, PTS, 10.2.4, Pg No. 5/23	One (1) no. – 630A, MCCB: As standby MCCB shall be fed from dam DG set	We propose to consider 630A ACB in place of 630 A MCCB . Please confirm.	As per specifications only.
341	Volume 6, PTS, 11.7.1.1, Pg No. 12/33	All communications of protection system with the control system shall be based on universally accepted Protocol namely IEC 60870-5-103	We propose to consider the communication between protection system and control system either through hardwired or through profibus to avoid interface issues. Please confirm.	As per specifications only.
342	Volume 6, PTS, 13.2.3, Pg No. 4/15	One (1) set of Lead Acid, minimum 100 Ah or of higher capacity (as calculated during detailed engineering and approved by engineer) battery bank complete with terminal connections, hardware, connecting cables, and associated accessories, · One (1) set of charger, · Connectors / bushings / hardware etc for connection between battery bank terminal and cables, leading to distribution board	We propose to consider 2 no. of battery & 2 no. of charger for 48V system for redundancy purpose. Please confirm.	As per specifications only.
343	General	Regarding DC system for DAM area	Please clarify the scope of DC system required for Dam area.	As per specifications only.
344	Volume 6, PTS, 14.3.2.2, Pg No. 7/19	The design and construction of emergency illumination system and that of 220 V DC system shall be adequately coordinated.	Please confirm whether 220V Battery is common for emergency lighting and plant 220V DC system.	Yes.
345	Volume 6, PTS, 34.13.2, Pg No. 25/25	Short circuit test (IEC-76) shall be carried out as a type test and FRA (Frequency Response Analysis) test shall be carried out along with routine test as per IEC 60076 before and after this test.	Short circuit test is a special test.Generally suppliers do not recommend to do the short circuit test. Please confirm.	As per specifications only.
346	Volume 6, PTS, 1.16.7.6.3, Page no. 84/110 2.9.6.2 ; Page no. 17/30	Pressure Oil system for MIV and guide vanes	We propose to offer combined pressure oil system for guide vane and MIV operation. MIV shall be equipped with single acting servomotor closing by counter weight. Accumulator shall be sized to cater 3 complete strokes (Close-open-close) of guide vane servomotors and 1 stroke (Open) due to single acting of MIV servomotor as per IEC 61362	As per specifications only.

348	Volume 6, PTS, 20.4.2 ; Page no. 9/25	The Contractor shall conduct his own water analysis and ensure that all necessary precautions and allowances are made in the design and used piping material to avoid corrosion problems, blockage of pipe work, strainers and instrumentation due to the biological fouling. In particular, the design shall incorporate elevant provisions to avoid operational problems due to this biological fouling and also avoid the necessity to dismantle and clean the raw water piping system frequently. In this regard, the manual cleaning interval shall not be any shorter than six months.	At this stage conducting water analysis is not feasible for E&M contractor and also even if managed to do, result may not be accurate and may have significant variation in the parameters. Water analysis report consisting of atleast 3 years of record and average values which can be used for design is required. Therefore it is requeted to please arrange to furnish the Water analysis report (with particle distribution, size & type) for further proceeding. If at all the water report not possible to furnish, we will inform about the basis of design with bidding document and the same shall be subject to actual water analysis report during detail engineering.	Please refer Owner's reply at Sl. No. 8 above
349	Volume 6, PTS, 20.15.5 ; Page no. 24/25	Trial Operation of the Cooling Water System will be carried out for each unit in parallel with the corresponding generating unit.	Kindly clarify the statement.	Observation is not clear.
350	Volume 6, PTS, 21.4.4.2 ; Page no. 10/33	The box housing the terminal strips is located nearest to the pump but above the flood level. Water proof cable jointing kits shall be employed wherever necessary to ensure operation of pumps under flood conditions,	Power house Ventilation/escape tunnel elevation is 943.2 m.a.s.l while Maximum flood level elevation mentioned is 945.6 m.a.s.l.Kindly check and confirm	Please keep this level at 925.0m

351	Volume 6, PTS, 22.2.1 ; Page no. 3/20	TAC / other Statutory approval for Ratle HEP	Approval shall be in customer scope, However all technical assistance / documents for TAC or any statutory approval shall be provided by Contractor	As per specifications only.
352	Volume 6, PTS, 22.2.1 ; Page no. 3/20 22.3.1 ; Page no. 5/20	All piping including embedded and exposed piping, valves, fittings and associate accessories necessary for the system including connecting pipe line between fire tank and fire header, main & standby submersible pumps, MCC with auto & manual modes at dam site and piping work from dam site to the fire tanks located near pothead yard.	We propose following: - Filling arrangement including pumping, filtration etc from cooling water system for fire tank in Contractors scope - Filling arrangement including pumping, filtration etc from DAM area for fire tank shall be in customer scope - All tanks (fire, drinking water tank etc) including filtration plant for drinking water tank filling and further arrangement inside power house shall be in custotmer scope. - Piping from fire tank for fire protection purpose shall be in Contractor's scope however civil related requirement shall be in customer scope	As per specifications only.
353	Volume 6, PTS, 22.2.1 ; Page no. 3/20	Scope of supply	Fire doors, filre barriers, fire isolators, safety uniform & appratus etc. will be in customer scope. Please confirm.	No, as EPC contractor it is in the scope of E&M Bidder.
354	Volume 6, PTS, 23.2.2 ; Page no. 3/17 23.2.4 ; Page no. 4/17 23.2.5 ; Page no. 4/17	The heat exchanger shall be used for cooling of air at the suction of circulating fans. Air washer unit of sufficient capacity for different floors of machine hall, erection bay and different floors of control block. Suitable number of AHUs for control block, machine hall floors and erection bay areas.	Please clarify whether we should consider Air Washer Units or AHU's with cooling coils (along with water cooled chiller units) of sufficient capacity for different floors of machine hall, erection bay and different floors of control block	Bidders may submit as per their design.
355	Volume 6, PTS, 24.2 ; Page no. 4/32	Load testing of cranes at site including load arrangement and all logistics.	Arranging load at site not feasible for E&M contractor hence we propose that test load, cradle, slings etc for testing at site along with logistics should be in customer scope. kindly confirm.	As EPC contractor it is in the scope of the bidder. For test load bidders has to co-ordinate with the civil & HM contractor.
356	Volume 6, PTS, 24.5 ; Page no. 5/32	Maximum distance between bottom of gantry rail and the highest point of Crane : 6.5 m - Power House Crane 0.6 m - GIS Crane Main/Auxiliary/Monorail from the centre of the gantry rail on u/s side : 1200mm(MH), 2700mm(AH), 1500mm(Mono) - Power House Crane Main/Auxiliary/Monohook from the centre of gantry rail on d/s side : 2700mm(MH), 1200mm(AH), 1500mm(Mono) - Power House Crane The distance of Main/Auxiliary hooks from inner edge of wall/nearest obstruction in their terminal positions : 2000mm (MH), 3500mm(AH) - Power House Crane	You will appreciate that Clearance and Crane approaches may only be confirmed during detail engineering after evaluation of actual requirement. Kindly confirm.	Details of crane will be finalised during detail engineering.
357	Volume 6, PTS, 28.5.1.1 ; Page no. 4/10	The purifier shall be capable of processing the oil on single pass basis at rated flow to the following specification:	We propose to have system with multi passes arrangement. Please confirm.	As per specifications only.
358	Volume -5 /General Technical Specifications/ 6.3	TRANSPORT AND HANDLING OF PLANT AND EQUIPMENT, CRANE FACILITIES/	We request you to inform the transportation limitation (weights & dimensions).	Please refer Owner's reply at Sl. No. 8 above
359	Volume 5, GTS,Cl-1.9 (General project information),page-7 And Volume 6, PTS,Cl-1.4 (Design conditions), page-10	Hydraulic operating parameter	There is a contradiction of maximum tail water level values between these clauses. Hence please provide all heads (Maximum, rated and minimum) corresponding to their head losses, HWL, TWL and operating conditions. For better understanding please provide your calculated head loss table at different operating conditions. In addition to the above please provide tail race curve with respect to various discharges.	Various heads and parameters are given in specifications.
360	Volume 6, PTS,Cl-1.4 (Design conditions), page-10	Hydraulic operating parameters for additional unit	In tender document complete hydraulic operating parameters of additional unit are not specified. Hence for additional unit, please provide all heads (Maximum, rated and minimum) corresponding to their head losses, HWL, TWL and operating conditions (Outputs).	Various heads and parameters are given in specifications.

361	Volume 6, PTS,Cl-1.4 (Design conditions), page-11 And Volume 6, PTS,Cl-2.3 (Main characteristics of BFV), page-7	Design and test pressure Turbine and MIV	Design head= Static head x water hammer = 114.7 x 1.3 = 149.11 mWC = 14.6 bar Test head = 1.5 x Design head = 223.67 mWC = 21.9 bar Please confirm.	Scope entitles you for complete design & workout pressure and speed rise and arrive at the design & test pressure.
362	Volume 6, PTS,Cl-1.4.2 (Hydraulic conditions), page-13 And Volume 6, PTS,Cl-1.4.9 page- 20	Water quality analysis	To envisage HVOF coating silt data needs to be elaborated by providing the silt load which will pass through each turbine, in respect of silt concentration in ppm during monsoon and non monsoon months. During monsoon months it should contain day wise silt data. Silt data should also have the Quartz or other hard particles content along with its shape and size. We request you to furnish the above mentioned silt data.	Please refer Owner's reply at Sl. No. 8 above
363	Volume 6, PTS,Cl-1.4.2.1 (Guaranteed turbine operating range), page-12 & 13 And Volume 6, PTS,Cl-1.5.2 (Guaranteed power), page-21 And Volume 6, PTS,Cl-1.5.4 (Guaranteed efficiency), page-22	3MAX and 2 MAX	Please review the following Please refer (c) For the given output 208.75MW it is not possible to achieve the maximum head of 105.79m with given HWL and TWL. Please refer column 3MAX For 246MW it is not possible to achieve maximum head of 105.79m with given HWL and TWL. Please refer column 1MIN For francis turbine generally 50% of rated output is recommended. Hence please review the requirement of minimum output of 77MW. In addition based on above points please review the value of maximum net head in clause-1.5.4 in guaranteed efficiency.	HWL is no where given in our specifications. TWL alone is also not given. Therefore, question is not clear. Generally, Francis turbine can run between 40% to 50% of rated discharge and may be designed accordingly.
364	Volume 6, PTS,Cl-1.6.2 (Stresses and deflections), page-28	Stresses and deflections	Allowable stresses shall be as per Andritz Hydro design and safety philosophy which is based on ASME boiler and pressure vessel code section VIII, Div 2.which is usual practice in hydro turbines and has proven records in many hydro plants in India and worldwide. Please confirm.	As per specifications only.
365	Volume 9, Drawings	Drawings	Please provide all drawings in Auto Cad including plan and cross section drawings of complete water conductor system (from intake to tail race tunnel outlet). In addition to the above please furnish surge tank detail drawing for transient calculations.	Bidders has to develop their own drawings as the design is in the scope of the bidders. At a later date.
366	Volume 9, Drawings	Drawings of additional unit	Please provide all drawings of additional unit in Auto Cad including plan and cross section of complete water conductor system (from intake to tail race tunnel outlet).	Bidders has to develop their own drawings as the design is in the scope of the bidders.
367	Vol-6_PTS / 1.16.7.6	Oil pumps	Screw type pumps give very high leakage when operating at high pressure, In view of this, please also accept variable displacement axial piston type pump which is suitable for high pressure system.	As per specifications only.
368	Vol-6_PTS / 1.16.7.6.1 & 2.9.6.2	Piston Accumulator	The capacity of Accumulator shall be designed to handle the complete 3 x strokes of turbine servomotors i.e. COC (as per IEC 61362) plus 1 x MIV servomotor strokes i.e. one opening of MIV servomotor as closing of MIV is by counter weight for safe and reliable operation and without pump operation. Please confirm.	As per specifications. There shall be independent PPU & Accumulator for MIV and Turbine.
369	Vol-6_PTS / 20.1 & Drawing No.71.2133.08.908	Tapping from penstock	Cl.no.20.1 & drawing no.71.2133.08.908 are contradicting with each other. We propose tapping at one point in the penstock as showing drawing No. 71.2133.08.908.	Yes. One tapping at each unit penstock with two isolating valves in series.
370	Vol-6_PTS / 24.7.20.4	Load Testing	We request that the necessary arrangement of load at site for conducting load test shall be in Employer's Scope. Please confirm.	As EPC contractor it is in the scope of the bidder. For test load bidders has to co-ordinate with the civil & HM contractor.

371	Vol-6_PTS / 1.10.1.1 & 32.10.4.1.	All embedded pipes shall be equipped with an elastic layer (approx. 500 mm).	This clause is not clear. Please elaborate.	This is typographical error. Elastic layer thickness is 0.5mm.
372	Volume 6-3, Section 3, Cl. 3.4, pg 11	Design conditions	In Cl. 3.4 of Generator, the rated output power is 205 MW (considering 227.78 MVA, 0.9 p.f) while in Cl. 3 of Information For Bids, the Generator rated output power is 195 MW. In same way in Cl. 3.4 of Generator, the maximum continuous power output is 250.55 MVA while in Generator Cl. 3.5.2 pg 16 & Turbine Cl. 1.4.4 pg 16, the generator max. Continuous output power is 268.4 MVA. Please confirm the rated and max. Continuous output power for Generator.	Rated output 227.78 MVA and Max. continuous output is 268.4 MVA.
373	Volume 6-3, Section 3, Cl. 3.4, pg 11	Design conditions	As per tender Cl. 3.4, combined inertia constant of Generator & Turbine is 3.2 while in Cl. 3.4.1, it is written that the inertia of turbine parts should be neglected. So, please confirm the inertia constant of 3.2 is including inertia of Turbine parts or not. And please correct the unit of inertia constant as kW-Sec/kVA.	3.2 is including of turbine parts but this is tentative. Bidder will decide the inertia constant for 150% of rated speed. Agreed.
374	Volume 6-3, Section 3, Cl. 3.4, pg 11	Design conditions	The SCR requirement of 1.1 seems to be on the higher side, considering the modern excitation systems with faster response time, thus help maintaining increased stability to system changes. Also to have an efficient machine, we would suggest reduction of SCR value to minimum 1.0. Please confirm.	As per specifications only..
375	Volume 6-3, Section 3, Cl. 3.4, pg 11	Design conditions	We understand that the Class B limits of temperature-rise is applicable for Generator rated output of 227.78 MVA at rated P.F with combined voltage & frequency variations as per IEC 60034-1 standard and Class F limits of temperature-rise is applicable for Generator maximum continuous output at rated P.F with combined voltage & frequency variations as per IEC 60034-1 standard. Please confirm.	As per specifications only.
376	Volume 6-3, Section 3, Cl. 3.5.3, pg 17	Guaranteed Efficiency	The load points at which efficiency figures required are different in Technical Datasheet and Particular Technical Specifications. Please confirm.	As per PTS section 3.5.3.
377	Volume 6-3, Section 3, Cl. 3.6.3.3, pg 22	Critical Bending Speed	In Generator Cl. 3.6.3.3, the first critical bending speed requirement is 25% higher than run-away speed while in Cl. 2.15 of Technical Data Sheet of Generator, the first critical bending speed requirement is 20% higher than run-away speed. Please confirm.	As per PTS. 25% higher than run-away speed.
378	Volume 6-3, Section 3, Cl. 3.10.1.4, pg 38	Generator Housing/ Pit cover	In working condition, it is not possible to replace the generator air-water coolers hence please remove this requirement from the specification however there will be access opening at generator top covers for removal of air coolers.	Yes. Radiators will be removed during shut down period only.

379	Volume 6-3, Section 3, Cl. 3.11.3, pg 40	Lower Generator Shaft	The NEMA standard for tolerances and procedure for shaft run-out are withdrawn and hence this standard is no more available. So, please confirm that “ANSI/IEEE Std 810-1987 : IEEE Standard for Hydraulic Turbine and Generator Integrally Forged Shaft Couplings and Shaft Runout Tolerances” and “IEEE Std 1095 -1989 : IEEE Guide for installation of Vertical Generators and Generator/Motors for Hydroelectric Applications” are also acceptable.	Agreed.
380	Volume 6-3, Section 3, Cl. 3.11.3, pg 40	Lower Generator Shaft	The construction of thrust block should be open to all the bidders. Please confirm.	All the Bidders have to adhere to the specifications.
381	Volume 6-3, Section 3, Cl. 3.12.2, pg 43	Combined thrust & guide bearing	The max permissible absolute temperature of thrust & guide pads should be allowed up-to 80 deg.C and 70 deg.C respectively. Please confirm.	As per specifications
382	Volume 6-3, Section 3, Cl. 3.12.3, pg 45	Lubrication and Cooling	There is requirement of 100% redundancy in oil-water heat exchangers hence 10% plugging margin is not more important hence request you to remove this 10% plugging margin in cooler tubes. Please confirm.	As per specifications only.
383	Volume 6-3, Section 3, Cl. 3.12.3, pg 46	Lubrication and Cooling	For bearings with white metal lined thrust pads, high pressure oil jacking system is required during starting-up and shut down. The purpose of this is to avoid chances of mixed friction, which may lead to surface damage of the white metal lined thrust bearing pads due to smaller oil film thickness at low speed. Hence request you to remove this requirement from the specification.	As per specifications only.
384	Volume 6-3, Section 3, Cl. 3.13, pg 46	Technical specifications for air cooling	Please confirm that Cupro - Nickle material for air-water heat-exchanger is also acceptable.	As per specifications only.
385	Volume 6-3, Section 3, Cl. 3.16.2, pg 63	Braking System	Please let us know the speed at which electrical braking will be applied.	As per the Bidder’s design
386	Volume 6-3, Section 3, Cl. 3.16.2, pg 63	Braking System	The low pressure air should be available at 7 kg/cm2 in place of 10 kg/cm2 however the air vessels will be designed for 10 kg/cm2. Please confirm.	Agreed.
387	Volume 6-3, Section 3, Cl. 3.17.2, pg 69	Sensors and Instruments for Generator & Excitation	Please confirm that Periodic on line partial discharge monitoring system is also acceptable for 30 MW unit.	As per CEA guidelines.
388	Volume 6-3, Section 3, Cl. 3.18.2.1, pg 70	Specified spare parts	Please let us know the mandatory spare parts for 30 MW unit.	As per specifications only. Refer para 33.18
389	Volume 6-3, Section 3, Cl. 3.18.2.1, pg 70 & 71	Specified spare parts	We understand that the definition of “Set” for spares means quantity required per Unit. Please confirm.	Yes. Set means quantity required per unit.
390	Volume 6-3, Section 3, Cl. 3.20.1.2.3, pg 80	Welding tests during manufacture	Please confirm that the minimum Impact test values shall be accepted as per international standard.	Yes.
391	Volume 6-3, Section 3, Cl. 3.20.1.2.11, pg 84	Stator winding bars	Tan Delta test is basically an evasive test and this would cause damage to the bar insulation, therefore this test will be carried out on two bars for every VPI lot and the values for tan delta measurement should be acceptable as per European standard EN 50209-1998. In lieu, Partial Discharge (PD) measurement is carried out for each VPI bar produced. This method offers the advantage that it is much more sensitive compared to the dissipation factor measurement and records even small imperfections in the insulation. Please confirm.	As per specifications only.

392	Volume 6-3, Section 3, Cl. 3.20.1.2.11, pg 85	Stator winding bars	The test voltage for High Voltage Test on ready assembled stator should be (2 x UN + 1 kV) as per IEC60034-1 standard. Please confirm.	OK. Confirmed.
393	Volume 6-3, Section 3, Cl. 3.20.1.4, pg 87	Shop Assembly and Tests	Due to transportation limitation it is difficult to transport stator frame in single piece and hence stator frame will be divided in to parts and assembly will be done at site to make it in single piece. Assembly of generator rotor and assembly of generator bearings including brackets will be done at site. Please confirm.	As per specifications only.
394	Volume 6-3, Section 3, Cl. 3.20.1.4, pg 87	Shop Assembly and Tests	The generator bearing assembly will be done at site hence pressure test of the bearing oil system in assembled condition will be performed at site. Please confirm.	As per specifications only
395	Volume 6-3, Section 3, Cl. 3.20.3.2, pg 93	Commissioning tests	Temperature Rise test is a type test hence it should be performed on ONE unit only. Please confirm.	Yes.
	Volume 6-3, Section 3, Cl. 3.20.3.2, pg 94	Commissioning tests	We do not recommend conducting runaway speed test due to its possible adverse impact on civil foundations and structures. The unit shall however be designed to withstand such adverse conditions of operation. However the over speed test will be performed which is already requested in commissioning test. Please confirm.	As per specifications only.
396	Volume 01/Annexure - 1/Qualification Criteria/4.2 d	Design, Manufacturing, supply, erection, testing and commissioning of 13.8kV to 15.75kV / 400kV, 100MVA single phase transformers, 400kV cables etc	We request to relook into the qualification criteria of 400kV single phase transformers considering the experience of reputed manufacturers in India.	As per specifications only.
397	Volume 06/Section 04/ 4.2.1/.	Transformer and Accessories/ Fourteen (14) nos. of continuous on-line moisture and dissolved gas analyzing system	We understand that the on line moisture (water content) shall be provided with each generator transformer (excluding spare). However the dissolve gas analyzing system (portable) shall be common for the all the unit. Kindly confirm.	Continuous on-line moisture and dissolved gas analyzing system for all the units separately. As per specifications only.
398	Volume 06/Section 04/ 4.4.1/.	90MVA, Single Phase Transformer/ Minimum % Impedance at, Rated MVA and Rated frequency – 12.5%.	We understand that the % impedance of the transformer is tentative; the same may vary in line with the system requirement (system study) during details engineering. Kindly confirm.	Agreed.
399	Volume 06/Section 04/ 4.4.1/.	90MVA, Single Phase Transformer/ Lightning impulse withstand voltage - H.V. neutral / Bushing (minimum) 1425 / 1425 kV (peak)	The same shall be corresponding to the 36kV HV neutral bushing i.e. 170kVp. Kindly confirm.	Agreed.
400	Volume 06/Section 04/ 4.4.1/	90MVA, Single Phase Transformer./ Maximum temperature rise with a reference maximum ambient temperature of 40C	We understand the temperature rise shall be as per the applicable standards (i.e CBIP/ IS / IEC). Kindly confirm.	As per specifications only.
401	Volume 06/Section 04/ 4.4.2/	40MVA, Single Phase Transformer./ Maximum temperature rise with a reference maximum ambient temperature of 40C	We understand the temperature rise shall be as per the applicable standards (i.e CBIP/ IS / IEC). Kindly confirm.	As per specifications only.
402	Volume 06/Section 04/ 4.5.1/.	Guaranteed losses	We understand the guaranteed losses shall not be used for the price evaluation. Kindly confirm.	No, the guaranteed losses shall be used for evaluation.
403	Volume 06/Section 04/ 4.10	Spare Parts/ List of spare parts	The mandatory spare parts lists mainly specify the spare parts for the 90/85 MVA Transformer. Kindly clarify the requirement for the 40MVA GT.	Mandatory spares requirement is same but for 3-phase, 40MVA Tr.
404	Volume 06/Section 04/ 4.13.1/	Shop Tests/ Short circuit test (IEC-76) shall be carried out as a type test and FRA (Frequency Response Analysis) test shall be carried out along with routine test as per IEC 76 before and after this test.	We understand the short circuit test reports carried out on similar transformer (IEC 60076-5) shall be acceptable in lieu of repetition of tests. Please confirm.	As per specifications only.
405	Volume 06/Section 05/ 5.2.3/	420 kV Generator Transformers Feeder Bay Modules/ Two (2) nos. : 3-phase, single-pole, group-operated safety-grounding switches, complete with manual and motor driven operating mechanisms	The one no common 3-phase, single-pole, group-operated safety-grounding switches, complete with manual and motor driven operating mechanisms should be provided in similar with the line bays. Kindly confirm.	Yes. Confirmed.
406	Volume 06/Section 05/ 5.2.5 /	420 kV Bus Reactor Circuit Breaker Bay Module/ Two (2) nos. : 3-phase, single-pole, group-operated safety-grounding switches, complete with manual and motor driven operating mechanisms	The one no common 3-phase, single-pole, group-operated safety-grounding switches, complete with manual and motor driven operating mechanisms should be provided in similar with the line bays. Kindly confirm.	Yes. Confirmed.
407	Volume 06/Section 05/ 5.5.1	General / Window for viewing physical status of disconnectors / Earthing switch etc.	Provision of the windows on the GIS shall be as per the manufacturer practice. Kindly confirm.	As per specifications only.

408	Volume 06/Section 05/ 5.5.3.12	Closing Time Less than or equal to 50 ms Opening Time Less than or equal to 30 ms	We propose the followings. The same are in line with manufacturer standards. Kindly confirm. Closing Time shall be Less than or equal to 100 ms Opening Time shall be Less than or equal to 60 ms	As per specifications only.
409	Volume 06/Section 05/ 5.5.4.	Current Transformers	We recommend that the CTs ratio, burden, knee point voltages shall be as per the requirement finalized during detail engineering. Kindly confirm.	OK. Confirmed.
410	Volume 06/Section 05/ 5.5.11	Bus Bars and Enclosures/ The 400 kV main double bus bars shall be three phase encapsulated horizontal type.	We understand that the main Bus bar shall be isolated/individual bus bar. Kindly confirm.	Yes. Confirmed.
411	Volume 06/Section 05/ 5.5.12	Gas Insulated Bus Duct (GIB)/ Rated power frequency withstand voltage to ground 1050 kV	The same shall be as per IEC 62271-203. Kindly confirm.	Yes. Confirmed.
412	Volume 06/Section 05/ 5.5.14	Gas Monitoring System	We understand that the Gas density/pressures of the GIS shall be monitored continuously by the density switches and the abnormal condition of the gas pressure shall be communicated to SCADA with the help of potential free contact of the density switches. Kindly confirm.	Yes. Confirmed.
413	Volume 06/Section 05/ 5.12.4	Field Tests/ Dielectric tests including partial discharge measurements.	The procedure B (IEC 62271-203/60694) shall be followed for GIS HV testing at site. Kindly confirm.	Yes. Confirmed
414	Volume 06/Section 06/ 6.2	SCOPE OF WORK	We understand that the future equipments & structures are not under this package scope. Kindly confirm.	Yes. Confirmed
415	Volume 06/Section 06/ 6.2	SCOPE OF WORK/ Supply of CVT, Wave Trap, LMU for remote substation	We understand that the bidder scope shall be limited to the supply only. The erection & commissioning shall be in client scope. Kindly clarify.	As EPC Bidder, every thing is in bidder's scope.
416	Volume 06/Section 06/ 6.2	SCOPE OF WORK	We understand that the spreading of suitable size gravels & fencing work at pothead yard area shall be in civil contractor scope. Kindly confirm.	Yes. Confirmed.
417	Drg. No. 71.2133.08.903 Sheet 2 of 2	Power House 400kV pothead yard	The space (width) indicated for the installation of the 400kV pothead yards equipments is less. As the 400kV wave trap shall be pedestal mounted instead of gantry hanging arrangement. We understand the level surface/area shall be provided at pothead yard as per the requirement finalized during detail engineering.	Agreed.
418				
419	Volume 06/Section 07/ 7.2	SCOPE OF SUPPLY / The supply of 2 or 4 pole structures and all overhead line with all supporting structures and insulators in the project area as indicated in SLD of 11 kV switchgear are in the scope of bidder.	We understand that the 11kV Transmission line to Dam site & colony area shall be in the bidder scope. However the terminal equipments scope shall be as per the 11kV SLD. Kindly confirms. We understand that the necessary statuary clearance for installation of the 11kV transmission line shall be provided by the client. Kindly specify the length of the followings11kV Transmission line. · 11kV T/L to Colony -1 · 11kV T/L to Colony -2 · 11kV T/L to Colony -1 · 11kV T/L to Colony -2	Transmission Line- 4 Total length- 10 km
420	Volume 06/Section 08/ 8.5.1	Rating/ Rated short circuit current (kA) 40 kA for 1 sec.	The short circuit rating of the main, delta & Tap off run shall be as per the system requirement. Kindly confirm.	Agreed.
421	Volume 06/Section 08/ 8.7.2	Current transformer / The burden and rating of each current transformer shall not be less than 200 % of the overall	The CT burden shall be as per IEC 44-1 to meet the accuracy requirement. The CTs shall be window type hence the FS class shall be to best possible values considering the dimensional constraints. Kindly confirm.	As per CEA regulations.
422	Volume 06/Section 09/9.5.1.1 /	UAT and SAT/ Impedance Voltage at rated Current 6.25%	We understand that the Impedance voltage of the Transformer may vary during details engineering as per the system requirement. Kindly confirm.	Agreed.
423	Volume 06/Section 09/9.5.1.1 /	UAT and SAT / Short circuit withstand capacity on HV side	The short circuit withstand capacity of the transformers shall be as per IEC 60076-5, considering the indicated fault level as a source/system fault level. Kindly confirm.	As per specifications only.
424	Volume 06/Section 09/ 9.5.1.3	Dam Transformer/ Class of insulation H	As the transformer is oil filled the class of Insulation shall be A. Kindly confirm.	Yes. Confirmed.
425	Volume 06/Section 10/ 10.6.1	Layout Conditions/ If during detail engineering cable numbers are large due to which termination and routing of LT cables is difficult, suitable current rating Copper Bus-Bar Trunking shall be used for all transformers (SST & UAT) to LT boards (SAB & UAB).	As the bustruking shall be used in place of the Aluminium conductor power cables, hence we request you to accept the suitable rating Aluminium Bus Trunking in place of copper. Kindly confirm.	As per specifications only.

426	Volume 06/Section 10/ 10.6.2.5	Wiring/ Current transformer secondary leads shall not be less than 4.0 mm2.	We request you to accept the panel internal wiring for CT/PT circuit with 2.5 sqmm lead, as this is a standard & proven practice followed by all reputed LT supplier. Kindly confirm.	As per specifications only.
427	Volume 6/11.2/11.2.1	Scope of work	As per our Philosophy Field Over Voltage Protection is a part of Excitation system. Same is proposed for the system. Please confirm	During detail engineering.
428	Volume 06/Section 13/ 13.2.1	220V DC system (Power House)/ Two (2) sets of Lead Acid / Plante, minimum 1200 Ah	We request to accept the equivalent size Ni-Cad battery also along with Lead Acid/Plante. Kindly confirm.	As per specifications only.
429	Volume 06/Section 13/ 13.12	TESTING AND INSPECTION/ Type tests on one equipment of each type	We request you to accept the Type test report carried out on similar equipments in lieu of repetition of the tests. Please confirm.	As per specifications only.
430	Volume 06/Section 14/ 14.3.1.1	Indoor lighting/ Down stream surge shaft, all adits and ducts (indoor & outdoor).	The provision of the Illumination at the surge shaft and all audit shall be in the client scope. As the provision of the 415V LT supply is not in the bidder scope. Kindly confirm.	As per specifications only.
431	Volume 06/Section 14/ 14.3.2.3	Power supply/ Power supply shall be taken from LT auxiliary boards.	As a standard practice and to reduce the fault level in illumination system the illumination system supply is fed from suitable capacity of Isolation Transformers (lighting transformer). However the requirement of same is not specified in the tender. Kindly clarify.	Design is in the scope of the bidder. May be considered if necessity is envisaged.
432	Volume 06/Section 14/ 14.3.3.2	Lux levels and quality of direct glare limitation/ Control Room Lux level 500	This seems to be on higher side, The same should be 300lux. Kindly confirm.	As per IS.
433	Volume 06/Section 14/ 14.7.8	Cables/ Minimum size of copper conductor for single core cable shall be 2.5 mm2.	Minimum size of copper conductor for single core cable shall be 1.5 mm2 for phase & neutral conductor; however for earthing the minimum conductor size shall 2.5 sqmm. Kindly confirm.	As per specifications only.
434	Volume 06/Section 15/ 15.4.2.3.4	Coaxial Cable/ Coaxial cable shall be offered to connect coupling unit installed in the pothead yard to the PLCC terminals, installed in control room of Ratle HEP, Dulhasti HEP & Kishenpur Sub station.	Kindly specify the co-axial cable length required at Dulhasti HEP & Kishenpur Sub station.	Bidder to estimate as it will be an EPC package.
435	Volume 06/Section 15/ 15.7	DESIGN CONSIDERATION/	We propose 0.75/1 mm2 copper conductor for annunciation	As per specifications only.
436		1.5 mm2 stranded copper conductor for annunciation and RTD cable,		
437	Volume 06/Section 15/ 15.15.1.1	Type Test on cables.	We request you to accept the Type test report carried out on similar cables in lieu of repetition of the tests. Please confirm.	As per specifications only.
438	Volume 06/Section 16/16.7.5.6	Fuel system/ The fuel system shall include portable fuel drums	We understand the bulk oil is not required. Kindly confirm.	Yes. Confirmed.
439				
440	Volume 06/Section 16/16.7.5.7	Starting Battery System / Ampere Hour Rating of battery	The ampere Hour capacity of the starting batteries shall be as per the manufacturer recommendation for the selected stating sequence. Kindly confirm.	Yes. Confirmed.
441	Volume 06/Section 16/ 16.7.7.2	Test Mode/ The generator is run parallel to the electrical system and automatically loaded up to an adjustable value.	The requirement is contradictory to the para 10.6.5.3. Kindly clarify.	Para 10.6.5.3 to be considered.
442	Volume 06/Section 17/ 17.2	SCOPE OF WORK / telephone exchange	We understand that the EPBAX system needs to be supplied along with PLCC system. Kindly specify the requirement of telephone lines/channel at receiving & sending end.	Refer Section 18 of Volume 06.
443	Volume 06/Section 19/ 19.2.1	Earthing network	We understand the grounding scope at pothead yard area shall be limited to the area applicable for the supplied equipments only. Kindly confirm.	Yes. Confirmed.
444	Volume 06/Section 19/ 19.2.1	Earthing network/ Flexible copper braided connections for connection of ground points of equipment	The connection to the equipments shall be done with the suitable size MS/GI flat, to avoid the multiple bolted connections in the grounding system. The same is in line with the standards practice followed in the industry. Kindly confirm.	During detail design.
445	Volume 06/Section 19/ 19.2.1	Earthing network/ Lightning masts in Dam area & pothead yard.	The appropriate lightning protection system shall be provided at pothead yard & dam site area. Accordingly the requirement & quantities of the Lightning mast shall be accessed during detail engineering. Kindly confirm.	Yes. Confirmed
446	Volume 06/Section 19/ 19.3.1	Salient Features and Technical Parameters/	We understand the grounding system shall be designed for 50kA, 1 Second, however the applicable current split factor shall be considered during details engineering. Kindly confirm.	During detail engineering.
447		Fault current level 50 kA for 1 second.		
448	Volume 06/Section 22/ 22.2.1	Fire protection system/ Door closing mechanism with necessary cabling,	We understand the doors are manually operated. Kindly clarify the requirements.	Door closing mechanism is for Transformer compartments.

449	Volume 06/Section 22/22.3.1	Layout and General Arrangement/ Two number submersible pumps installed near PH intake in the upstream of dam.	We understand that the construction of the bore well/foundation pedestal in line with the requirement finalized during details engineering shall be in Civil contractor scope. Kindly confirm.	Yes. Confirmed.
450	Volume 06/Section 22/22.3.1	Layout and General Arrangement/ A twin concrete fire tank having capacity of at least two (2) hours supply to meet the largest fixed fire suppression demand plus the maximum hose stream demand of not less than 1900 LPM shall be provided.	Kindly confirm that the addition of the supplementary hose protection water demand shall be as per the TAC norms.	Yes. As per TAC norms.
451	Volume 06/Section 22/22.3.1	Layout and General Arrangement/ Medium velocity Water (MVW) spray system, for Oil pressure unit of governor and main inlet	We propose that the suitable capacity/type portable fire extinguisher is sufficient to suppress the fire in the system. Kindly confirm.	As per specifications only.
452	Volume 06/Section 22/22.3.1	Layout and General Arrangement/ Medium velocity Water (MVW) spray system for UCB, UAB and excitation cubicles	The water based fire protection system is not provided for the LT switchgear. Kindly clarify.	For panels fire extinguishers and for cables MVW spray system.
453	Volume 06/Section 22/22.7.3	Water for fire tank	We understand that the Fire tank shall be constructed by civil contractor at suitable elevation, which shall meet the water pressure requirement of the HVWS/MVWS/Fire Hydrants systems to be provided at power house and as well as outdoor area. The requirement of the any additional booster pumps are not envisaged at this stage. Kindly confirm.	Refer Drg. No. 71.2133.08.910. Booster pumps are used only for HVW spray system. If for MVW spray system pressure is not adequate, MVW spray system will be tapped after booster pumps with pressure reducer.
454	Volume 06/Section 22/ 22.7.7.1	Hydrant systems and hose reels/ The spacing of hydrants shall not be more than 20m from each other in alternate side.	We propose that the spacing of hydrants (internal & external) shall be as per the TAC norm. Kindly confirm.	Yes. Confirmed.
455	Volume 06/Section 22/ 22.7.7.2	Water sprinkler and spray systems/ electrically operated deluge valve.	We recommend that the as per the system requirements the deluge vales modes of operation (standard practice & TAC norms) shall be selected. Kindly confirm.	Yes. Confirmed.
456	Volume 06/Section 22/ 22.7.11	Fire barriers, assemblies and interior finish / All fire barriers shall have fire resistant classification for minimum 4-hour exposure rating or as specified in applicable codes.	The requirement of the fire doors/damper is not clear. We request to either specify the requirement quantitatively or the same can be assessed at later date (after plant commissioning) accordingly the change of scope can be ordered. Kindly remove the requirement at this stage.	As per specifications only.
457	Volume 06/Section 26/ 26.2	SCOPE AND LIMITS OF SUPPLY	We understand that the one type/rating instrument/tools /equipment for the project shall be supplied once irrespective of the requirement specified at multiple places. Kindly confirm.	Yes. Confirmed.
458	Volume 06/Section 27/	SCOPE OF SUPPLY	The requirement of oil storage tank is not specified in the tender. Kindly confirm.	Suitable capacity storage tank is to be considered.
459	Volume 06/Section 28/ 28.2	SCOPE OF SUPPLY	The requirement of oil storage tank is not specified in the tender. Kindly confirm.	Suitable capacity storage tank is to be considered.
460	Volume 06/Section 28/ 28.5.1.1	Insulating oil handling system/ The purifier shall be capable of processing the oil on single pass basis at rated flow to the following specification:	The required parameter after single pass shall be met considering the input oil quality as per IS 335. Kindly confirm.	Yes. Confirmed
461	Volume 06/Section 30/ 30.2	SCOPE OF SUPPLY / Eleven (11), Single-phase, 400kV, 2500A continuous current capacity, copper conductor, XLPE cables	We understand the 400kV XLPE cables to be installed between GIS & 400kV pothead yard to evacuate the Ratle HEP generation. Considering the above requirement the specified current capacity of the 400kV Cables is on higher side. Kindly clarify.	As per specifications only.
462	Volume 06/Section 30/ 30.2	SCOPE OF SUPPLY/ Eleven (11), Single-phase, 400kV, 2500A continuous current capacity, copper conductor, XLPE cables	We understand the 2 nos single run 400kV XLPE cable spare run is envisaged. However current practice is to have one spare run cable. Kindly clarify.	As per specifications only.
463	Volume 06/Section 30/30.5	SPECIFIC PARAMETERS AND LAYOUT CONDITIONS/ short circuit withstand current (r.m.s) for 1 second (KA) 50	This seems to be very high for 400kV system. Kindly review.	As per specifications only.
464	Volume 06/Section 30/ 30.9.1	Electrical Characteristics/ The sheath voltage under full load conditions shall not exceed 25 V to ground at the terminations.	In order to minimize the sheath losses and to optimize the possible load current, single end bonding will be required and depending on system length the sheath voltage at one end may become higher than 25 V. Kindly confirm.	As per the Bidder.
465	Volume 06/Section 30/ 30.9.3	Cable Construction/ The cable sheath shall be corrugated aluminium sheath.	Kindly confirm that the cable sheath can be Corrugated Aluminium / Corr. Copper/Welded Aluminium/Smooth seamless Al./Aluminium Foil / copper wire screen (laminated sheath)/Equivalent PQ Type tested design.	As per specifications only.
466	Volume 06/Section 30/ 30.14.2	Field Tests / For AC voltage test, the test voltage shall be 1.7 x Uo for one hour. The High Voltage testing kit shall be arranged by contractor which may be taken back after test.	The Cable shall be tested as per IEC 62067 (soak test) a voltage of U0 may be applied for 24 hours. Kindly confirm.	As per IEC.

467	Volume 06/Section 30/ 31.2	SCOPE OF SUPPLY	We understand that the suitable capacity (as per requirement finalized during detail engineering) the oil soak pit shall be constructed by civil contractor. The necessary gravel, metallic gratings and embedded pippins for the systems shall also be in the civil contractor scope. Kindly confirm. The one no suitable capacity portable pumps shall be provided by the E&M bidder for the evacuation of the oil/water.	Yes. Confirmed.
468				
469	Volume 06/Section 34/ 34.2.1	Bus Reactor and Accessories/	The rating of the shunt reactor selected looks to be high. The Transportation of the 125MVAr shunt reactor may not be possible. Please clarify.	This is CEA requirement. We have to adhere to this.
470	Volume 06/Section 34/ 34.2.1	Bus Reactor and Accessories/ One nos. of continuous on-line moisture and dissolved gas analyzing system	We understand that the on line moisture (water content) shall be provided as proposed for the GTs and one no common dissolve gas analyzing system (portable) shall be provided for the all the unit. Kindly confirm.	Continuous on-line moisture and dissolved gas analyzing system for Bus Reactor. As per specifications only.
471	Volume 06/Section 34/ 34.4.1	125MVAR, Three Phase Bus Reactor/ Maximum temperature rise with a reference maximum ambient temperature of 40C	We understand the temperature rise shall be as per the applicable standards (i.e CBIP/ IS / IEC). Kindly confirm.	As per specifications only.
472	Volume 06/Section 34/ 34.13.1	Shop Tests/ Short circuit test (IEC-76) shall be carried out as a type test and FRA (Frequency Response Analysis) test shall be carried out along with routine test as per IEC 76 before and after this test.	We understand the short circuit test reports carried out on similar reactor (IEC 60076-5) shall be acceptable in lieu of repetition of tests. Please confirm.	As per specifications only.
473	Volume 09/ Drawings	General.	We request you to provide following drawings in Auto CAD & Editable format. 2. Power house cross sectional Drawing 3. Project layout/contour plan drawing. 4. All floor Plan/ elevations drawing. 5. Project SLDs. 6. Data Sheets.	Drawings are already given in PDF.
474	Volume 09/ Drawings/71.2133.08.903 sheet 1 of 2	Power House 400kV Pothead Yard.	We understand that the spare indicated for the 400kV pothead yard, DG buildings, 11kV switchgears etc are indicative. The same shall be as per the actual requirement finalized during detail engineering. Please confirm.	Yes. Confirmed.
475	Volume 09/ Drawings/71.2133.08.903 sheet 2 of 2	Power House 400kV Pothead Yard.	The 400kV wave trap shall be pedestal mounted instead of hanging type. Kindly confirm.	During detail design.
476	Volume 09/ Drawings/71.2133.08.023	Power House General Arrangement Typical unit Transverse section.	1. The minimum hook height required for the EOT crane is 11 meter from the machine hall floor. 2. The space provided for the laying of the cable trays below/above the IPBD at floor El 920 (along B line) is very less. The width of the power house needs to be increased suitably. 3. The suitable size nitch to be provided below El 926 (along B line) for entry of IPBD, Piping's, Cable trays to the bus duct tunnel. 4. There shall be mass concrete below the El 920, hence the installation of the electrical panels at EL 920 (along B line) with bottom cable entry is not possible. In this case all the electrical panels needs to be shifted to El 926 (along B line), which shall require increase in spacing between units. 5. The Dynamic breaking cubicle in not indicated in the layout. We understand that the same shall be installed in the bus duct tunnel. Kindly confirm. 6. The Transformer cavern height looks to be less. The same should be 8.5 meter. 7. The GIS hall EOT crane minimum hook clearance required is 8 meter for the easy handling of GIS for erection & maintenance at later dates.	Drawings supplied with Bid documents are tentative and informative only. Final drawings for the execution are to be prepared by the Bidder. (Please review para 2.5 of GTS).