



Bharat Heavy Electricals Limited

(A Govt. of India Undertaking)

Transmission Business Group

Materials Management, 5th Floor, Plot No.25,

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CORRIGENDUM - 01 TO NIT NO-95178

Dated 30-10-2025

Subject: Corrigendum-01 to Tender enquiry for Pre-bid tender enquiry for Supply & Services of 400KV GIS FOR 4x150 MW Khorlochhu Hydropower Project/Tender from M/s Khorlochhu Hydro Power Limited Sub-Station Tender/ project.

Project : 4x150 MW Khorlochhu Hydropower Project/Tender from M/s Khorlochhu Hydro Power Limited
Equipment / Item : Supply & Services of 400kV GIS and Its associated equipment
Enquiry No/Date : Enquiry No. 61Q2600346 Dated 21-10-2025
BHEL NIT NO : 95178
Original Tender due date : 31-10-2025

This Corrigendum is issued by BHEL TBG against above mentioned NIT/ enquiry for issuance of pre-bid clarifications (enclosed).

Due date of tender opening shall remain same. i.e. 31-10-2025.

All other terms and conditions for this tender enquiry shall remain unchanged.

Bidder to ensure submission of offer on or before due date.

Note: Tender ID on CPP Portal is **2025_BHEL_53879_1**.

Thanking you

-----Sd/-----

Gaurav Agarwal

BHEL TBG, NOIDA

Project: 4x150 MW KHORLOCHHU HYDROPOWER PROJECT, TRASHIYANGTSE, BHUTAN (Contract Package: KEM-I)						
Sr No	Document	Clause No & Page No.	Topic	Description of customer requirement	GIS Manufacturer's comments	BHEL REPLY 29.10.2025
1	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.32 - 3.6	Employer's spec	Material For Bus-Bar Electrolytic COPPER (The PTS specifies bus bar material as Aluminium Alloy, however the Data Sheet A1 (3.6) ask for Electrolytic copper. Bidder would like to inform that as per OEM Standard proven design, practice and type tested Al alloy busbar will be provided. Kindly accept.)	As per the practice, GIS is manufactured using aluminium instead of copper. All these OEMs have successfully typetested GIS with aluminium conductors. We therefore request you to kindly accept aluminium conductor in place of copper	The Bus and all current carrying parts shall be as per bidding document or equivalent.
2	Chapter 9, Cl. No. 9.19.1 Circuit breaker (ix)			The circuit breakers shall be of double interrupter design (2 breaks in series per pole) for 63 kAIC and can be of single interrupter design up to 50 kAIC and lower subject to satisfactory operation of the Circuit Breaker for Short Line Faults and Terminal Faults Test duties without the need of external devices.	Bidder would like to inform that as per OEM Standard proven design and practice single interrupter circuit breaker will be supplied and Same is type tested and globally accepted. However, Type test report will be provided for review during detail engg. stage. Kindly accept.	Bidder to offer as per the bidding document or equivalent.
3	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.19.2 / 230	Circuit Breaker	i) Circuit breakers installed close to large generating plant or controlling very long transmission Lines will be subjected to fault currents which may have delayed or no zero crossing for a considerable number of cycles due to a high X/R ratio of the system. The GIS Manufacturer shall propose a suitable Circuit Breaker which can mitigate the high reactive component to achieve the opening of the Circuit Breaker at current zero within the normal operating time of the breaker. The methods of demonstrating satisfactory conformance to this requirement shall be mutually agreed between the Purchaser and the Vendor. ii) Purchaser shall furnish the Network parameters for the delayed zero passage condition, if applicable to the GIS Manufacturer after award of Contract. The GIS manufacturer shall prove by calculations and by factory tests that the Circuit Breaker can safely interrupt the fault without restrikes.	The offered GIS Circuit breaker is designed & type tested to perform duties as per IEC 62271-100 only. Any specific duties related to power plant operations are not covered.	Please refer to the attached X/R ratio and DC component details and confirm compliance for generator synchronization. Both the Line and Generator Transformer circuit breakers may be used for synchronization. The average number of operations is four per day.
20	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 xxiii) / 225	Spares	The switchgear assembly supply shall include an additional 10% supply of gas complete with containers and monitoring equipment for use during the warranty period.	Please note that any additional gas shall be supplied as per tender spares list. And container with monitoring system, if required shall be in scope of EPC. Kindly confirm.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification. Cost of the same shall be deemed inclusive of GIS.
	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification: Clause 9.25.4 Relays			x) Electrically reset latch type trip relay shall be provided for SF6 Gas low zone trip stage. The operating time of the same shall not be more than 10 milliseconds. Provision for reset from remote to be provided		The zone trip logic shall be developed in the LCC by the GIS manufacturer. Any contact multipliers and/or additional contacts required in the density monitors shall be provided by the GIS manufacturer.

Project: 4x150 MW KHORLOCHHU HYDROPOWER PROJECT, TRASHIYANGTSE, BHUTAN (Contract Package: KEM-I) Client: KHORLOCHHU HYDRO POWER LIMITED						
Sr No	Document	Clause No & Page No.	Topic	Description of customer requirement	GIS Manufacturer's comments	BHEL REPLY 29.10.2025
1	KEY SINGLE LINE DIAGRAM KHPP-EL-PH-SLD-4006-AU-40001	-	Termination type	Termination type for Line-1, Line-2 and ICT bay is shown as SF6/Air termination in SLD. But in Power House Layout No. KHPP-ME-6017-GA-60001 (SHEET-4), the termination for Line-1, Line-2 and ICT bay shown as cable type.	Kindly confirm which termination type to be followed for Line-1, Line-2 and ICT bay. Also any male & female termination kit shall be excluded from GIS Manufacturer's scope of supply. Also share gantry position if SF6/Air termination is to be considered.	For Line and ICT, SF6 to Cable connection shall be provided
2	Power House Layout No. KHPP-ME-6017-GA-60001 (SHEET-4)	-	Layout	There is a mismatch between bay sequence in tender SLD and layout. Also, location of buscoupler is not shown in layout.	We shall follow layout drawing and place bus coupler bay in optimal position. Kindly confirm.	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed during the detailed engineering stage and
3	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.4.1. iv) / 219	Walkway	The GIS Equipment shall be complete with all necessary supports, ladders, galleries, staircases, catwalks, movable platforms, or walkways (for accessing the equipment above two meters for maintenance and operation),	Please note that, A type ladder shall be provided to access remote parts of GIS during operation and maintenance. Kindly accept the same.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
4	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.4.1. vii) / 219	Future Extension	Provision shall be made for expansion of GIS on either side of GIS.	From Tender layout we understand that future extension provision is feasible on one side of GIS. Kindly accept.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
5	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.4.1. ix) / 219	Termination type	overhead lines, cables, transformers, reactors, capacitor banks, etc. supplied by other manufacturers in order to ensure full compatibility. The GIS manufacturer shall also specify the dimension and mounting details, weight, etc. of the spring/bellow used between GIS bus duct termination with transformer.	We confirm that offered GIS shall have termination enclosures of standard size as per relevant IEC. EPC contractor shall co-ordinate with other equipment manufacturers to ensure compatibility of respective terminations in drawing approval stage.	Scope distribution for SF6 to Cable & SF6 to Oil shall be as per IEC
6	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.4.1. x) / 220	Glass window	Suitable glass window/telescopic port shall be provided in the circuit breaker, disconnect and grounding switch modules for ensuring proper contact making.	We confirm to provide glass window for disconnect and earth switch. However, for safety reasons glass window in circuit breaker compartment is not envisaged. Kindly accept the same.	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed during the detailed engineering stage and shall be subject to customer approval.
7	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.4.1. xiii) / 220	Spares	All new gaskets, sealants, and desiccants for permanent sealing of all field joints and all access covers, removed during assembly, shall also be provided.	We confirm to provide spares as per List of spares (Annexure-I) shared with tender documents.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
8	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.4.1. xxi) / 220	Service continuity	GIS modules shall have gas tight barrier insulator partitions such that fault in one compartment will not affect the normal operation of the adjacent compartment The section shall be designed: - To minimize operation shutdown when the gas pressure is reduced due to leakage or for maintenance purpose. - To minimize the quantity of gas that must be evacuated and recharged before and after maintaining any item of equipment.	We confirm the same and the offered GIS shall confirm to the service continuity requirement of MRE11 as per IEC 62271-203 Annex-F. During maintenance/ replacement / extension one alternate bus bar along with the adjacent bays shall remain out of service. Kindly accept the same. Kindly accept the same.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
9	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.4.1. xxv) / 221	PD sensors	Gas barriers shall have PD sensors.	We confirm to provide PD sensors on GIS housing as per standard type tested design. Kindly accept.	The same shall be reviewed during the detailed engineering stage and shall be subject to customer approval.
10	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.5 ii) / 221	Temperature rise	The maximum temperature of the external surfaces shall be 70°C as per the applicable standards mentioned in Data Sheet A2.	We request to kindly accept temperature rise as per IEC 62271-203 and type tested design of manufacturer.	Bidder to please comply with the requirements indicated in the Technical Specification.
11	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.6 v) / 221	Internal arcing duration	The enclosure shall be designed to withstand internal fault at the rated short circuit current level and consequent pressure for a period specified in Data Sheet A1 without a burn through.	We confirm, the offered GIS is type tested for internal arcing duration as per IEC-62271 203 Table-4. Kindly accept the same.	Bidder to please comply with the requirements indicated in the Technical Specification. Type test as per CEA guideline

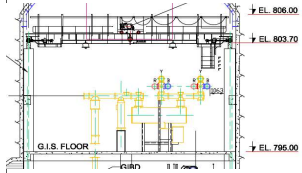
12	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.6 xi) / 222	Surface finish	The exterior surface finish of the enclosure shall be finalized in agreement with the Purchaser. The actual colour shade shall be based on the end user's requirement.	We request to kindly accept the exterior color shade as RAL 7035 and as per manufacturer's standard painting procedure, which shall be submitted to customer for approval during detailed engineering.	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed during the detailed engineering stage and shall be subject to customer approval.
13	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 iii) / 223	leakage rate	The sealing system shall also effectively ensure against the ingress of moisture, dust and other contaminants into gas compartments. SF6 gas relative leakage rate of each gas compartment shall not exceed 0.5% per year over the life time of the switchgear (as per applicable standard). Double "O" ring design be adopted to ensure Gas tightness.	We confirm to comply gas leakage rate less than 0.1% per year. However, the gas tightness arrangement in GIS to achieve guaranteed leakage rate shall be as per manufacturer's standard design. Request to accept the same.	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed during the detailed engineering stage and shall be subject to customer approval.
14	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 vii) / 223	SF6 gas density monitor	SF6 gas in each individual compartment shall be monitored by suitable gas density or temperature-compensated gas pressure gauges and two stage temperature compensated pressure (gas-density continuous monitoring) switches/ relays to monitor the loss of SF6 gas.	We confirm to provide temperature compensated density monitor switch for each gas compartment which shall have two stage alarm settings for gas low level and lock out level. Analog alarms signals shall be obtained from NO-NC type micro-switch dry contacts without any mA current output. Request to accept the same.	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed during the detailed engineering stage and shall be subject to customer approval.
15	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 vii) / 223	SF6 gas density monitor	Separate gas density monitor switch shall be provided for each equipment compartment including but not limited to Circuit Breaker, Current Transformer, Voltage Transformer, Surge Arrester, Isolator (separate monitor for bus bar and bus Isolator) & Earth Switch etc (for each compartment).	Please note that compartmentalization of enclosures is decided based on number of active switching element (disconnect switch OR circuit breaker). We confirm that each gas compartment shall not have more than one switching element (DS/CB). Also Voltage Transformer, Surge Arrester shall have individual gas compartment. This is as per our standard type tested design. Request to accept the same.	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed during the detailed engineering stage and shall be subject to customer approval.
16	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 xii) / 224	Type test	In the event of gas leakage, all parts of the switchgear in the affected compartment shall be able to withstand continuously the maximum rated voltage with SF6 gas at atmospheric pressure.	We confirm the specified requirement for a specified time period as per relevant IEC and our type tested design. Request to accept the same.	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed during the detailed engineering stage and shall be subject to customer approval.
17	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 xv) / 224	Special tools	Gas leakage detectors of an approved type shall be provided.	All special tools on supply basis shall be excluded from GIS OEM's scope of supply.	Please refer Bid Price Schedule. Bidder to comply with the requirements indicated in the Technical Specification.
18	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 xvii) / 224	Online Gas Monitoring	If specified in Datasheet/ bill of materials, GIS shall be equipped with the remote online GAS monitoring system. The gas pressure of each compartment shall be able to be monitored remotely from SCADA. The system shall have the facility to pinpoint the exact gas module in the bay where gas leakage problem is there.	If there is a requirement of such online gas monitoring system, the same shall be in EPC's scope. Kindly accept.	Please refer Bid Price Schedule. Bidder to comply with the requirements indicated in the Technical Specification.
19	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 xvii) / 224	Online moisture measurement	At each gas compartment, provisions shall be made for connecting online moisture measurement instrumentation and the gas service cart. The moisture content in the gas shall not exceed 150 ppmv (parts per million per volume) in circuit breakers, and 250 ppmv at rated pressure at 20degC in other equipment. Provision for disconnection of gas pipelines shall be incorporated. 100µm or smaller sintered stainless steel particle filter disk, suitable for pressure involved, shall be installed at the gas service connection.	We confirm, standard NRV port shall be provided in each gas compartment which shall be compatible to connect with portable moisture measurement test kit/gas service cart.	The same shall be reviewed & commented during the detailed engineering stage and shall be subject to customer approval.
20	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 xxiii) / 225	Spares	The switchgear assembly supply shall include an additional 10% supply of gas complete with containers and monitoring equipment for use during the warranty period.	Please note that any additional gas shall be supplied as per tender spares list. And container with monitoring system, if required shall be in scope of EPC. Kindly confirm.	Please refer Annexure-1

21	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.8 xxiv) / 225	Spares	The total design shall incorporate facilities for SF6 storage adjacent to the installed switchgear assembly.	Any such facility, if required shall be in EPC's scope. Kindly accept.	Please refer Clarification attached with TS which clarifies "Clause 9.8 xxiv) is deleted."
22	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.14. i) / 226	Service continuity	The layout shall be such that future alterations and extensions can be undertaken in either direction without requiring major shutdown or Bus outage or adjacent bay outage. Manufacturers shall include in their bid detailed plans to describe the process of expansion.	We confirm during future extension, there will be shutdown of only one busbar at a time, keeping the other bays in service from alternate busbar. However, adjacent bay/busbar-section may go in shutdown/degassing for a brief period. Kindly accept.	MAIN BUS BAR END PIECE (INTERFACE) MODULES SET OF 3 PAHSE is BPS item. Exact qty shall be finalised in contract stage.
23	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.14. ix) / 227	Future Extension	The GIS shall be extendable on both sides and all the components required for enabling future extension like end conductor, gas barrier, end plates, etc shall be considered if specified in Data Sheet A1. Bidder has to furnish the required drawings for expansion interface of future bays along with the bid.	Offered GIS shall have provision for future extension. All the necessary drawings shall be provided by present OEM for future extension. However, supply of any materials required to perform extension activity shall be in the scope of the OEM performing the extension work. Kindly confirm and accept the same.	Please refer ANNEXURE_BOQ which clarify scope for MAIN BUS BAR END PIECE (INTERFACE) MODULES

24	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.15 / 227	Special tools	Partial discharge (PD) monitoring system - Online	Optional rate for online PDM shall be submitted. All special tools on supply basis shall be excluded from GIS OEM's scope of supply.	Please refer BPS. PORTABLE PARTIAL DISCHARGE MEASUREMENT TEST KIT is called
25	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.18 / 228	Earthing	GIS Earthing: All enclosures of the GIS shall be grounded at several points and connected to ground bus. All conduits and cable sheaths shall also be connected to the ground bus available within the control cubicles and in the marshalling boxes.	Please note, earthing provisions shall be provided on various location of GIS. However, EPC shall provide earth riser beside GIS and shall connect GIS earth point to earth risers.	Section-1A is well clarifies for scope of earthing material. Please refer the same.
26	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.19.2 / 230	Circuit Breaker	i) Circuit breakers installed close to large generating plant or controlling very long transmission Lines will be subjected to fault currents which may have delayed or no zero crossing for a considerable number of cycles due to a high X/R ratio of the system. The GIS Manufacturer shall propose a suitable Circuit Breaker which can mitigate the high reactive component to achieve the opening of the Circuit Breaker at current zero within the normal operating time of the breaker. The methods of demonstrating satisfactory conformance to this requirement shall be mutually agreed between the Purchaser and the Vendor. ii) Purchaser shall furnish the Network parameters for the delayed zero passage condition, if applicable to the GIS Manufacturer after award of Contract. The GIS manufacturer shall prove by calculations and by factory tests that the Circuit Breaker can safely interrupt the fault without restrikes.	The offered GIS Circuit breaker is designed & type tested to perform duties as per IEC 62271-100 only. Any specific duties related to power plant operations are not covered.	Please refer Annexure-1
27	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.19.3 / 230	PIR/CSD	Closing/Opening Resistors/Reactors (where applicable)	1. CSD is not considered in our offered. If required then please inform us for which bay we should consider it. We have not considered the same. 2. Also, please confirm if PIR is required, as we have not considered same.	CSD to be offered as per BPS. PIR is not envisaged
28	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.25.2 / 240	Local control panel	Bay Control Unit shall be provided in the LCP for control and indication purpose while interfacing with SCADA/SCS to reduce the hardwiring if specified in Data Sheet A1. BCU's shall be placed in an air-conditioned environment.	BCU shall be excluded from GIS scope of supply. We would like to recommend to BCU to be part of CRP to avoid LCC not to be overcrowded & for easy maintenance & sufficient left for future modifications/additions.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification. Cost of the same shall be deemed inclusive of GIS.
29	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.26.1	Operation counter	The Circuit breaker mechanism cabinet shall consist of the following: ii) Operation counter	As per our standard design operation counter shall be placed in LCC. kindly accept.	The same shall be reviewed & commented during the detailed engineering stage and shall be subject to customer approval.
30	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.28.2	Grounding tester	A capacitive tap shall be provided on each gas section. One loose instrument common to the complete plant, shall be supplied for connection to a capacitive tap to indicate whether the circuit is live or dead. Provision of tap to indicate status – live or dead, capacitive taps and the instrument shall be optional and quoted for separately.	This requirement is not applicable in GIS. Hence excluded. Please accept.	The same shall be reviewed & commented during the detailed engineering stage and shall be subject to customer approval.
31	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.28.4 ii)	Seismic qualification	GIS Manufacturer shall submit type test certificates, if applicable to prove seismic withstand capability. If identical GIS is not tested in the past, successful GIS Manufacturers shall furnish design calculation or carry out testing to prove seismic withstand capacities without cost and time implication to the Purchaser.	We confirm to provide detailed seismic design calculation for the offered GIS substation during detailed engineering. Kindly accept.	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed during the detailed engineering stage and shall be subject to customer approval.
32	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.29	Special tools	-	All special tools on supply basis shall be excluded from GIS OEM's scope of supply.	Bidder to comply with the requirements indicated in the Technical Specification.

33	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.30.1	Routine tests	-	We confirm that offered GIS shall be tested as per IEC 62271-203 latest edition. <i>Routine test reports shall be submitted to customer.</i>	Bidder to comply with the requirements indicated in the Technical Specification.
34	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.30.2	Type tests	iii) The type tests shall be carried out at reputed testing laboratory, the tests must have been carried out during last 5 years.	We confirm that offered GIS is fully type tested as per IEC 62271-203. Any additional tests are not in the scope of GIS manufacturer. Also as per CEA guideline, type test of GIS is valid up to 15 years. Kindly accept the same.	Validity of type test report will be as per latest CEA guidelines. Performance of type test will be as per latest CEA guidelines.
35	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.30.3 v)	Site tests	The fully assembled equipment shall be subjected to 1 min. power frequency withstand test at 80% of the rated withstand test voltage and impulse/switching impulse voltage test at site.	We confirm site tests shall be performed as per relevant IEC standard. Also impulse/switching impulse test is not applicable for GIS.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
36	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.30.3 vi)	Site tests	Provision shall be made by GIS Manufacturer for incorporating a test bushing and other necessary testing equipment to facilitate site testing. Test bushing shall be included in GIS Manufacturer's scope, and shall be handed over to Purchaser, if so specified.	Please note that Tools and tackles required for installation, testing & commissioning of GIS shall be brought to site by GIS manufacturer on returnable basis.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
37	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.31	Training	The training of employer's personnel shall be as specified in clause 11.0 "Training of Employer's Personnel" of General Technical Specification.	Noted. However, travel, accommodation, food, local transport, insurance etc. for the trainees shall be in the scope of EPC.	Bidder's understanding is in order.
38	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.32 - 3.2	Employer's specification	Atmospheric Conditions (For Outdoor Applications) - Corrosive	We confirm, offered GIS shall have corrosivity class upto C4. Kindly confirm the same.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
39	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.32 - 3.6	Employer's specification	Material For Bus-Bar Electrolytic COPPER	Please note, as per our type tested design, material for busbar shall be of Aluminium alloy.	Please refer Annexure-1
40	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.32 - 3.8	Employer's specification	Painting a. Interior - RAL 9010 (White) Glossy Finish b. Exterior - RAL 7035 (Pebble GREY) Matt Finish	We confirm the exterior paint shade shall be as specified. However, request to kindly accept interior finish of GIS enclosure as per manufacturer's standard type tested design.	Bidder to please comply with the requirements indicated in the Technical Specification. The same may be reviewed and commented during contract stage subject to customer approval
41	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.32 - 3.10	Special tools	GIS Manufacturer to Furnish Drawing Showing the Locations for Detectors	We request to keep gas detection system in EPC scope. All special tools on supply basis shall be excluded from GIS OEM's scope of supply.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
42	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.32 - 3.17	Special tools	Internal Fault Locator	Requirement is not clear. Kindly explain the requirement. All special tools on supply basis shall be excluded from GIS OEM's scope of supply.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
43	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.32 - 3.19	Special tools	Remote Online Gas Monitoring System To Be Provided	All special tools on supply basis shall be excluded from GIS OEM's scope of supply.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
44	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	9.32 - 3.21	Special tools	Offline partial discharge monitoring (PDM) system by portable device considered	All special tools on supply basis shall be excluded from GIS OEM's scope of supply.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
45	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	13	Testing	Test Requirements For Main Components	Testing on GIS shall be as per IEC 62271-203.	Performance of type test will be as per latest CEA guidelines.
46	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification	14	Special tools	GIS Maintenance Equipment	All special tools on supply basis shall be excluded from GIS OEM's scope of supply.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.

PRE_BID CLARIFICATIONS

Sr. No.	References	Description as per Tender Document	Queries from the Bidders	KHPL's Clarifications	Bidder Response (24/10/2025)	BHEL REPLY 29.10.2025
1	Chapter 9, Cl. No. 9.4. 9.4.1 x) General	Suitable glass window/telescopic port shall be provided in the circuit breaker	As per OEM Design Glass viewing window shall be provided for Disconnect and Earthing Switch (if the same is applicable for the OEM's design, as all OEM do not have viewports).	As per bidding document	We wish to inform that since Since circuit breaker is an arcing device at short circuit levels, glass window or view ports are not recommended due to safety hazard. As per OEM standard design glass windows are not applicable on circuit breaker	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed & commented during the detailed engineering stage and shall be subject to customer approval.
2	Chapter 9, Cl. No. 9.4., 9.4.1 xiv) General	The Bus and all current carrying parts shall be made of electrical grade Aluminum alloy.	The PTS specifies bus bar material as Aluminium Alloy, however the Data Sheet A1 (3.6) ask for Electrolytic copper. Bidder would like to inform that as per OEM Standard proven design, practice and type tested Al alloy busbar will be provided. Kindly accept.	The bus and all current carrying parts shall be as per bidding document or equivalent	As per OEM standard, and type tested design all current carrying conductor is Aluminium type	Please refer Annexure-1
3	Chapter 9, Cl. No. 9.19.1 Circuit breaker (ix)	The circuit breakers shall be of double interrupter design (2 breaks in series per pole) for 63 kAIC and can be of single interrupter design up to 50 kAIC and lower subject to satisfactory operation of the Circuit Breaker for Short Line Faults and Terminal Faults Test duties without the need of external devices. Circuit breakers installed close to large generating plant or controlling very long transmission Lines will be subjected to fault currents which may have delayed or no zero crossing for a considerable number of cycles due to a high X/R ratio of the system.	Bidder would like to inform that as per OEM Standard proven design and practice single interrupter circuit breaker will be supplied and Same is type tested and globally accepted. However, Type test report will be provided for review during detail engg. stage. Kindly accept.	As per the bidding document or equivalent.	As per OEM standard, and type tested design our offered 63kA circuit breaker is single interrupter type	Please refer Annexure-1
4	Chapter 9, Cl. No. 9.19.2 Page No. 230	Circuit breakers installed close to large generating plant or controlling very long transmission Lines will be subjected to fault currents which may have delayed or no zero crossing for a considerable number of cycles due to a high X/R ratio of the system.	For offered GIS the X/R ratio is design and tested as per IEC 62271-209 and IEC 62271-100.	Accepted. However, it shall be as per the latest applicable IEC Standards.	We have considered that X/R ratio corresponding to standard DC time constant of 45ms as per IEC 62271-100 shall be applicable	Please refer Annexure-1
5	Volume 4: Section – 7: PTS CHAPTER 9: 420 kV GAS INSULATED SWITCHGEAR Clause 9.30.1	D) Bending strength test and testing of impact strength for insulating rods shall be carried out on one sample in the presence of Purchaser's representative.	Kindly note that Insulator is bought out item for GIS manufacturers. Therefore, it is not feasible to perform bending test. However, test manufacturer's test certificates tested in accordance with applicable standard shall be provided for review.	As per Bidding Document.	This is not a routine test or type test of the manufactured GIS. Please note that insulating materials are sub-components of GIS and are sourced from approved sub-vendors of GIS manufacturer. Hence these tests shall not be a part of FAT, and any sample tests in presence of purchaser's representative is not envisaged	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed & commented during the detailed engineering stage and shall be subject to customer approval.
6	Volume 4 Section – 7: PTS Chapter: 9 420 kV Gas Insulated Switchgear Clause 9.32	Material For Bus-Bar - Electrolytic COPPER	As per the practice of all reputed GIS manufacturers such as Bidder, GE, Vendor, and Hysung, bus bar conductors are manufactured using aluminium instead of copper. All these OEMs have successfully type tested GIS with aluminium conductors. We therefore request you to kindly accept aluminium conductor in place of copper	As per Bidding Document.	As per OEM standard, and type tested design all current carrying conductor is Aluminium type	Please refer Annexure-1
7	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification Clause 9.8	iii) Double "O" ring design be adopted to ensure Gas tightness. The material and method of sealing used shall be stated in the tender.			We wish to inform that as per OEM standard type tested design single "O" ring is applicable. We will provide a verification test of gas tightness (relative leakage rate of ≤0.1% per annum for the above design)	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed & commented during the detailed engineering stage and shall be subject to customer approval.
8	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification Clause 9.19.1	xiv) Breaker disposition must be horizontal to provide higher mechanical stability and ease in maintenance.			The 400kV GIS configuration & arrangements and CB mounting details proposed are in line with the manufacturer's (Bidder) preferred layout which enjoy successful trouble free satisfactory operation to its various customers worldwide, wherein the circuit breaker modules are mounted vertically in a manner that minimum time for handling during installation, dismantling (or) for O&M purpose with easy access to each pole of the CB while handling of circuit breaker during operation & maintenance regime, whenever necessary, without need to removal of operating mechanism.	Bidder to comply with the requirements indicated in the Technical Specification.
9	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification Clause 9.19.5	iv) Circuit breakers shall have high repeatability of closing time over a wide range of parameters (ambient, temperature, hydraulic pressure, control voltages etc.). The time difference between first and last pole, for opening or closing shall be as follows: a. Closing: Less than 4 msecs (60Hz) and 5 msecs (50Hz) b. Opening: Less than 2.5 msecs (60Hz) and 3 msecs (50Hz)			As per IEC 62271-100, clause 6.101, The time difference between first and last pole, for opening or closing shall be as follows: i. Closing: Less than 5 msecs (50Hz) ii. Opening: Less 3.33 msecs (50Hz)	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed & commented during the detailed engineering stage and shall be subject to customer approval.
10	Volume 4: GTS, PTS, QAP Section – 7: Particular Technical Specification Clause 9.28.2	As an additional measure for the safety of personnel it shall be possible to ascertain that the particular section of the plant is de-energised before a Ground switch is closed onto the conductor. A capacitive tap shall be provided on each gas section. One loose instrument common to the complete plant, shall be supplied for connection to a capacitive tap to indicate whether the circuit is live or dead. Provision of tap to indicate status – live or dead, capacitive taps and the instrument shall be optional and quoted for separately. Required electrical interlock with VT secondary shall also be provided to ensure that the feeder/bus is dead.			For Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV maintenance of accessible parts of the main circuit are done by isolation and earthing of the main circuit by normal earth switches as well as high speed earth switches of making capability (at line side). Earth switches are interlocked with respective isolators/bus VT as applicable and high speed earth switches are interlocked with isolators or C/V.T. Further for additional safety inspection windows are provided to check the isolation distance and earth switch contact position at modules. Any VPIS (Voltage presence indicating system) incorporating capacitive or resistive coupling elements is not applicable in EHV GIS as per IEC 62271-203, unlike IEC 62271-200 (AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV) which calls for VPIS (as per IEC 62271-206). Capacitive tap for VPIS is not applicable as per IEC for EHV GIS as well as our type tested design. Installations of our GIS in other utilities are without any such capacitive tap and are in successful operation without any safety compromise.	Bidder to comply with the requirements indicated in the Technical Specification.
11	Pg 38 of 257 of TS				As GIS OEM we require minimum crane hook height 8.6 mtrs from the G.F.L (GIS finish level)	Bidder to comply with the requirements indicated in the Technical Specification.
12	Pg 26 of 257 of TS	1.12 CONTROLLED SWITCHING DEVICE FOR 3-PH CIRCUIT BREAKER 5 SET			We have considered that CSD (Controlled switching device) shall be applicable for Reactor feeder: 1 no and ICT feeder: 1 no Total: 2 nos	Bidder to comply with the requirements indicated in the Technical Specification.
13	Pg 36 of 257 of TS	Key Single Line diagram			As per key single line diagram SF6 to air bushing applicable for 1) O/G to Yangbari PS 2) ICT However as per protection SLD and Layout Cable head termination is applicable for the above feeders.	Line & ICT end are to be connected by SF6 to Cable connection

Bidder to please comply with the requirements indicated in the Technical Specification.

Schedule of Deviations from Specification

Sl. No.	Tender Specification Clause	Exception & deviations from the tender specification proposed by the bidder	Justification for deviation	BHEL REPLY 29.10.2025
1	9.1 Scope of Works	This Specification covers the requirements of sizing, design, engineering, material selection, constructional features, manufacture, inspection and testing at the VENDOR'S or his SUB-VENDOR'S Works, delivery to Site including transit insurance, installation, testing & commissioning, performance testing, training of employer's personals and handling over of Gas Insulated Switchgear.	1. Material & constructional features of GIS shall be as per OEMs standard type tested design. 2. Test reports for testing at OEMs vendor shall be provided. QAP plan shall be shared. 3. However Our offer shall be EX-works, Supply, Unloading, Storage shall be in EPCs/Customers scope. 4. We shall provide site training at factory for 2 working days for 3 or 4 personnels. Only training charges are included. Charges of travel, accomodation, and local conveyance is excluded from Bidder scope.	1. Bidder to comply with the requirements indicated in the Technical Specification. 2. Bidder to comply with the requirements indicated in the Technical Specification. 3. Please refer to the Commercial Terms for the Tender Enquiry. 4. Please refer to Bid Price Schedule "TRAINING". It is further confirmed that the charges for participants' travel, accommodation, and local conveyance are excluded from the bidder's scope.
2	9.1 Scope of Works	420kV Gas insulated switchyard (GIS) with double bus bar type consisting of.....	There are two tender SLDs, we shall follow the first tender SLD which includes 4 generator transformer bays, 1 shunt reactor bay, 2 outgoing line bays, 1 ICT bay, 1 bus coupler along with BBM+BE.	Please refer KEY SLD. Another is metering and protection diagram
3	9.1 Scope of Works	The GIS will be connected to the main power transformers and 400kv XLPE cables will connect GIS to Pothead yard.	As per tender SLD we understand that SF6 to Oil termination shall be provided for transformer bays. however for line bay & ICT bay SF6 to Air Bushing is shown. kindly confirm for Line & ICT bay SF6 to Air termination shall be provided or cable termination (as mentioned in specification) shall be provided.	For Line and ICT, SF6 to Cable connection shall be provided
4	9.3 Components of GIS Assembly	vii) Partial Discharge Monitoring devices (where applicable)	As per specification partial discharge monitoring mentioned and as per datasheet portable partial discharge monitoring mentioned kindly confirm exact requirement. however we shall provide UHF compatible sensors any other system is excluded from Bidder GIS scope of supply.	Offline PD monitoring system is to be supplied.
5	9.4 Design and Constructional Features 9.4.1 General	i) The switchgear assembly shall be suitable for indoor or outdoor installation	As per tender drawings we understand that GIS is indoor and same shall be offered.	Bidder to please comply with the requirements indicated in the Technical Specification.
6	9.4 Design and Constructional Features 9.4.1 General	vi) The GIS shall be installed on suitable mounting pads or supporting frames/structures with provision for levelling, including fasteners to foundation, which shall also be included in the supply.	Noted however baseframe of CB shall be provided, embeded steel shall be excluded from Bidder scope of supply	Bidder to comply with the requirements indicated in the Technical Specification.
7	9.4 Design and Constructional Features 9.4.1 General	Suitable glass window/telescopic port shall be provided in the circuit breaker, disconnect and grounding switch modules for ensuring proper contact making.	Viewing windows for disconnect and earthing switch shall be provided as per OEMs standard type tested design.	Bidder to comply with the requirements indicated in the Technical Specification. However, the same shall be reviewed during the detailed engineering stage and shall be subject to customer approval.
8	New clause added as per revised specification received.	Following sentences is added to the clause: "Drawing and structural embedment shall be provided by E&M contractor while installation of embedment shall be carried by Civil."	Details of embedded material (insert plates) for GIS and foundation shall be provided. However supply of insert plates is excluded from scope.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
9	9.4 Design and Constructional Features 9.4.1 General	xxv) Gas barriers shall have PD sensors.	For offered GIS PD sensors are mounted on the flanges of GIS not on gas barriers selection of PD sensors location shall be as per OEMs standard practices. (Ammended clausue : As per revised tender documents Clause No. 9.4.1 xxv) is amended as: "Mounting of PD sensors will be as per latest applicable standard. Bidder Reply : The same is closed.)	Noted. Bidder to comply with the requirements indicated in the Technical Specification, read in conjunction with the amended clause.

10	9.4 Design and Constructional Features 9.4.1 General	xxvi) In event of arcing in compartment the arc should not extend to neighbouring compartment. Any failure to the enclosure of compartment shall not lead to damages in neighbouring compartment. In view of this continuous busbar without gas segregation is not acceptable.	Since offered GIS busbar is separate gas tight compartment and does not contain any switching devices thus chances of fault occurrence in busbar chamber are very less thus we shall offer continuous busbar, Request customer to confirm.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
11	9.7 GIS Gas Section	v) Compartmentalisation shall be provided for circuit breaker, Busbar, Current transformer, Voltage transformer, Surge arrester (if specified in data sheet), Disconnecter along with Earthing switch and Cable sealing end, SF6 to Air Bushing, SF6 Bus Ducts in the switchgear assembly.	Current transformer being passive element shall be part or line side disconnecter considering the technicalities of the substation. This is inline with OEMs standard practices.	The same shall be reviewed and commented upon during the detailed engineering stage & the same shall be subject to customer approval.
12	9.8 SF6 Gas system and associated devices	xii) In the event of gas leakage, all parts of the switchgear in the affected compartment shall be able to withstand continuously the maximum rated voltage with SF6 gas at atmospheric pressure.	BIL is guaranteed as per IEC for minimum rated pressure.	The bidder to comply TS. However the same shall be reviewed and commented upon during the detailed engineering stage & the same shall be subject to customer approval.
13	9.8 SF6 Gas system and associated devices	xv) Gas leakage detectors of an approved type shall be provided.	Supply of same shall be excluded from Bidder GIS scope of supply.	Please refer Bid Price Schedule. The bidder is requested to comply with the requirements specified in the Technical Specification.
14	9.8 SF6 Gas system and associated devices	xvii) GIS shall be equipped with the remote online GAS monitoring system. The gas pressure of each compartment shall be able to be monitored remotely from SCADA. The system shall have the facility to pinpoint the exact gas module in the bay where gas leakage problem is there.	We shall offer analogue type gas density monitors for continuous gas monitoring on each gas tight compartment which shall be wired up to LCC and LCC shall have the alarm supervision for checking the status. LCC is equipped with required hardware with hard logic interlocks complying to technical requirement. Cabling between LCC to CRP / SCADA shall be excluded from scope. Further to add the only status of gas shall be seen SCADA.	1. Online Gas Monitoring System, including Local Monitoring Display Unit and HMI Panel for GIS, is in the scope of the bidder. 2. SCADA System is not in the bidder's scope of supply. 3. Please refer to Section-1A, Clause 8 — "Internal Cables" for the scope of cable supply.
15	9.8 SF6 Gas system and associated devices	xviii) At each gas compartment, provisions shall be made for connecting online moisture measurement instrumentation and the gas service cart. The moisture content in the gas shall not exceed 150 ppmv (parts per million per volume) in circuit breakers, and 250 ppmv at rated pressure at 20degC in other equipment.	We do not envisage online moisture measurement. Gas is tested as per IEC in factory and at site also. Gas purity shall be measured at site also. However from dew point meter the same shall be measured supply of dew point meter shall be excluded from Bidder GIS scope of supply.	Bidder to comply with the requirements indicated in the Technical Specification.
16	9.8 SF6 Gas system and associated devices (Amended clause as per revised tender documents received)	The clause is amended as: "At each gas compartment, provisions shall be made for connecting to dew point meter. Supply of dew point meter is in the scope of bidder."	At each gas compartment provision is available for connection of dew point meter. Supply of dew point meter is excluded from scope. If required optional price shall be provided.	Please refer Annexure-1
17	9.8 SF6 Gas system and associated devices	SF6 gas filters shall be as follows: a) For moisture (H2O): b) For gaseous arc by-products: c) For particles (generally dust residues) or solid arc by-products:	Same shall be as per OEMs standard practices inline with standards.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
18	9.8 SF6 Gas system and associated devices	xxiv) The total design shall incorporate facilities for SF6 storage adjacent to the installed switchgear assembly.	We shall not provide any facility, SF6 gas bottles shall be provided. (As per revised tender documents Clause 9.8 xxiv) is "deleted". Hence the same is closed.)	Noted. Bidder to comply with the requirements indicated in the Technical Specification, read in conjunction with the amended clause.
19	9.13 SF6 Gas Monitoring devices		We shall offer temperature compensated density monitor which shall monitor the gas continuously any other system is excluded from Bidder GIS scope.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
20	9.15 GIS Earthing		Our scope shall be limited to providing earthing provision & earthing proposal. Supply of earthing material & other accessories shall be excluded from Bidder energy scope.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.

21	9.19.1 Circuit breakers	ix) The circuit breakers shall be of double interrupter design (2 breaks in series per pole) for 63 kAIC and can be of single interrupter design up to 50 kAIC and lower subject to satisfactory operation of the Circuit Breaker	Offered GIS shall have single break facility inline with OEMs standard type tested design.	Please refer Annexure-1
22	9.19.2 The breakers shall be capable of:	i) Circuit breakers installed close to large generating plant or controlling very long transmission Lines will be subjected to fault currents which may have delayed or no zero crossing for a considerable number of cycles due to a high X/R ratio of the system. The GIS Manufacturer shall propose a suitable Circuit Breaker which can mitigate the high reactive component to achieve the opening of the Circuit Breaker at current zero within the normal operating time of the breaker.	Please confirm the X/R ratio. Offered GIS X/R shall be 14.	Please refer Annexure-1
23	9.19.2 The breakers shall be capable of:	ii) Purchaser shall furnish the Network parameters for the delayed zero passage condition, if applicable to the GIS Manufacturer after award of Contract. The GIS manufacturer shall prove by calculations and by factory tests that the Circuit Breaker can safely interrupt the fault without restrikes.	Offered GIS is tested inline with IEC standards. We shall not perform any studies.	Not agreeable, Bidder to please comply with the requirements indicated in the Technical Specification.
24	9.19.3 Closing/Opening Resistors/Reactors (Where Applicable)		We understand that the same is not applicable for offered GIS. Please confirm	The same shall be reviewed during the detailed engineering stage and will be subject to customer approval.
25	9.19.6 Spring and Hydraulic-Spring Operated Mechanism	vi) When closing springs are discharged after closing a breaker, closing springs shall automatically be charged for the next operation and an indication of this shall be provided in the local control cabinet & SAS.	We shall provide the indication to local control cubical however connection from LCC to CRP/ scada shall be excluded from Bidder GIS Scope supply.	Bidder's understanding is in order.
26	9.20 Disconnect switches and ground switches	xix) Interlocks : a) Electrical and Mechanical interlocks shall be provided for absolute and positive protection against potentially harmful mal operations of the switchgear.	Electrical Interlocks & padlocking arrangement shall be provided as per OEMs standard type tested design.	The same shall be reviewed during the detailed engineering stage and will be subject to customer approval.
27	9.20 Disconnect switches and ground switches	b) Disconnect Switch and Grounding switch shall be mechanically interlocked such that it will not be possible to close the Grounding switch when the Disconnect Switch is closed or vice-versa.		
28	9.21 Instrument Transformer ii) Voltage Transformers	c) In case of ungrounded voltage transformers both the terminals of the primary winding shall be brought out through bushings rated for full line voltage. In case of Grounded voltage transformers, the end of the primary winding intended to be grounded shall be brought out through a bushing and Grounding connection shall be made outside.	For offered GIS we understand that the system is solidly earthed. The rated voltage factor for Vt shall be 1.2 continuous and 1.5 for 30 sec in line with IEC standards. Request customer concurrence on same.	Bidder to please comply with the requirements indicated in the Technical Specification.
29	9.21 Instrument Transformer ii) Voltage Transformers	e) Whenever a VT secondary winding is used for both measurement and protection application it shall have dual accuracy class of 0.5/3P, unless otherwise specified. However, for revenue class metering applications the accuracy class shall be 0.2 for that core or as per Utility requirements.	We shall refer VT parameters as mentioned in tender SLD only. Request customer to confirm.	

30	9.21 Instrument Transformer iii) Current Transformers	(a) Accuracy Class 5P20, Class PX, Class TPS etc and class 0.2/0.2S for revenue metering as required shall be provided as specified in the single line diagram.	We shall offer CT VT parameters as per Tender SLD received only. Any changes in CT VT parameters other than offered may have time & price implications.	Bidder to please comply with the requirements indicated in the Technical Specification.. Separate cores for metering and protections for the CTs and PTs are required. For supply, SLD to be referred.
31	9.25.2 Local control panel	Bay Control Unit shall be provided in the LCP for control and indication purpose while interfacing with SCADA/SCS to reduce the hardwiring if specified in Data Sheet A1. BCU's shall be placed in an air-conditioned environment.	BCU shall be part of CRP. Hence same is excluded from GIS OEM scope of supply. LCC is equipped with required hardware with hard logic interlocks complying to technical requirement and no soft logic interlocks are provided.	Please refer Annexure-1
32	9.25.3 Control & Auxiliary Power Supply	i) For alarm, auxiliary devices, annunciation and indication, separate control supply feeder shall be provided by the Purchaser to each Local Control Panel.	Separate control supply is excluded from Bidder GIS scope of supply.	Please refer Section-1A, clause 8. INTERNAL CABLES for scope of cable supply
33	9.25.6 Internal Wiring	iii) Alarms to be made available to HMI at control room.	Bidder GIS scope shall be limited to cabling between GIS to LCC. However HMI and its connection are excluded from Bidder GIS scope of supply.	Please refer Section-1A, clause 8. INTERNAL CABLES for scope of cable supply
34	9.28 Miscellaneous Requirements		The same shall be excluded from scope of supply.	Bidder to please comply with the requirements indicated in the Technical Specification.
35	9.30 Testing		All testings shall be as per attached QAP inline with IEC standard.	Type Testing as per CEA guideline
36	9.30.2 Type tests	iii) The type tests shall be carried out at reputed testing laboratory, the tests must have been carried out during last 5 years.	As per CEA guidelines type test validity shall be 15years, Request customer to confirm.	Type Testing as per CEA guideline
37	9.30.2 Type tests	iv) BIDDER shall carry out the following additional type tests as per relevant IEC standard and furnish test reports to the purchaser:	All the type test shall be as per IEC, summary of type test shall be provided, we do not envisaged to carry the additional type test request customer to confirm the same.	Performance of type test will be as per latest CEA guidelines.
38	9.32 Employers Specification 3.0 GIS parameters & GIS Busducts	3.6 Material For Bus-Bar : Electrolytic COPPER	Busbar shall be made of aluminium as per OEMs standard type tested product, supplied in indian and export market.	Please refer Annexure-1
39	9.32 Employers Specification 3.0 GIS parameters & GIS Busducts	3.17 Internal Fault Locator	The same is not applicable however request customer to clarify the exact requirement.	Bidder to please comply with the requirements indicated in the Technical Specification.
40	9.32 Employers Specification 13.0 Test Requirements For Main Components		All the test shall be as per attached QAP only inline with IEC standards.	Bidder to please comply with the requirements indicated in the Technical Specification.
41	9.32 Employers Specification 14.0 GIS Maintenance Equipment		Supply of same shall be in EPCs scope.	Bidder to please comply with the requirements indicated in the Bid Price Schedule & Technical Specification.
42	9.32 Employers Specification 15.0 Test Bushing And Other Necessary Testing Equipment To Facilitate Site Testing.		We shall provide one no of test bushing for testing purpose however required tools & tackles and HV test kits shall be in EPCs Scope.	Bidder to please comply with the requirements indicated in the Bid Price Schedule & Technical Specification.
43	9.32 Employers Specification 16.0 Mobile Gas Treatment Plant To Be Included		Supply of same shall be in EPCs scope.	Bidder to please comply with the requirements indicated in the Bid Price Schedule & Technical Specification.
44	General		What are the anticipated number of switching operations which the CB will perform during its operating cycle.	This is an hydro power project and accordingly may be operated as peak load / base load plant. Please consider the same
45	General		Kindly confirm if the subject requirement calls for Generator synchronisation.	Bidders understanding is in order
46	General		Kindly share the X/R details and DC component requirements.	Please refer Annexure-1
47	General		Generator Circuit breaker shall be available at LV side and offered GIS CBs are not used for generator switching and synchronization.	GIS CB shall be used for generator switching and synchronization.
48	General		Offered GIS CB shall not be used as backup CB for GCB.	Please refer to the SLD. GCB is not envisaged.

49	General		Kindly support with the layout also confirm if there is requirement of building expansion.	Please refer Annexure-1
50	General		We understand that the line length is less than 200 km , and thus PIR CBs are not offered for line bays. Request customer concurrence on same.	PIR is not envisaged


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! B H E L ! generator excitation data !sheet: 01 of 01 !
! HGE-2016 !
=====
!customer/project:KHORLOCHHU HPP, M/s Khorlochhu Hydro Power Ltd., Bhutan !
=====
!w.o.no. : TENDER no.of units :4 !
=====
!generator/! hydro / vertical !
=====
! !kva ! 167000 ! amps ! 6987 ! rpm ! 375.00! d r i v e !
! rating !====!=====!=====!=====!=====!=====!=====!=====!
! ! kv !13.8±10 %! p f ! 0.900 ! h z !50±5.0%! V.Pelton !
!=====
! ! xd ! 0.897 ! xdd ! 0.210 ! tdod ! 10.46 !rf20 ! 0.1719 !
! machine !====!=====!=====!=====!=====!=====!=====!=====!
! ! xq ! 0.552 ! xddd ! 0.137 ! tdd ! 2.45 !rf75 ! 0.2091 !
! constants !====!=====!=====!=====!=====!=====!=====!=====!
! ! xl ! 0.087 !tdodd ! 0.063 ! tddd ! 0.04 !rf130! 0.2463 !
!=====
! e x c i t a t i o n !amps ! volt ! res.!
!=====
! a !open circuit :rated voltage- 13.80 kv ! 684! 135!0.192!
!=====
! b !rated load:150300kw 167000kva 13.80kv 50.0hz0.90pf! 1102! 253!0.226!
!=====
! c !rated load:150300kw 167000kva 14.49kv 47.5hz0.90pf! 1209! 285!0.233!
!=====
! d !over load:165330kw 183700kva 13.80kv 50.0hz0.90pf! 1152! 272!0.233!
!=====
! e !over load:165330kw 183700kva 14.49kv 47.5hz0.90pf! 1258! 305!0.240!
!=====
! f !synch.cond: 104375kva. 13.80kv zpf leading ! 1102! 253!0.226!
!=====
! g !line charging: 140570kva 13.80kv zpf leading ! 169! 33!0.172!
!=====
! h !short circuit: full load stator current ! 551! 120!0.192!
!=====
! i !ceiling : for 10 second duration ! ! !
!=====
! excitation! t y p e ! STATIC !
! !=====!=====!=====!=====!
! equipment ! r a t i n g ! 1400 a 350 v 490 kw v ceiling !
!=====
! field current at instant of f.c.b! a.c.comp.! 1121 amps !
! opening under 3-phase short circuit ! ! !
! (maximum prior to load) ! d.c.comp.! 3014 amps !
!=====
! additional information: !
! site conditions :amb.temp.: oc altitude: humidity: !
! auxiliary supply: ac dc !
! field winding test voltage: 2.53 kv(rms) for 60 seconds !
! PROVISION OF MEASUREMENT AND DISPLAY OF ROTOR TEMPERATURE ALONGWITH !
! ALARM AND TRIP SIGNALS TO BE MADE IN-BUILT IN THE EXCITATION SYSTEM. !
!=====
!revision: !distribution!hydrogenerator engineering division !
! !-----! bharat heavy electricals limited !
! ! hge: 2 ! bhopal !
! ! hse: 2 !-----!
! ! ! prepared !approved ! d a t e !
! ! !-----!-----!
!date: ! SBS ! PKV ! 24.09.2025 !
!=====

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Generator & Transformer data are to be considered for GIS design

Generator Data

X shall be = 0.137 PU

And Stator winding resistance per phase at 20 Deg. C = 0.00138 Ohms.

Armature time constant, Ta = 0.28

KHORLOCHHU HPP, M/s Khorlochhu Hydro Power Ltd., Bhutan

NGT AND NGR DATA

```
!=====!  
! neutral earthing calculations                                     !  
! trfr.continuous    one min  five min  thirty min    resistor      !  
!   40   13.8 kv/ 220v   188     112      72          127v  688a  0.18 ohm  !  
!=====!  
! Designed:                               Checked:                Approved:      !
```

Generator Transformer & Transformer data

X/R ratio for 63 MVA GT is Approx 58.5

X/R ratio for 67 MVA ICT is approx 79.

LINE LENGTH

Approximate 75km