Bharat Heavy Electricals Limited

(A Govt. of India Undertaking)
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CORRIGENDUM - 05 TO NIT NO-66823

Subject: Corrigendum-05 to Tender enquiry for Pre-bid Tie up for Supply & Services of 230kV and 66kV GIS for CPCL Nagapattinam Refinery Project.

Project	: CPCL Nagapattinam Refinery PROJECT
Equipment / Item	: SUPPLY & SERVICES OF 230kV and 66kV.
Enquiry No/Date	: 61Q2300095 Dated 16.07.2022
BHEL NIT NO	: 66823
Original Tender due date	**: 18.07.2022**

Please find enclosed Technical corrigendum issued against above mentioned NIT/ enquiry**. Revised Price bid schedule is also enclosed herewith based on technical corrigendum.**

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

Bidder to ensure submission of offer on or before due.

Note: Tender ID in CPP Portal is **2022_BHEL_15373_1.**

Thanking you

-------Sd/------
Gaurav Agarwal
BHEL TBG, NOIDA

Annexure_BOQ_230kV & 66kV GIS CPCL_TABLE

Pre Bid Tie up for,

Design, Engineering, Supply, Erection*, Testing & Commissioning of 230kV & 66kV GIS for Cauvery Basin Refinery (CBR), Chennai Petroleum Corporation Ltd. (CPCL) at Nagapattinam, Tamil Nadu.

* - only supervision of Erection will be in bidder's scope.

Sl. No.	BOQ DESCRIPTION
A	**230kV GIS for CBR, CPCL at Nagapattinam, Tamil Nadu**
A.1	Annexure_BOQ_CPCL_230kV GIS- MAIN & INSTRUMENTS
A.2	Annexure_BOQ_CPCL_230kV GIS- SPARE
A.3	Annexure_BOQ_CPCL_230kV GIS- SERVICES
B	**66kV GIS for CBR, CPCL at Nagapattinam, Tamil Nadu**
B.1	Annexure_BOQ_CPCL_66kV GIS- MAIN & INSTRUMENTS
B.2	Annexure_BOQ_CPCL_66kV GIS- SPARE
B.3	Annexure_BOQ_CPCL_66kV GIS- SERVICES

Annexure_BOQ_230kV CPCL_MAIN & INSTRUMENTS

Sl. No.	Item Description	Unit	Qty.	Remarks
1	**Supply- GIS: 230kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
1.01	SUPPLY- GIS:230KV, 3150A, SF6 GIS LINE FEEDER BAY MODULE- INCOMING FFEDER FROM TNSEB GRID-1/2 (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	2	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.02	SUPPLY- GIS: 230KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- OUTGOING FEEDER TO 220/66KV ICT (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	2	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.03	SUPPLY- GIS: 230KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- SPARE BAY FOR FUTURE SIMILAR TO ICT WITH AIR TO SF6 BUSHING WITH GIB/ CABLE CONNECTION MODULE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	1	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.04	SUPPLY- GIS: 230KV, 3150A, SF6 GIS BUS COUPLER FEEDER BAY MODULE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	1	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.05	SUPPLY- GIS: 230KV, 3150A, SF6 GIS BUS BAR MODULE WITH BUS VT BAY & BUS EARTH SWITCH (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	2	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.06	SUPPLY- GIS : 230KV, 3150A, SINGLE PHASE GIB DUCT OUTSIDE GIS HALL (INCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	MTR	250	Gas insulated duct shall be measured from last equipment of GIS bay. Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.07	SUPPLY- GIS : 230KV, 3150A, SINGLE PHASE SF6 TO AIR BUSHING (INCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	12	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS. 1 SET= 1 NO. FOR 1 PHASE
1.08	SUPPLY- GIS~~: SPARES:~~ 230kV CLASS SF6 GIS SURGE ARRESTER (INCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING)	SET	1	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS. This is an optional Item, to be finalized as per detailed engineering. 1 SET= 1 NO. FOR 1 PHASE
1.09	SUPPLY- GIS: ~~SPARES:~~ 230kV SF6 GIS VOLTAGE TRANSFORMER (INCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING)	SET	6	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS. ~~This is an optional Item, to be finalized as per detailed engineering.~~ 1 SET= 1 NO. FOR 1 PHASE

Annexure_BOQ_230kV CPCL_MAIN & INSTRUMENTS

Sl. No.	Item Description	Unit	Qty.	Remarks
1.10	SUPPLY- GIS: SF6 GAS REQUIRED FOR PLACING GIS BAYS INTO SUCCESSFUL OPERATION (EXCLUDING REQUIREMENT OF BUS DUCT, SF6 TO AIR BUSHING, SURGE ARRESTOR & VT ETC.)	LOT	1	Please refer clause 4.5 & 9.1, Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.11	SUPPLY- GIS: STRUCTURE MATERIAL, FOUNDATION BOLTS, EMBEDDED ITEMS, RAILS AND/ OR ANY OTHER MATERIALS ETC (EXCLUDING REQUIREMENT OF BUS DUCT, SF6 TO AIR BUSHING, SURGE ARRESTOR & VT ETC.)	LOT	1	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.12	SUPPLY- GIS: EARTHING MATERIALS WITH HIGH FREQUENCY EARTHING, IF APPLICABLE FOR COMPLETE GIS SYSTEM (EXCLUDING REQUIREMENT OF BUS DUCT, SF6 TO AIR BUSHING, SURGE ARRESTOR & VT ETC.)	LOT	1	Please refer clause 4.15, Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.13	SUPPLY- GIS: LOCAL CONTROL CUBICLES	SET	6	Please refer clause 7.0, Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS. Local control cubicles requirement for Bus VT and Bus E/ swicth shall be included in adjacent bay.
1.14	SUPPLY- GIS: ONLINE PARTIAL DISCHARGE MONITORING (PDM) SYSTEM	LOT	1	Please refer clause 4.12, Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.15	SUPPLY- GIS: 230kV, 3150A, SF6 GIS END PIECE/ INTERFACE MODULE FOR FUTURE GIS EXTENSION MODULE	SET	2	
1.16	SUPPLY- GIS: 230kV, 3150A, SF6 GIS BUS BAR EXTENSION MODULE	SET	1	Optional item, applicable in case of change in architectural layout of GIS building.
1.17	SUPPLY- GIS: 230kV, 3150A, CSD SUITABLE FOR 230KV & 66KV CIRCUIT BREAKER	SET	1	Optional item, it shall be applicable as per detailed engineering.
2	**Supply- GIS: Special Tools and Testing & Maintenance Instruments as per TS**			
2.01	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: Mobile SF6 gas treatment plant	NO	1	Please refer clause 9.2, section-2.
2.02	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: Two-wheel gas maintenance cart	NO	1	Please refer clause 9.3, section-2.
2.03	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: SF6 Gas maintenance cart	NO	1	Please refer clause 9.4, section-2.

Annexure_BOQ_230kV CPCL_MAIN & INSTRUMENTS

Sl. No.	Item Description	Unit	Qty.	Remarks
2.04	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: SF6 gas leakage test equipment	NO	1	Please refer clause 9.5, section-2.
3	**Supply- GIS: Special Tools & Tackles as per TS**			
3.01	SUPPLY- GIS: SPECIAL TOOLS AND TACKLES: Any other special tool required for the purpose of installation, maintenance, overhauling and testing of GIS shall be provided by bidder. Bidder to recommend the special tools & tackles required.	LOT	1	Please refer clause 9.6, section-2.

Annexure_BOQ_230KV CPCL_MANADATORY SPARES

Sl. No.	Item Description	Unit	Qty.	Remarks
4	**Spares-GIS: Mandatory Spares for 230kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
4.01	SUPPLY- GIS: SPARES: Portable gas filling equipment/ SF6 gas cart	NO	1	
4.02	SUPPLY- GIS: SPARES: 230kV, Handle for disconnector switch drive	NO	2	
4.03	SUPPLY- GIS: SPARES: 230kV, Handle for earthing switch drive	NO	2	
4.04	SUPPLY- GIS: SPARES: 230KV, Pre selection/ mechanical key	NO	1	
4.05	SUPPLY- GIS: SPARES: 230KV, Power cable termination kit along with plug and socket (R,Y, B Phases)	SET	2	1 SET= 1 No. for each type of cable size for all R, Y, B phase
4.06	SUPPLY- GIS: SPARES: 230KV, Tripping coil	LOT	1	1 LOT= 20% spare of total quantity
4.07	SUPPLY- GIS: SPARES: 230KV, Closing coil	LOT	1	1 LOT= 20% spare of total quantity
4.08	SUPPLY- GIS: SPARES: 230KV, Capacitive type voltage detectors	SET	1	1 SET= 1 No. for each type of cable size for all R, Y, B phase
4.09	SUPPLY- GIS: SPARES: 230KV, Control fuses/ MCB	SET	1	1 SET= 10 No. for each type and rating
4.10	SUPPLY- GIS: SPARES: 230KV, Density / Pressure Gauge	SET	2	1 SET= 1 No. for each type
4.11	SUPPLY- GIS: SPARES: 230KV, Indicating lamps covers	LOT	1	1 LOT= Min. 5 No. of different colours for every 5 feeders of similar group
4.12	SUPPLY- GIS: SPARES: 230KV, Indicating lamps	LOT	1	1 LOT= Min. 5 No. of different colours for every 5 feeders of similar group
4.13	SUPPLY- GIS: SPARES: 230KV, Auxiliary relays for LCC/ drive mechanism etc.	LOT	1	1 LOT= 10% or Min. 2 No. of each type
4.14	SUPPLY- GIS: SPARES: Portable SF6 gas leakage detector	NO	1	
4.15	SUPPLY- GIS: SPARES: 230KV, Ethernet Switch	SET	1	1 SET= 1 No. of each type
5	**Supply- GIS: Commissioning Spares as per TS**			
5.01	SUPPLY- GIS: COMMISSIONING SPARES: Commissioning Spare Parts shall be provided along with main equipment/ 230KV GIS as per OEMs recommendations. The list of such recommended commissioning spares shall be proposed by bidder.	LOT	1	

Annexure_BOQ_230KV CPCL_MANADATORY SPARES

Sl. No.	Item Description	Unit	Qty.	Remarks
6	**Supply- GIS: Recommended Spare for Normal Operation & Maintenance as TS**			
6.01	SUPPLY- GIS: RECOMMENDED SPARE FOR NORMAL OPERATION & MAINTAINENCE: Two-years spares for normal operation and maintenance (over and above mandatory spares) along with unit price is to be proposed by bidder	LOT	1	
7	**Spares-GIS: Reference Unit Price for addition/ deletion of supply items of 230kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
	Unit Prices of Individual Equipment included here or in mandatory spares are required for any Addition/Deletion of Equipment and replacement of damaged items. Vendor to ensure that the unit prices have a logical relationship with prices of assemblies in main items. Quoting for unit prices is mandatory and shall be considered for evaluation			
7.01	SUPPLY- GIS: SPARES: 230kV, OPERATING MECHANISM FOR CIRCUIT BREAKER	SET	1	1 SET= Operating Mechanism for 1 Pole of Circuit Breaker complete in all respect
7.02	SUPPLY- GIS: SPARES: 230kV, OPERATING MECHANISM FOR DISCONNECTOR	SET	1	1 SET= Operating Mechanism for 3 Poles of Disconnector complete in all respect
7.03	SUPPLY- GIS: SPARES: 230kV, OPERATING MECHANISM FOR MAINTENANCE EARTHING SWITCH	SET	1	1 SET= Operating Mechanism for 3 Poles of Maintenance Earthing Switch complete in all respect
7.04	SUPPLY- GIS: SPARES: 230kV, OPERATING MECHANISM FOR FAST ACTING EARTHING SWITCH	SET	1	1 SET= Operating Mechanism for 1 Pole of High Speed Earthing Switch complete in all respect
7.05	SUPPLY- GIS: SPARES: 230kV, CIRCUIT BREAKER	SET	1	1 SET= 1 Pole complete in all respect
7.06	SUPPLY- GIS: SPARES: 230kV, DISCONNECTOR	SET	1	1 SET= 1 Pole complete in all respect
7.07	SUPPLY- GIS: SPARES: 230kV, MAINTENANCE EARTHING SWITCH	SET	1	1 SET= 1 Pole complete in all respect
7.08	SUPPLY- GIS: SPARES: 230kV, FAST ACTING EARTHING SWITCH	SET	1	1 SET= 1 Pole complete in all respect
7.09	SUPPLY- GIS: SPARES: 230kV, CURRENT TRANSFORMER	Set	1	1 SET= 1 No. each type and rating in complete in all respect
7.10	SUPPLY- GIS: SPARES: 230kV, VOLTAGE TRANSFORMER	Set	1	1 SET= 1 No. each type and rating in complete in all respect
7.11	SUPPLY- GIS: SPARES: 198kV SURGE ARRESTER	Set	1	1 SET= 1 No. complete in all respect
7.12	SUPPLY- GIS: SPARES: 230kV, SINGLE PHASE BUS BAR	MTR	1	
7.13	SUPPLY- GIS: SPARES: 230kV, GIS METALLIC ENCLOSURE	KG	50	
7.14	SUPPLY- GIS: SPARES: 230kV, EXPANSION JOINTS	SET	1	1 SET= 1 No. of each type
7.15	SUPPLY- GIS: SPARES: 230kV, BARRIER INSULATOR	SET	1	1 SET= 1 No. of each type
7.16	SUPPLY- GIS: SPARES: 230kV, NON-BARRIER INSULATOR	SET	1	1 SET= 1 No. of each type
7.17	SUPPLY- GIS: SPARES: 230kV, GAS SEALS	SET	1	1 SET= 1 No. of each type
7.18	SUPPLY- GIS: SPARES: 230kV, GAS DENSITY MONITOR SWITCH	SET	1	1 SET= 1 No. of each type
7.19	SUPPLY- GIS: SPARES: 230kV, UHF PD SENSOR	SET	1	1 SET= 1 No. of each type

Annexure_BOQ_230KV CPCL_MANADATORY SPARES

Sl. No.	Item Description	Unit	Qty.	Remarks
7.20	SUPPLY- GIS: SPARES: 230kV, GAS PRESSURE SWITCH	SET	1	1 SET= 1 No. of each type
7.21	SUPPLY- GIS: SPARES: 230kV, TEE BEND	SET	1	1 SET= 1 No. of each type
7.22	SUPPLY- GIS: SPARES: 230kV, ANGLE BEND	SET	1	1 SET= 1 No. of each type
7.23	SUPPLY- GIS: SPARES: 230kV, L-BEND	SET	1	1 SET= 1 No. of each type

Annexure_BOQ_230KV CPCL_SERVICES

Sl. No.	Item Description	Unit	Qty.	Remarks
8	**Services- GIS: 230kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
8.01	SERVICES- GIS: SUPERVISION OF ERECTION: 230KV, SF6 GIS BAY MODULE	SET	6	Supervision of erection of GIS system, complete in all respect including LCC and other accessories. It also includes supervision of unloading & verification of materials for proper storage at site. GIS bay having GIS circuit Breaker shall be treated as Bay Module.
8.02	SERVICES- GIS: TESTING & COMMISSIONING: 230KV, SF6 GIS BAY MODULE	SET	6	Testing and commissioning of complete GIS system, is to be executed by vendor. All testing instruments, kits, T&P etc. are to be arranged by contractor on returnable basis. GIS bay having GIS circuit Breaker shall be treated Bay Module.
8.03	SERVICES- GIS : 230KV, SUPERVISION OF ERECTION OF 1 PHASE GAS INSULATED BUS DUCT	MTR	250	
8.04	SERVICES- GIS : 230KV, TESTING & COMMISSIONING OF 1 PHASE GAS INSULATED BUS DUCT	MTR	250	
8.05	SERVICES- GIS : 230KV, SUPERVISION OF ERECTION OF 1 PHASE, SF6 TO AIR BUSHING	SET	12	
8.06	SERVICES- GIS : 230KV, TESTING & COMMISSIONING OF 1 PHASE, SF6 TO AIR BUSHING	SET	12	
8.07	SERVICES- GIS: FINAL SUCCESSFUL HV/ POWER FREQUENCY TESTING OF GIS INCLUDING ARRANGING OF HV TEST KIT ALONG WITH OPERATOR	Lot	1	Carrying out successful HV/ Power Frequency Testing of complete GIS as per IEC including Arrangement of HV Test kit (on returnable basis) shall be in scope of bidder, which includes charges for HV test kit with vendor, accessories & tools required for completion of HV testing. Bays may be commissioned in phase wise manner.
8.08	SERVICES- GIS: INSULATION CO-ORDINATION & VFTO STUDIES FOR GIS SYSTEM COMPLETE	LOT	1	1 LOT= Insulation co-ordination and VFTO studies for 230kV GIS system complete
9	**Services-GIS: Reference Unit Price for addition/ deletion of supply items of 230kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
9.01	SERVICES- GIS : REFERENCE UNIT PRICE OF GIS INDIVIDUAL ITEM/ EQUIPMENT - SERVICES FOR SUPERVISION OF ERECTION OF GIS	MAN-DAY	10	Charges for repetition of services - (if required due to reasons not attributed to the contractor) This item will be executed only if repetition of services is required by BHEL.
9.02	SERVICES- GIS : REFERENCE UNIT PRICE OF GIS INDIVIDUAL ITEM/ EQUIPMENT - SERVICES FOR TESTING & COMMISSIONING OF GIS	MAN-DAY	10	Charges for repetition of services - (if required due to reasons not attributed to the contractor) This item will be executed only if repetition of services is required by BHEL.
9.03	SERVICES- GIS : REFERENCE UNIT OF GIS INDIVIDUAL ITEM/ EQUIPMENT - HIRING CHARGES OF HV TEST KIT WITH OPERATOR	LOT	1	Additional HV test kit charges including charges of operator, HV test kit, accessories & tools required for completion of HV test (Dielectric Test after installation of GIS). This item is executed only if repetition/ additional HV Test is required by BHEL i.e. post successful commissioning of GIS. (if required due to reasons not attributed to vendor)

10	**Services-GIS: Training of customer/ owner Personnel as per TS**			
10.01	SERVICES- GIS : Training- Training for Maintenance Engineers in batch (3 batches) for 2 Days (Max 4 Persons per batch) at Vendors works.	MAN-DAY	24	2 engineers from BHEL/TBG is also included.
10.02	SERVICES- GIS : Training- Training for Operators in batch (2 batches) for 3 days (Max 7 Persons per batch) at Site works.	MAN-DAY	42	2 engineers from BHEL/TBG is also included.

Annexure_BOQ_66kV CPCL_MAIN & INSTRUMENTS

Sl. No.	Item Description	Unit	Qty.	Remarks
1	**Supply- GIS: 66kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
1.01	SUPPLY- GIS: 66KV, 3150A, SF6 GIS LINE FEEDER BAY MODULE- INCOMING FFEDER FROM 230/66KV ICT (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	2	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.02	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- INCOMING FEEDERS FROM GTR-1/2/3/4 (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	4	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.03	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- SPARE INCOMING FEEDER SIMILAR TO GTR (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	1	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.04	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- INCOMING FEEDERS FROM STR-1/2/3 (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	3	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.05	SUPPLY- GIS: 66KV, 3150A, SF6 GIS BUS COUPLER FEEDER BAY MODULE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	2	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.06	SUPPLY- GIS: 66KV, 3150A, SF6 GIS BUS SECTIONALISER MODULE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	2	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.07	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- OUTGOING FEEDERS FOR LSTK CONTRACTOR (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	4	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.08	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- OUTGOING FEEDERS FOR CUSTOMER BAYS (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	33	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.09	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- SPARE OUTGOING FEEDERS FOR CUSTOMER (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	8	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.10	SUPPLY- GIS: 66KV, 3150A, SF6 GIS BUS BAR MODULE WITH BUS PT BAY & BUS EARTH SWITCH (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	4	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.

Annexure_BOQ_66kV CPCL_MAIN & INSTRUMENTS

Sl. No.	Item Description	Unit	Qty.	Remarks
1.11	SUPPLY- GIS : 66KV, 3150A, SF6 GIS CABLE CONNECTION MODULE SUITABLE UP TO MIN. 1CX630SQMM SIZE CABLE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	63	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS. 1 SET= 1 No. FOR ALL 3 PHASES
1.12	SUPPLY- GIS: ~~SPARES:~~ 66kV CLASS, SF6 GIS SURGE ARRESTER (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	55	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS. 1 SET= 1 No. FOR ALL 3 PHASES
1.13	SUPPLY- GIS: ~~SPARES:~~ 66kV, SF6 GIS VOLTAGE TRANSFORMER (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	SET	9	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS. 1 SET= 1 NO. FOR ALL 3 PHASES
1.14	SUPPLY- GIS: SF6 GAS REQUIRED FOR PLACING GIS BAYS INTO SUCCESSFUL OPERATION	LOT	1	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.15	SUPPLY- GIS: STRUCTURE MATERIALS, FOUNDATION BOLTS, EMBEDDED ITEMS, RAILS AND/ OR ANY OTHER MATERIALS ETC.	LOT	1	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS.
1.16	SUPPLY- GIS: EARTHING MATERIALS WITH HIGH FREQUENCY EARTHING, IF APPLICABLE FOR COMPLETE GIS SYSTEM	LOT	1	Please refer clause 4.15, section-2.
1.17	SUPPLY- GIS: LOCAL CONTROL CUBICLES	SET	59	Please refer Section-2 along with drawing KEY SINGLE LINE DIAGRAM FOR CPP, METERING & PROTECTION SLD FOR 230KV & 66KV GIS & ELECTRICAL EQUIPMENT LAYOUT FOR 66kV MAIN DISTRIBUTION (CPP) & 230kV SUB STATIONS. Local control cubicles requirement for Bus VT and Bus E/ swicth shall be included in adjacent bay.
1.18	SUPPLY- GIS: ONLINE PARTIAL DISCHARGE MONITORING (PDM) SYSTEM	LOT	1	Please refer clause 4.12, section-2.
1.19	SUPPLY- GIS: 66kV, 3150A, SF6 GIS END PIECE/ INTERFACE MODULE FOR FUTURE GIS EXTENSION MODULE	SET	4	
2.20	SUPPLY- GIS: 66kV, 3150A, SF6 GIS BUS BAR EXTENSION MODULE	SET	1	Optional item, applicable in case of change in architectural layout of GIS building.
2	**Supply- GIS: Special Tools and Testing & Maintenance Instruments as per TS**			
2.01	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: Mobile SF6 gas treatment plant	NO	1	Please refer clause 9.2, section-2.
2.02	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: Two-wheel gas maintenance cart	NO	1	Please refer clause 9.3, section-2.

Annexure_BOQ_66kV CPCL_MAIN & INSTRUMENTS

Sl. No.	Item Description	Unit	Qty.	Remarks
2.03	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: SF6 Gas maintenance cart	NO	1	Please refer clause 9.4, section-2.
2.04	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: SF6 gas leakage test equipment	NO	1	Please refer clause 9.5, section-2.
3	**Supply- GIS: Special Tools & Tackles as per TS**			
3.01	SUPPLY- GIS: SPECIAL TOOLS AND TACKLES: Any other special tool required for the purpose of installation, maintenance, overhauling and testing of GIS shall be provided by bidder. Bidder to recommend the special tools & tackles required.	LOT	1	Please refer clause 9.6, section-2.

Annexure_BOQ_66KV CPCL_MANADATORY SPARES

Sl. No.	Item Description	Unit	Qty.	Remarks
4	**Spares-GIS: Mandatory Spares for 66kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
4.01	SUPPLY- GIS: SPARES: Portable gas filling equipment/ SF6 gas cart	NO	1	
4.02	SUPPLY- GIS: SPARES: 66kV, Handle for disconnector switch drive	NO	2	
4.03	SUPPLY- GIS: SPARES: 66kV, Handle for earthing switch drive	NO	2	
4.04	SUPPLY- GIS: SPARES: 66KV, Pre selection/ mechanical key	NO	1	
4.05	SUPPLY- GIS: SPARES: 66KV, Power cable termination kit along with plug and socket (R,Y, B Phases)	SET	2	1 SET= 1 No. for each type of cable size for all R, Y, B phase
4.06	SUPPLY- GIS: SPARES: 66KV, Tripping coil	LOT	1	1 LOT= 20% spare of total quantity
4.07	SUPPLY- GIS: SPARES: 66KV, Closing coil	LOT	1	1 LOT= 20% spare of total quantity
4.08	SUPPLY- GIS: SPARES: 66KV, Capacitive type voltage detectors	SET	1	1 SET= 1 No. for each type of cable size for all R, Y, B phase
4.09	SUPPLY- GIS: SPARES: 66KV, Control fuses/ MCB	SET	1	1 SET= 10 No. for each type and rating
4.10	SUPPLY- GIS: SPARES: 66KV, Density / Pressure Gauge	SET	2	1 SET= 1 No. for each type
4.11	SUPPLY- GIS: SPARES: 66KV, Indicating lamps covers	LOT	1	1 LOT= Min. 5 NO of different colours for every 5 feeders of similar group
4.12	SUPPLY- GIS: SPARES: 66KV, Indicating lamps	LOT	1	1 LOT= Min. 5 NO of different colours for every 5 feeders of similar group
4.13	SUPPLY- GIS: SPARES: 66KV, Auxiliary relays for LCC/ drive mechanism etc.	LOT	1	1 LOT= 10% or Min. 2 NO of each type
4.14	SUPPLY- GIS: SPARES: Portable SF6 gas leakage detector	NO	1	
4.15	SUPPLY- GIS: SPARES: 66KV, Ethernet Switch	SET	1	1 SET= 1 NO of each type
5	**Supply- GIS: Commissioning Spares as per TS**			
5.01	SUPPLY- GIS: COMMISSIONING SPARES: Commissioning Spare Parts shall be provided along with main equipment/ 66KV GIS as per OEMs recommendations. The list of such recommended commissioning spares shall be proposed by bidder.	LOT	1	

Annexure_BOQ_66KV CPCL_MANADATORY SPARES

Sl. No.	Item Description	Unit	Qty.	Remarks
6	**Supply- GIS: Recommended Spare for Normal Operation & Maintenance as TS**			
6.01	SUPPLY- GIS: RECOMMENDED SPARE FOR NORMAL OPERATION & MAINTAINENCE: Two-years spares for normal operation and maintenance (over and above mandatory spares) along with unit price is to be proposed by bidder	LOT	1	
7	**Spares-GIS: Reference Unit Price for addition/ deletion of supply items of 66kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
	Unit Prices of Individual Equipment included here or in mandatory spares are required for any Addition/Deletion of Equipment and replacement of damaged items. Vendor to ensure that the unit prices have a logical relationship with prices of assemblies in main items. Quoting for unit prices is mandatory and shall be considered for evaluation			
7.01	SUPPLY- GIS: SPARES: 66kV, OPERATING MECHANISM FOR CIRCUIT BREAKER	SET	1	1 SET= Operating Mechanism for 3 Pole of Circuit Breaker complete in all respect
7.02	SUPPLY- GIS: SPARES: 66kV, OPERATING MECHANISM FOR DISCONNECTOR	SET	1	1 SET= Operating Mechanism for 3 Poles of Disconnector complete in all respect
7.03	SUPPLY- GIS: SPARES: 66kV, OPERATING MECHANISM FOR MAINTENANCE EARTHING SWITCH	SET	1	1 SET= Operating Mechanism for 3 Poles of Maintenance Earthing Switch complete in all respect
7.04	SUPPLY- GIS: SPARES: 66kV, OPERATING MECHANISM FOR FAST ACTING EARTHING SWITCH	SET	1	1 SET= Operating Mechanism for 3 Pole of High Speed Earthing Switch complete in all respect
7.05	SUPPLY- GIS: SPARES: 66kV, CIRCUIT BREAKER	SET	1	1 SET= 3 PoleS complete in all respect
7.06	SUPPLY- GIS: SPARES: 66kV, DISCONNECTOR	SET	1	1 SET= 3 Pole complete in all respect
7.07	SUPPLY- GIS: SPARES: 66kV, MAINTENANCE EARTHING SWITCH	SET	1	1 SET= 3 Pole complete in all respect
7.08	SUPPLY- GIS: SPARES: 66kV, FAST ACTING EARTHING SWITCH	SET	1	1 SET= 3 Pole complete in all respect
7.09	SUPPLY- GIS: SPARES: 66kV, CURRENT TRANSFORMER	SET	1	1 SET= 1 NO comprising of 3 phases- each type and rating in complete in all respect
7.10	SUPPLY- GIS: SPARES: 66kV, VOLTAGE TRANSFORMER	SET	1	1 SET= 1 NO comprising of 3 phases- each type and rating in complete in all respect
7.11	SUPPLY- GIS: SPARES: 60kV SURGE ARRESTER	SET	1	1 SET= 1 NO comprising of 3 phases- Phases complete in all respect
7.12	SUPPLY- GIS: SPARES: 66kV, SINGLE PHASE BUS BAR	MTR	1	
7.13	SUPPLY- GIS: SPARES: 66kV, GIS METALLIC ENCLOSURE	KG	50	
7.14	SUPPLY- GIS: SPARES: 66kV, EXPANSION JOINTS	SET	1	1 SET= 1 NO of each type
7.15	SUPPLY- GIS: SPARES: 66kV, BARRIER INSULATOR	SET	1	1 SET= 1 NO of each type
7.16	SUPPLY- GIS: SPARES: 66kV, NON-BARRIER INSULATOR	SET	1	1 SET= 1 NO of each type

Annexure_BOQ_66KV CPCL_MANADATORY SPARES

Sl. No.	Item Description	Unit	Qty.	Remarks
7.17	SUPPLY- GIS: SPARES: 66kV, GAS SEALS	SET	1	1 SET= 1 NO of each type
7.18	SUPPLY- GIS: SPARES: 66kV, GAS DENSITY MONITOR SWITCH	SET	1	1 SET= 1 NO of each type
7.19	SUPPLY- GIS: SPARES: 66kV, GAS PRESSURE SWITCH	SET	1	1 SET= 1 NO of each type
7.20	SUPPLY- GIS: SPARES: 66kV, TEE BEND	SET	1	1 SET= 1 NO of each type
7.21	SUPPLY- GIS: SPARES: 66kV, ANGLE BEND	SET	1	1 SET= 1 NO of each type
7.22	SUPPLY- GIS: SPARES: 66kV, L-BEND	SET	1	1 SET= 1 NO of each type

Annexure_BOQ_66KV CPCL_SERVICES

Sl. No.	Item Description	Unit	Qty.	Remarks
8	**Services- GIS: 66kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
8.01	SERVICES- GIS: SUPERVISION OF ERECTION: 66KV, SF6 GIS BAY MODULE	SET	59	Supervision of erection of GIS system, complete in all respect including LCC and other accessories. It also includes supervision of unloading & verification of materials for proper storage at site. GIS bay having GIS circuit Breaker shall be treated as Bay Module.
8.02	SERVICES- GIS: TESTING & COMMISSIONING: 66KV, SF6 GIS BAY MODULE	SET	59	Testing and commissioning of complete GIS system, is to be executed by vendor. All testing instruments, kits, T&P etc. are to be arranged by vendor on returnable basis. GIS bay having GIS circuit Breaker shall be treated as Bay Module.
8.03	SERVICES- GIS: FINAL SUCCESSFUL HV/ POWER FREQUENCY TESTING OF GIS INCLUDING ARRANGING OF HV TEST KIT ALONG WITH OPERATOR	LOT	1	Carrying out successful HV/ Power Frequency Testing of complete GIS as per IEC including Arrangement of HV Test kit (on returnable basis) shall be in scope of vendor, which includes charges for HV test kit with operator, accessories & tools required for completion of HV testing. Bays may be commissioned in phase wise manner.
8.04	SERVICES- GIS: INSULATION CO-ORDINATION & VFTO STUDIES FOR GIS SYSTEM COMPLETE	LOT	1	1 LOT= Insulation co-ordination and VFTO studies for 66kV GIS system complete
9	**Services-GIS: Reference Unit Price for addition/ deletion of supply items of 66kV, 40kA for 3sec, Gas Insulated Switchgear (GIS) as per TS**			
9.01	SERVICES- GIS : REFERENCE UNIT PRICE OF GIS INDIVIDUAL ITEM/ EQUIPMENT - SERVICES FOR SUPERVISION OF ERECTION OF GIS	MAN-DAY	10	Charges for repetition of services - (if required due to reasons not attributed to vendor) This item will be executed only if repetition of services is required by BHEL.
9.02	SERVICES- GIS : REFERENCE UNIT PRICE OF GIS INDIVIDUAL ITEM/ EQUIPMENT - SERVICES FOR TESTING & COMMISSIONING OF GIS	MAN-DAY	10	Charges for repetition of services - (if required due to reasons not attributed to vendor) This item will be executed only if repetition of services is required by BHEL.
9.03	SERVICES- GIS : REFERENCE UNIT OF GIS INDIVIDUAL ITEM/ EQUIPMENT - HIRING CHARGES OF HV TEST KIT WITH OPERATOR	LOT	1	Additional HV test kit charges including charges of operator, HV test kit, accessories & tools required for completion of HV test (Dielectric Test after installation of GIS). This item is executed only if repetition/ additional HV Test is required by BHEL i.e. post successful commissioning of GIS. (if required due to reasons not attributed to vendor)

Annexure_BOQ_66KV CPCL_SERVICES

10	**Services-GIS: Training of customer/ owner Personnel as per TS**			
10.01	SERVICES- GIS : Training for Maintenance Engineers in batch (3 batches) for 2 Days (Max 4 Persons per batch) at Vendors works.	MAN-DAY	24	2 engineers from BHEL/TBG is also included.
10.02	SERVICES- GIS : Training for Operators in batch (2 batches) for 3 days (Max 7 Persons per batch) at Site works.	MAN-DAY	42	2 engineers from BHEL/TBG is also included.

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Tender Inviting Authority: BHEL TBG NOIDA

Name of Work: CPCL Nagapattinam Refinery

Enquiry/NIT No: NIT_66823_Enquiry No.61Q2300095 Dated 16.07.2022

Name of the Bidder/ Bidding Firm / Company :	

PRICE SCHEDULE

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Sl. No.	Item Description	Item Code / Make	Quantity	Units	Unit RATE In Figures To be entered by the Bidder in Rs. P	GST (in Percentage)	GST Amount (Unit Rate*Quantity* GST) Rs. P	Unit Freight & Insurance Charges in Rs. P	GST (in Percentage)	GST Amount on F&I (Unit Rate*Quantity*GST) Rs. P	HSN / SAC Code	TOTAL Ex-Works + F & I AMOUNT excluding GST in Rs. P	TOTAL Ex-Works + F & I AMOUNT including GST in Rs. P	TOTAL AMOUNT In Words
1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
1.01	SUPPLY- GIS:230KV, 3150A, SF6 GIS LINE FEEDER BAY MODULE- INCOMING FFEDER FROM TNSEB GRID-1/2 (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item1	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
1.02	SUPPLY- GIS: 230KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- OUTGOING FEEDER TO 220/66KV ICT (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item2	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
1.03	SUPPLY- GIS: 230KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- SPARE BAY FOR FUTURE SIMILAR TO ICT WITH AIR TO SF6 BUSHING WITH GIB/ CABLE CONNECTION MODULE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item3	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
1.04	SUPPLY- GIS: 230KV, 3150A, SF6 GIS BUS COUPLER FEEDER BAY MODULE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item4	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
1.05	SUPPLY- GIS: 230KV, 3150A, SF6 GIS BUS BAR MODULE WITH BUS VT BAY & BUS EARTH SWITCH (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item5	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
1.06	SUPPLY- GIS : 230KV, 3150A, SINGLE PHASE GIB DUCT OUTSIDE GIS HALL (INCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item6	250	MTR			0.00			0.00		0.000	0.000	INR Zero Only
1.07	SUPPLY- GIS : 230KV, 3150A, SINGLE PHASE SF6 TO AIR BUSHING (INCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item7	12	SET			0.00			0.00		0.000	0.000	INR Zero Only
1.08	SUPPLY- GIS: 230kV CLASS SF6 GIS SURGE ARRESTER (INCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING)	item8	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
1.09	SUPPLY- GIS: 230kV SF6 GIS VOLTAGE TRANSFORMER (INCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING)	item9	6	SET			0.00			0.00		0.000	0.000	#NAME?
1.10	SUPPLY- GIS: SF6 GAS REQUIRED FOR PLACING GIS BAYS INTO SUCCESSFUL OPERATION (EXCLUDING REQUIREMENT OF BUS DUCT, SF6 TO AIR BUSHING, SURGE ARRESTOR & VT ETC.)	item10	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
1.11	SUPPLY- GIS: STRUCTURE MATERIAL, FOUNDATION BOLTS, EMBEDDED ITEMS, RAILS AND/ OR ANY OTHER MATERIALS ETC (EXCLUDING REQUIREMENT OF BUS DUCT, SF6 TO AIR BUSHING, SURGE ARRESTOR & VT ETC.)	item11	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
1.12	SUPPLY- GIS: EARTHING MATERIALS WITH HIGH FREQUENCY EARTHING, IF APPLICABLE FOR COMPLETE GIS SYSTEM (EXCLUDING REQUIREMENT OF BUS DUCT, SF6 TO AIR BUSHING, SURGE ARRESTOR & VT ETC.)	item12	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
1.13	SUPPLY- GIS: LOCAL CONTROL CUBICLES	item13	6	SET			0.00			0.00		0.000	0.000	INR Zero Only

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Name of Work: CPCL Nagapattinam Refinery

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1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
1.14	SUPPLY- GIS: ONLINE PARTIAL DISCHARGE MONITORING (PDM) SYSTEM	item14	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
1.15	SUPPLY- GIS: 230kV, 3150A, SF6 GIS END PIECE/ INTERFACE MODULE FOR FUTURE GIS EXTENSION MODULE	item15	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
1.16	SUPPLY- GIS: 230kV, 3150A, SF6 GIS BUS BAR EXTENSION MODULE	item16	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
1.17	SUPPLY- GIS: 230kV, 3150A, CSD SUITABLE FOR 230KV & 66KV CIRCUIT BREAKER		1	SET			0.00			0.00		0.000	0.000	
2.01	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: Mobile SF6 gas treatment plant	item17	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
2.02	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: Two-wheel gas maintenance cart	item18	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
2.03	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: SF6 Gas maintenance cart	item19	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
2.04	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: SF6 gas leakage test equipment	item20	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
3.01	SUPPLY- GIS: SPECIAL TOOLS AND TACKLES: Any other special tool required for the purpose of installation, maintenance, overhauling and testing of GIS shall be provided by bidder. Bidder to recommend the special tools & tackles required.	item21	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
4.01	SUPPLY- GIS: SPARES: Portable gas filling equipment/ SF6 gas cart	item22	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
4.02	SUPPLY- GIS: SPARES: 230kV, Handle for disconnector switch drive	item23	2	NO			0.00			0.00		0.000	0.000	INR Zero Only
4.03	SUPPLY- GIS: SPARES: 230kV, Handle for earthing switch drive	item24	2	NO			0.00			0.00		0.000	0.000	INR Zero Only
4.04	SUPPLY- GIS: SPARES: 230KV, Pre selection/ mechanical key	item25	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
4.05	SUPPLY- GIS: SPARES: 230KV, Power cable termination kit along with plug and socket (R,Y, B Phases)	item26	2	SET			0.00			0.00		0.000	0.000	INR Zero Only

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Sl. No.	Item Description	Item Code / Make	Quantity	Units	Unit RATE In Figures To be entered by the Bidder in Rs. P	GST (in Percentage)	GST Amount (Unit Rate*Quantity* GST) Rs. P	Unit Freight & Insurance Charges in Rs. P	GST (in Percentage)	GST Amount on F&I (Unit Rate*Quantity*GST) Rs. P	HSN / SAC Code	TOTAL Ex-Works + F & I AMOUNT excluding GST in Rs. P	TOTAL Ex-Works + F & I AMOUNT including GST in Rs. P	TOTAL AMOUNT In Words
1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
4.06	SUPPLY- GIS: SPARES: 230KV, Tripping coil	item27	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
4.07	SUPPLY- GIS: SPARES: 230KV, Closing coil	item28	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
4.08	SUPPLY- GIS: SPARES: 230KV, Capacitive type voltage detectors	item29	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
4.09	SUPPLY- GIS: SPARES: 230KV, Control fuses/ MCB	item30	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
4.10	SUPPLY- GIS: SPARES: 230KV, Density / Pressure Gauge	item31	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
4.11	SUPPLY- GIS: SPARES: 230KV, Indicating lamps covers	item32	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
4.12	SUPPLY- GIS: SPARES: 230KV, Indicating lamps	item33	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
4.13	SUPPLY- GIS: SPARES: 230KV, Auxiliary relays for LCC/ drive mechanism etc.	item34	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
4.14	SUPPLY- GIS: SPARES: Portable SF6 gas leakage detector	item35	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
4.15	SUPPLY- GIS: SPARES: 230KV, Ethernet Switch	item36	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
5.01	SUPPLY- GIS: COMMISSIONING SPARES: Commissioning Spare Parts shall be provided along with main equipment/ 230KV GIS as per OEMs recommendations. The list of such recommended commissioning spares shall be proposed by bidder.	item37	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
6.01	SUPPLY- GIS: RECOMMENDED SPARE FOR NORMAL OPERATION & MAINTAINENCE: Two-years spares for normal operation and maintenance (over and above mandatory spares) along with unit price is to be proposed by bidder	item38	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
7.01	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, OPERATING MECHANISM FOR CIRCUIT BREAKER	item39	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.02	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, OPERATING MECHANISM FOR DISCONNECTOR	item40	1	SET			0.00			0.00		0.000	0.000	INR Zero Only

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Tender Inviting Authority: BHEL TBG NOIDA

Name of Work: CPCL Nagapattinam Refinery

Enquiry/NIT No: NIT_66823_Enquiry No.61Q2300095 Dated 16.07.2022

Name of the Bidder/ Bidding Firm / Company :	

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1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
7.03	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, OPERATING MECHANISM FOR MAINTENANCE EARTHING SWITCH	item41	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.04	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, OPERATING MECHANISM FOR FAST ACTING EARTHING SWITCH	item42	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.05	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, CIRCUIT BREAKER	item43	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.06	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, DISCONNECTOR	item44	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.07	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, MAINTENANCE EARTHING SWITCH	item45	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.08	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, FAST ACTING EARTHING SWITCH	item46	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.09	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, CURRENT TRANSFORMER	item47	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.10	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, VOLTAGE TRANSFORMER	item48	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.11	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 198kV SURGE ARRESTER	item49	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.12	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, SINGLE PHASE BUS BAR	item50	1	MTR			0.00			0.00		0.000	0.000	INR Zero Only
7.13	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, GIS METALLIC ENCLOSURE	item51	50	KG			0.00			0.00		0.000	0.000	INR Zero Only
7.14	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, EXPANSION JOINTS	item52	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.15	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, BARRIER INSULATOR	item53	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.16	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, NON-BARRIER INSULATOR	item54	1	SET			0.00			0.00		0.000	0.000	INR Zero Only

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Tender Inviting Authority: BHEL TBG NOIDA

Name of Work: CPCL Nagapattinam Refinery

Enquiry/NIT No: NIT_66823_Enquiry No.61Q2300095 Dated 16.07.2022

Name of the Bidder/ Bidding Firm / Company :	

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1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
7.17	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, GAS SEALS	item55	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.18	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, GAS DENSITY MONITOR SWITCH	item56	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.19	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, UHF PD SENSOR	item57	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.20	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, GAS PRESSURE SWITCH	item58	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.21	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, TEE BEND	item59	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.22	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, ANGLE BEND	item60	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
7.23	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 230kV, L-BEND	item61	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
8.01	SERVICES- GIS: SUPERVISION OF ERECTION: 230KV, SF6 GIS BAY MODULE	item62	6	SET			0.00			0.00		0.000	0.000	INR Zero Only
8.02	SERVICES- GIS: TESTING & COMMISSIONING: 230KV, SF6 GIS BAY MODULE	item63	6	SET			0.00			0.00		0.000	0.000	INR Zero Only
8.03	SERVICES- GIS : 230KV, SUPERVISION OF ERECTION OF 1 PHASE GAS INSULATED BUS DUCT	item64	250	MTR			0.00			0.00		0.000	0.000	INR Zero Only
8.04	SERVICES- GIS : 230KV, TESTING & COMMISSIONING OF 1 PHASE GAS INSULATED BUS DUCT	item65	250	MTR			0.00			0.00		0.000	0.000	INR Zero Only
8.05	SERVICES- GIS : 230KV, SUPERVISION OF ERECTION OF 1 PHASE, SF6 TO AIR BUSHING	item66	12	SET			0.00			0.00		0.000	0.000	INR Zero Only
8.06	SERVICES- GIS : 230KV, TESTING & COMMISSIONING OF 1 PHASE, SF6 TO AIR BUSHING	item67	12	SET			0.00			0.00		0.000	0.000	INR Zero Only
8.07	SERVICES- GIS: FINAL SUCCESSFUL HV/ POWER FREQUENCY TESTING OF GIS INCLUDING ARRANGING OF HV TEST KIT ALONG WITH OPERATOR	item68	1	Lot			0.00			0.00		0.000	0.000	INR Zero Only

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Tender Inviting Authority: BHEL TBG NOIDA

Name of Work: CPCL Nagapattinam Refinery

Enquiry/NIT No: NIT_66823_Enquiry No.61Q2300095 Dated 16.07.2022

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1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
8.08	SERVICES- GIS: INSULATION CO-ORDINATION & VFTO STUDIES FOR GIS SYSTEM COMPLETE	item69	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
9.01	SERVICES- GIS : REFERENCE UNIT PRICE OF GIS INDIVIDUAL ITEM/ EQUIPMENT - SERVICES FOR SUPERVISION OF ERECTION OF GIS	item70	10	MAN-DAY			0.00			0.00		0.000	0.000	INR Zero Only
9.02	SERVICES- GIS : REFERENCE UNIT PRICE OF GIS INDIVIDUAL ITEM/ EQUIPMENT - SERVICES FOR TESTING & COMMISSIONING OF GIS	item71	10	MAN-DAY			0.00			0.00		0.000	0.000	INR Zero Only
9.03	SERVICES- GIS : REFERENCE UNIT OF GIS INDIVIDUAL ITEM/ EQUIPMENT - HIRING CHARGES OF HV TEST KIT WITH OPERATOR	item72	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
10.01	SERVICES- GIS : Training- Training for Maintenance Engineers in batch (3 batches) for 2 Days (Max 4 Persons per batch) at Vendors works.	item73	24	MAN-DAY			0.00			0.00		0.000	0.000	INR Zero Only
10.02	SERVICES- GIS : Training- Training for Operators in batch (2 batches) for 3 days (Max 7 Persons per batch) at Site works.	item74	42	MAN-DAY			0.00			0.00		0.000	0.000	INR Zero Only
11.01	SUPPLY- GIS: 66KV, 3150A, SF6 GIS LINE FEEDER BAY MODULE- INCOMING FFEDER FROM 230/66KV ICT (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item75	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.02	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- INCOMING FEEDERS FROM GTR-1/2/3/4 (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item76	4	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.03	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- SPARE INCOMING FEEDER SIMILAR TO GTR (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item77	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.04	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- INCOMING FEEDERS FROM STR-1/2/3 (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item78	3	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.05	SUPPLY- GIS: 66KV, 3150A, SF6 GIS BUS COUPLER FEEDER BAY MODULE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item79	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.06	SUPPLY- GIS: 66KV, 3150A, SF6 GIS BUS SECTIONALISER MODULE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item80	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.07	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- OUTGOING FEEDERS FOR LSTK CONTRACTOR (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item81	4	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.08	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- OUTGOING FEEDERS FOR CUSTOMER BAYS (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item82	33	SET			0.00			0.00		0.000	0.000	INR Zero Only

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Tender Inviting Authority: BHEL TBG NOIDA

Name of Work: CPCL Nagapattinam Refinery

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1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
11.09	SUPPLY- GIS: 66KV, 3150A, SF6 GIS TRANSFORMER FEEDER BAY MODULE- SPARE OUTGOING FEEDERS FOR CUSTOMER (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item83	8	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.10	SUPPLY- GIS: 66KV, 3150A, SF6 GIS BUS BAR MODULE WITH BUS PT BAY & BUS EARTH SWITCH (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item84	4	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.11	SUPPLY- GIS : 66KV, 3150A, SF6 GIS CABLE CONNECTION MODULE SUITABLE UP TO MIN. 1CX630SQMM SIZE CABLE (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item85	63	SET			0.00			0.00		0.000	0.000	#NAME?
11.12	SUPPLY- GIS:-66kV CLASS, SF6 GIS SURGE ARRESTER (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item86	55	SET			0.00			0.00		0.000	0.000	#NAME?
11.13	SUPPLY- GIS:66kV, SF6 GIS VOLTAGE TRANSFORMER (EXCLUDING SF6 GAS, SUPPORT STRUCTURE, HARDWARES & EARTHING ETC.)	item87	9	SET			0.00			0.00		0.000	0.000	#NAME?
11.14	SUPPLY- GIS: SF6 GAS REQUIRED FOR PLACING GIS BAYS INTO SUCCESSFUL OPERATION	item88	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
11.15	SUPPLY- GIS: STRUCTURE MATERIALS, FOUNDATION BOLTS, EMBEDDED ITEMS, RAILS AND/ OR ANY OTHER MATERIALS ETC.	item89	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
11.16	SUPPLY- GIS: EARTHING MATERIALS WITH HIGH FREQUENCY EARTHING, IF APPLICABLE FOR COMPLETE GIS SYSTEM	item90	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
11.17	SUPPLY- GIS: LOCAL CONTROL CUBICLES	item91	59	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.18	SUPPLY- GIS: ONLINE PARTIAL DISCHARGE MONITORING (PDM) SYSTEM	item92	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
11.19	SUPPLY- GIS: 66kV, 3150A, SF6 GIS END PIECE/ INTERFACE MODULE FOR FUTURE GIS EXTENSION MODULE	item93	4	SET			0.00			0.00		0.000	0.000	INR Zero Only
11.20	SUPPLY- GIS: 66kV, 3150A, SF6 GIS BUS BAR EXTENSION MODULE	item94	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
12.01	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: Mobile SF6 gas treatment plant	item95	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
12.02	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: Two-wheel gas maintenance cart	item96	1	NO			0.00			0.00		0.000	0.000	INR Zero Only

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Name of Work: CPCL Nagapattinam Refinery

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1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
12.03	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: SF6 Gas maintenance cart	item97	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
12.04	SUPPLY- GIS: TESTING & MAINTENNACE INSTRUMENTS: SF6 gas leakage test equipment	item98	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
13.01	SUPPLY- GIS: SPECIAL TOOLS AND TACKLES: Any other special tool required for the purpose of installation, maintenance, overhauling and testing of GIS shall be provided by bidder. Bidder to recommend the special tools & tackles required.	item99	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
14.01	SUPPLY- GIS: SPARES: Portable gas filling equipment/ SF6 gas cart	item100	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
14.02	SUPPLY- GIS: SPARES: 66kV, Handle for disconnector switch drive	item101	2	NO			0.00			0.00		0.000	0.000	INR Zero Only
14.03	SUPPLY- GIS: SPARES: 66kV, Handle for earthing switch drive	item102	2	NO			0.00			0.00		0.000	0.000	INR Zero Only
14.04	SUPPLY- GIS: SPARES: 66KV, Pre selection/ mechanical key	item103	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
14.05	SUPPLY- GIS: SPARES: 66KV, Power cable termination kit along with plug and socket (R,Y, B Phases)	item104	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
14.06	SUPPLY- GIS: SPARES: 66KV, Tripping coil	item105	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
14.07	SUPPLY- GIS: SPARES: 66KV, Closing coil	item106	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
14.08	SUPPLY- GIS: SPARES: 66KV, Capacitive type voltage detectors	item107	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
14.09	SUPPLY- GIS: SPARES: 66KV, Control fuses/ MCB	item108	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
14.10	SUPPLY- GIS: SPARES: 66KV, Density / Pressure Gauge	item109	2	SET			0.00			0.00		0.000	0.000	INR Zero Only
14.11	SUPPLY- GIS: SPARES: 66KV, Indicating lamps covers	item110	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
14.12	SUPPLY- GIS: SPARES: 66KV, Indicating lamps	item111	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only

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tem Wise BoQ

Tender Inviting Authority: BHEL TBG NOIDA

Name of Work: CPCL Nagapattinam Refinery

Enquiry/NIT No: NIT_66823_Enquiry No.61Q2300095 Dated 16.07.2022

Name of the Bidder/ Bidding Firm / Company :	

PRICE SCHEDULE

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NUMBER #	TEXT #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Item Code / Make	Quantity	Units	Unit RATE In Figures To be entered by the Bidder in Rs. P	GST (in Percentage)	GST Amount (Unit Rate*Quantity* GST) Rs. P	Unit Freight & Insurance Charges in Rs. P	GST (in Percentage)	GST Amount on F&I (Unit Rate*Quantity*GST) Rs. P	HSN / SAC Code	TOTAL Ex-Works + F & I AMOUNT excluding GST in Rs. P	TOTAL Ex-Works + F & I AMOUNT including GST in Rs. P	TOTAL AMOUNT In Words
1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
14.13	SUPPLY- GIS: SPARES: 66KV, Auxiliary relays for LCC/ drive mechanism etc.	item112	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
14.14	SUPPLY- GIS: SPARES: Portable SF6 gas leakage detector	item113	1	NO			0.00			0.00		0.000	0.000	INR Zero Only
14.15	SUPPLY- GIS: SPARES: 66KV, Ethernet Switch	item114	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
15.01	SUPPLY- GIS: COMMISSIONING SPARES: Commissioning Spare Parts shall be provided along with main equipment/ 66KV GIS as per OEMs recommendations. The list of such recommended commissioning spares shall be proposed by bidder.	item115	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
16.01	SUPPLY- GIS: RECOMMENDED SPARE FOR NORMAL OPERATION & MAINTAINENCE: Two-years spares for normal operation and maintenance (over and above mandatory spares) along with unit price is to be proposed by bidder	item116	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
17.01	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, OPERATING MECHANISM FOR CIRCUIT BREAKER	item117	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.02	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, OPERATING MECHANISM FOR DISCONNECTOR	item118	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.03	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, OPERATING MECHANISM FOR MAINTENANCE EARTHING SWITCH	item119	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.04	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, OPERATING MECHANISM FOR FAST ACTING EARTHING SWITCH	item120	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.05	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, CIRCUIT BREAKER	item121	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.06	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, DISCONNECTOR	item122	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.07	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, MAINTENANCE EARTHING SWITCH	item123	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.08	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, FAST ACTING EARTHING SWITCH	item124	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.09	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, CURRENT TRANSFORMER	item125	1	SET			0.00			0.00		0.000	0.000	INR Zero Only

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Tender Inviting Authority: BHEL TBG NOIDA

Name of Work: CPCL Nagapattinam Refinery

Enquiry/NIT No: NIT_66823_Enquiry No.61Q2300095 Dated 16.07.2022

Name of the Bidder/ Bidding Firm / Company :	

PRICE SCHEDULE

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Sl. No.	Item Description	Item Code / Make	Quantity	Units	Unit RATE In Figures To be entered by the Bidder in Rs. P	GST (in Percentage)	GST Amount (Unit Rate*Quantity* GST) Rs. P	Unit Freight & Insurance Charges in Rs. P	GST (in Percentage)	GST Amount on F&I (Unit Rate*Quantity*GST) Rs. P	HSN / SAC Code	TOTAL Ex-Works + F & I AMOUNT excluding GST in Rs. P	TOTAL Ex-Works + F & I AMOUNT including GST in Rs. P	TOTAL AMOUNT In Words
1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
17.10	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, VOLTAGE TRANSFORMER	item126	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.11	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 60kV SURGE ARRESTER	item127	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.12	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, SINGLE PHASE BUS BAR	item128	1	MTR			0.00			0.00		0.000	0.000	INR Zero Only
17.13	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, GIS METALLIC ENCLOSURE	item129	50	KG			0.00			0.00		0.000	0.000	INR Zero Only
17.14	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, EXPANSION JOINTS	item130	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.15	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, BARRIER INSULATOR	item131	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.16	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, NON-BARRIER INSULATOR	item132	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.17	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, GAS SEALS	item133	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.18	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, GAS DENSITY MONITOR SWITCH	item134	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.19	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, GAS PRESSURE SWITCH	item135	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.20	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, TEE BEND	item136	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.21	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, ANGLE BEND	item137	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
17.22	Reference Unit Price for addition/ deletion: SUPPLY- GIS: SPARES: 66kV, L-BEND	item138	1	SET			0.00			0.00		0.000	0.000	INR Zero Only
18.01	SERVICES- GIS: SUPERVISION OF ERECTION: 66KV, SF6 GIS BAY MODULE	item139	59	SET			0.00			0.00		0.000	0.000	INR Zero Only
18.02	SERVICES- GIS: TESTING & COMMISSIONING: 66KV, SF6 GIS BAY MODULE	item140	59	SET			0.00			0.00		0.000	0.000	INR Zero Only

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Tender Inviting Authority: BHEL TBG NOIDA

Name of Work: CPCL Nagapattinam Refinery

Enquiry/NIT No: NIT_66823_Enquiry No.61Q2300095 Dated 16.07.2022

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Sl. No.	Item Description	Item Code / Make	Quantity	Units	Unit RATE In Figures To be entered by the Bidder in Rs. P	GST (in Percentage)	GST Amount (Unit Rate*Quantity* GST) Rs. P	Unit Freight & Insurance Charges in Rs. P	GST (in Percentage)	GST Amount on F&I (Unit Rate*Quantity*GST) Rs. P	HSN / SAC Code	TOTAL Ex-Works + F & I AMOUNT excluding GST in Rs. P	TOTAL Ex-Works + F & I AMOUNT including GST in Rs. P	TOTAL AMOUNT In Words
1	2	3	4	5	13	14	15	16	20	21	51	53	54	55
18.03	SERVICES- GIS: FINAL SUCCESSFUL HV/ POWER FREQUENCY TESTING OF GIS INCLUDING ARRANGING OF HV TEST KIT ALONG WITH OPERATOR	item141	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
18.04	SERVICES- GIS: INSULATION CO-ORDINATION & VFTO STUDIES FOR GIS SYSTEM COMPLETE	item142	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
19.01	SERVICES- GIS : REFERENCE UNIT PRICE OF GIS INDIVIDUAL ITEM/ EQUIPMENT - SERVICES FOR SUPERVISION OF ERECTION OF GIS	item143	10	MAN-DAY			0.00			0.00		0.000	0.000	INR Zero Only
19.02	SERVICES- GIS : REFERENCE UNIT PRICE OF GIS INDIVIDUAL ITEM/ EQUIPMENT - SERVICES FOR TESTING & COMMISSIONING OF GIS	item144	10	MAN-DAY			0.00			0.00		0.000	0.000	INR Zero Only
19.03	SERVICES- GIS : REFERENCE UNIT OF GIS INDIVIDUAL ITEM/ EQUIPMENT - HIRING CHARGES OF HV TEST KIT WITH OPERATOR	item145	1	LOT			0.00			0.00		0.000	0.000	INR Zero Only
20.01	SERVICES- GIS : Training for Maintenance Engineers in batch (3 batches) for 2 Days (Max 4 Persons per batch) at Vendors works.	item146	24	MAN-DAY			0.00			0.00		0.000	0.000	INR Zero Only
20.02	SERVICES- GIS : Training for Operators in batch (2 batches) for 3 days (Max 7 Persons per batch) at Site works.	item147	42	MAN-DAY			0.00			0.00		0.000	0.000	INR Zero Only
Total in Figures												0.000	0.000	#NAME?
oted Rate in Words		#NAME?												

Ref. No. **CPCL Technical Corrigendum-01**

Project: **Design, Engineering, Supply, Erection*, Testing & Commissioning of 230kV & 66kV GIS for Cauvery Basin Refinery (CBR), Chennai Petroleum Corporation Ltd. (CPCL) at Nagapattinam, Tamil Nadu.**

Date: **08.08.2022**

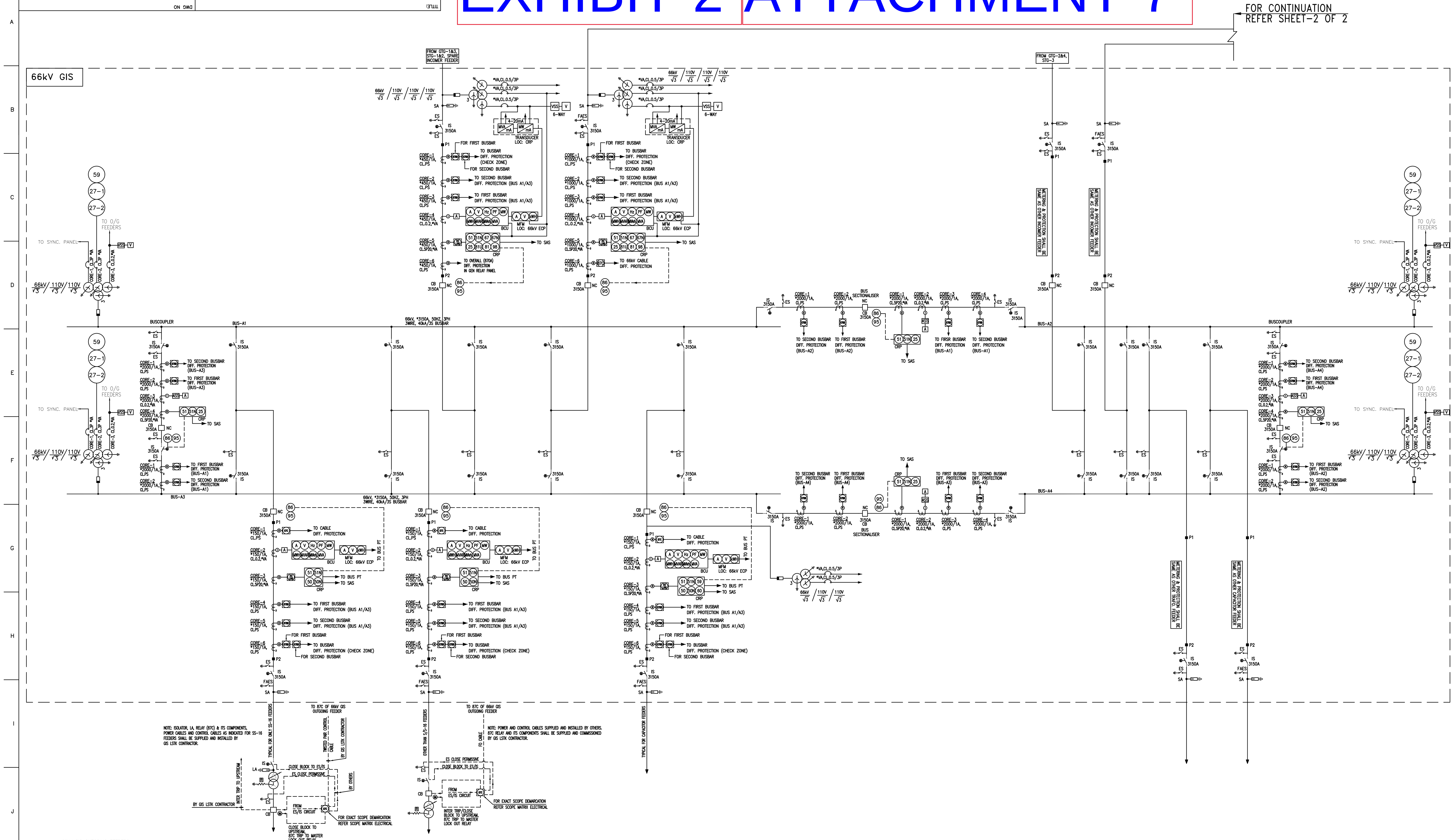
Sl. No.	Document Description of Original Technical Specification	Remarks, if any
1	**Section-1** **Annexure-BOQ 230kV & 66kV GIS CPCL**	For the revised requirements, please refer **Annexure- BOQ 230kV & 66kV GIS CPCL REV01.** **1. 230kV GIS** -Item No. 1.08, item description changed. - Item no. 1.09, item description and quantity changed from 1set to 6set with change in remarks. - Item no. 1.13, remarks added. - Item no. 1.17, new item added. - Item no. 3.01, description changed. - Item no. 4.05, remarks revised. - Item no. 4.08, remarks revised. - Item no. 7.09, unit changed from no. to set. - Item no. 7.10, unit changed from no. to set. - Item no. 7.10, unit changed from no. to set. **2. 66kV GIS** -Item No. 1.11, item description and quantity changed from 55set to 63set. - Item no. 1.12, item description changed. - Item no. 1.13, item description and quantity changed from 55set to 9set. - Item no. 3.01, description changed. - Item no. 4.05, remarks revised. - Item no. 4.08, remarks revised. **Note:** All the optional items of BOQ shall be considered during evaluation.

Date: **08.08.2022**

Sl. No.	Document Description of Original Technical Specification	Remarks, if any
2	**Section-1** **Section-1.2 & 1.6**	Please refer **Annexure- Technical Amendment to Section 1**in addition to original **Section-1 (Section-1.2 & 1.6).** 1. Structural steel members including bolts, nuts and washers of GIS shall be hot dip galvanized in accordance with relevant IS Codes. The Zinc coating on structuer members shall not be less than 900 gm/sqm, being coastal area. 2. List of mandatory spares can be referred from clause 6.1, Engineering Design Basis- Electrical (B416-999-16-50-EDB-1011) of Section-2. 3. For 230kV & 66kV GIS, Bus VT/ Bay VT are indicated in Metering & Protection SLD for 230kV & 66kVGIS, Exhibit-2. **Note:** Exhibit-2 and Exhibit-7 is also added in Section-1.6- Project drawings for covering the requirement of protection related requirement.
3	**Section-2**	Please refer **Annexure-Technical Amendment to Section 2**in addition to original **Section-2.** Following documents are added to Original Section-2, - Corrigendum-2 from CPCL. - Consolidated Bidder's Pre-bid Queries and Response - Engineering Design Basis- Electrical (B416-999-16-50-EDB-1011). **Note:** The highlighted changes are related to present scope of work and hence, these are to be noted and complied by bidders, however, bidders are requested to go through the complete document for entire understanding.

Note: Amendment/ addendum/ clarification/ corrigendum issued herein shall form part of Technical Specification. All bidders to please note that amendment/addendum/ clarification/ corrigendum issued will supersede the respective clause/ sub-clause of Technical Specification Document to the extent for the clause/ sub-clause or part thereof the amendment is issued.

EXHIBIT-2 ATTACHMENT-7



66kV GIS OUTGOING FEEDERS

S.NO	FEEDER DESCRIPTION	RATED POWER	BREAKER RATING	CT RATIO	REMARKS
1	TO S/S-01 (CDU/VDU)	31.5MVA	3150A	350/1A	
2	TO S/S-02 (MS BLOCK)	31.5MVA	3150A	350/1A	
3	TO S/S-03 (INDMAX)	16MVA	3150A	200/1A	
4	TO S/S-04 (VGO HDT)	31.5MVA	3150A	350/1A	
5	TO S/S-05 (DHDT)	31.5MVA	3150A	350/1A	
6	TO S/S-06 (DCU)	25MVA	3150A	250/1A	
7	TO S/S-07 (DHDT/FGTU)	20MVA	3150A	200/1A	
8	TO S/S-08 (CT-01)	25MVA	3150A	250/1A	
9	TO S/S-09 (CT-02)	31.5MVA	3150A	350/1A	
10	TO S/S-10 (PP UNIT-1)	31.5MVA	3150A	350/1A	
11	TO S/S-12 (SRU)	20MVA	3150A	200/1A	
12	TO S/S-14 (FIRE WATER)	25MVA	3150A	250/1A	
13	TO S/S-15 (CT-3/AIR)	25MVA	3150A	250/1A	
14	TO S/S-16 (CPP)	31.5MVA	3150A	350/1A	
15	TO S/S-19 (PRODUCT PIPE TERMINAL)	25MVA	3150A	250/1A	
16	TO S/S-28 (PP-2)	25MVA	3150A	250/1A	
17	TO CAPACITOR FEEDER-1		3150A	400/1A	
18	TO DG HOUSE-1	10MVA	3150A	150/1A	
19	TO DG HOUSE-2	10MVA	3150A	150/1A	
20	TO S/S-01 (CDU/VDU)	31.5MVA	3150A	350/1A	
21	TO S/S-02 (MS BLOCK)	31.5MVA	3150A	350/1A	
22	TO S/S-03 (INDMAX)	16MVA	3150A	200/1A	
23	TO S/S-04 (VGO HDT)	31.5MVA	3150A	350/1A	
24	TO S/S-05 (DHDT)	31.5MVA	3150A	350/1A	
25	TO S/S-06 (DCU)	25MVA	3150A	250/1A	
26	TO S/S-07 (DHDT/FGTU)	20MVA	3150A	200/1A	
27	TO S/S-08 (CT-01)	25MVA	3150A	250/1A	
28	TO S/S-09 (CT-02)	31.5MVA	3150A	350/1A	
29	TO S/S-10 (PP UNIT-1)	31.5MVA	3150A	350/1A	
30	TO S/S-12 (SRU)	20MVA	3150A	200/1A	
31	TO S/S-14 (FIRE WATER)	25MVA	3150A	250/1A	
32	TO S/S-15 (CT-3/AIR)	25MVA	3150A	250/1A	
33	TO S/S-16 (CPP)	31.5MVA	3150A	350/1A	
34	TO S/S-19 (PRODUCT PIPE TERMINAL)	25MVA	3150A	250/1A	
35	TO S/S-28 (PP-2)	25MVA	3150A	250/1A	
36	TO CAPACITOR FEEDER-2		3150A	400/1A	
37	TO S/S-PP UNIT (EXTRUDER)	37MVA	3150A	400/1A	
38	TO SPARE-1		3150A	350/1A	
39	TO SPARE-2		3150A	350/1A	
40	TO SPARE-3		3150A	350/1A	
41	TO SPARE-4		3150A	350/1A	
42	TO SPARE-5		3150A	350/1A	
43	TO SPARE-6		3150A	350/1A	
44	TO SPARE-7		3150A	350/1A	
45	TO SPARE-8		3150A	350/1A	
46	TO BUS COUPLER-1		3150A	2000/1A	
47	TO BUS COUPLER-2		3150A	2000/1A	
48	TO BUS SECTIONALISER-1		3150A	2000/1A	
49	TO BUS SECTIONALISER-2		3150A	2000/1A	

66kV GIS INCOMING FEEDERS

S.NO	FEEDER DESCRIPTION	RATED POWER	BREAKER RATING	CT RATIO	REMARKS
1	FROM GTG-1	34MW	3150A	500/1A	
2	FROM GTG-2	34MW	3150A	500/1A	
3	FROM GTG-3	34MW	3150A	500/1A	
4	FROM GTG-4	34MW	3150A	500/1A	
5	FROM STG-1	16MW	3150A	200/1A	
6	FROM STG-2	16MW	3150A	200/1A	
7	FROM STG-3	22MW	3150A	300/1A	
8	FROM 230kV GIS	100MVA	3150A	1000/1A	
9	FROM 230kV GIS	100MVA	3150A	1000/1A	
10	SPARE	34MW	3150A	500/1A	

ABBREVIATION:

GT	GRID TRANSFORMER
ONAN	OIL NATURAL AIR NATURAL
ONAF	OIL NATURAL AIR FORCE
OLTC	ON LOAD TAP CHANGER
CB	CIRCUIT BREAKER
DS	DISCONNECTING SWITCH
FAES	FAST ACTING EARTH SWITCH
ES	EARTH SWITCH
IS	ISOLATOR SWITCH
MCB	MINIATURE CIRCUIT BREAKER
WTI	WINDING TEMPERATURE INDICATOR
OTI	OIL TEMPERATURE INDICATOR
LA	LIGHTNING ARRESTOR
TVM	TRI VECTOR METER
BCU	BAY CONTROL UNIT
CRP	CONTROL RELAY PANEL
SAS	SUBSTATION AUTOMATION SYSTEM

TVM METER INCLUDES FOLLOWING PARAMETERS

SL NO.	METER
1	AMMETER
2	VOLTMETER
3	MW METER
4	MVAr METER
5	MVA METER
6	MWh METER
7	MVArh METER
8	POWER FACTOR
9	FREQUENCY METER

DEVICE NO.	DESCRIPTION
21	DISTANCE PROTECTION
24	VOLT PER HERTZ/OVER FLUXING RELAY
25	CHECK SYNCHRONIZING RELAY
26	APPARATUS THERMAL DEVICE
27	UNDER VOLTAGE PROTECTION WITH TIMER
30	ANNUNCIATOR RELAY
50	INSTANTANEOUS OVER CURRENT PROTECTION
50N	INSTANTANEOUS EARTH FAULT PROTECTION
50LBB	LOCAL BREAKER BACKUP PROTECTION
51	INVERSE TIME OVER CURRENT PROTECTION
51G	EARTH FAULT BACKUP PROTECTION
51N	INVERSE TIME EARTH FAULT PROTECTION
51NS	STAND BY EARTH FAULT PROTECTION
59	OVER VOLTAGE PROTECTION
59N	RESIDUAL OVER VOLTAGE PROTECTION
60	NEUTRAL DISPLACEMENT RELAY
63 B	BUCHHOLZ RELAY
63 PRD	PRESSURE RELIEF DEVICE RELAY
64R	RESTRICTED EARTH FAULT PROTECTION
67	DIRECTIONAL OVER CURRENT RELAY
67N	DIRECTIONAL EARTH FAULT RELAY

74	ALARM RELAY
81	UNDER FREQUENCY AND df/dt
81U	UNDER FREQUENCY RELAY
86	LOCK-OUT RELAY
87BB	BUSBAR DIFFERENTIAL PROTECTION
87C	CABLE DIFFERENTIAL PROTECTION
87L	LINE DIFFERENTIAL PROTECTION
87T	GRID TRANSFORMER DIFFERENTIAL PROTECTION
95	TRIP CIRCUIT SUPERVISION RELAY FOR 86
98	DEAD BUS CHARGING RELAY

TYPICAL CT PARAMETERS

S.NO	PARAMETERS	VALUE	UNITS	VALUE	UNITS	VALUE	UNITS	VALUE	UNITS	VALUE	UNITS	VALUE	UNITS
1	66/6.9kV FEEDER TRANSFORMER RATING	31.5	MVA	28	MVA	25	MVA	20	MVA	16	MVA	10	MVA
2	CT RATIO FOR FEEDER OR CABLE DIFFERENTIAL PROTECTION	350/1	A	300/1	A	250/1	A	200/1	A	200/1	A	150/1	A
3	CT CLASS	PS		PS		PS		PS		PS		PS	
4	CT SECONDARY WINDING RESISTANCE (Rct<=)	2	Ohms	2	Ohms	1	Ohms	1	Ohms	1	Ohms	1	Ohms
5	CT CABLE CROSS SECTION	2.5	Sq.mm	2.5	Sq.mm	2.5	Sq.mm	2.5	Sq.mm	2.5	Sq.mm	2.5	Sq.mm
6	KNEE POINT VOLTAGE Vk VALUE REQUIRED	1250	V	1250	V	1250	V	1250	V	1250	V	1250	V
7	CT MAGNETIZING CURRENT Imag AT Vk/2	30	mA	30	mA	30	mA	30	mA	30	mA	30	mA

LEGEND:

	TWO WINDING TRAFO WITH TAP CHANGER
	CURRENT TRANSFORMER
	BUSHING CURRENT TRANSFORMER
	TWO WINDING VOLTAGE TRANSFORMER
	THREE WINDING VOLTAGE TRANSFORMER
	LIGHTNING ARRESTOR/SURGE ARRESTOR
	CIRCUIT BREAKER
	DISCONNECTING SWITCH
	LINK
	DRAWOUT
	GROUNDING
	FUSE
KW/mA	kW TRANSDUCER (DUAL OUTPUT)
A	AMMETER
V	VOLTMETER
PF	POWER FACTOR METER
TVM	TRIVECTOR METER
F	FREQUENCY METER
kVAR	REACTIVE POWER METER
kVA	KILO VOLTAMP METER
KW	KILO WATT METER
V	ANALOG VOLTMETER
A	ANALOG AMMETER

NOTES:

1. ALL RATINGS INDICATED ARE PRELIMINARY AND THOSE WILL BE FINALIZED AS ENGINEERING PROGRESS.
2. ALL NUMERICAL RELAYS SHALL BE COMMUNICABLE OVER IEC 61850 PROTOCOL.
3. MVA METER IN EHV EXTERNAL POWER SUPPLY INCOMERS SHALL INCLUDE MAXIMUM DEMAND INDICATION ALSO.
4. SEPARATE MW, MVAR, MVA AND MVAH METERS SHALL BE PROVIDED FOR EHV EXTERNAL GRID POWER SUPPLY INCOMERS ONLY.
5. SEPERATE 3 NOS. VOLTMETER AND 3 NOS. AMMETER SHALL BE PROVIDED FOR EHV EXTERNAL GRID POWER SUPPLY INCOMERS.
6. WHEREVER MWH PARAMETERS ARE SPECIFIED, THE METER SHALL BE A MULTIFUNCTION METER SUITABLE FOR DATA CONNECTIVITY WITH HMI/SAS SYSTEM.
7. SEPARATE ANALOGUE METERS SHALL BE PROVIDED FOR BELOW MENTIONED FEEDERS, BESIDES METERING FACILITY AVAILABLE IN NUMERICAL RELAY
   7.1 INCOMERS & BUS COUPLE/BUS TIE OF EHV SWITCHGEAR : "V & A"
   7.2 EHV BREAKER FEEDERS - "A"
   7.3 EHV INCOMER FEEDERS - "DIGITAL MULTIFUNCTION METER".
8. PROTECTION RELAYS SHALL BE LOCATED IN THE RELAY PANEL.
9. DIGITAL MFMs SHALL BE LOCATED AT RESPECTIVE ECPs OF 230kV & 66kV GIS.
10. REQUIREMENT OF TERTIARY WINDING FOR GRID POWER TRANSFORMERS SHALL BE CONSIDERED AS PER TANTRANSCO REGULATIONS AND TRANSFORMER MANUFACTURER RECOMMENDATION.

REFERENCE DRAWINGS:

1. TCE.12416A-EL-4005-AU-40001 KEY SINGLE LINE DIAGRAM FOR CPP

ISSUE		DRN	DSN	CHD	CV	EL	IC	ME			PE/PM	APPD	DATE
R0	INITIALS	AKJ	BRS	HA		HA					HA	DG	22-07-2022
P2	INITIALS	AKJ	BRS	HA		HA					HA	DG	12-04-2022
P1	INITIALS	AKJ	BRS	HA		HA					HA	DG	17-03-2022
P0	INITIALS	AKJ	BRS	HA		HA					HA	DG	28-01-2022

CLEARED

DO NOT SCALE

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CONSTRUCTION / FABRICATION WORK IS PERMITTED ON 'R' (RELEASED) ISSUES ONLY.

INFORMATION CONTAINED WITHIN 'HOLD' IS NOT RELEASED FOR CONSTUCTION / FABRICATION. FIELD MUST GET DESIGN OFFICE TO CLEAR 'HOLDS' IN TIME BEFORE PROCEEDING WITH ANY CONSTRUCTION / FABRICATION WORK RELATED TO 'HOLDS'.

FILE NAME :

CHENNAI PETROLEUM CORPORATION LIMITED
POWER & UTILITIES FACILITIES OF CPCL'S 9MMTPA
CAUVERY BASIN REFINERY (CBR) PROJECT AT NAGAPATTINAM, TAMILNADU.

TITLE: METERING & PROTECTION SLD FOR 230kV & 66kV GIS

TATA CONSULTING ENGINEERS LIMITED
BENGALURU

SCALE : NTS | DC & DISC: PBU-EL | DWG NO. TCE.12416A-EL-4005-CP-40049 | SHEET 1 OF 2 | ISSUE R0 | SIZE-A0

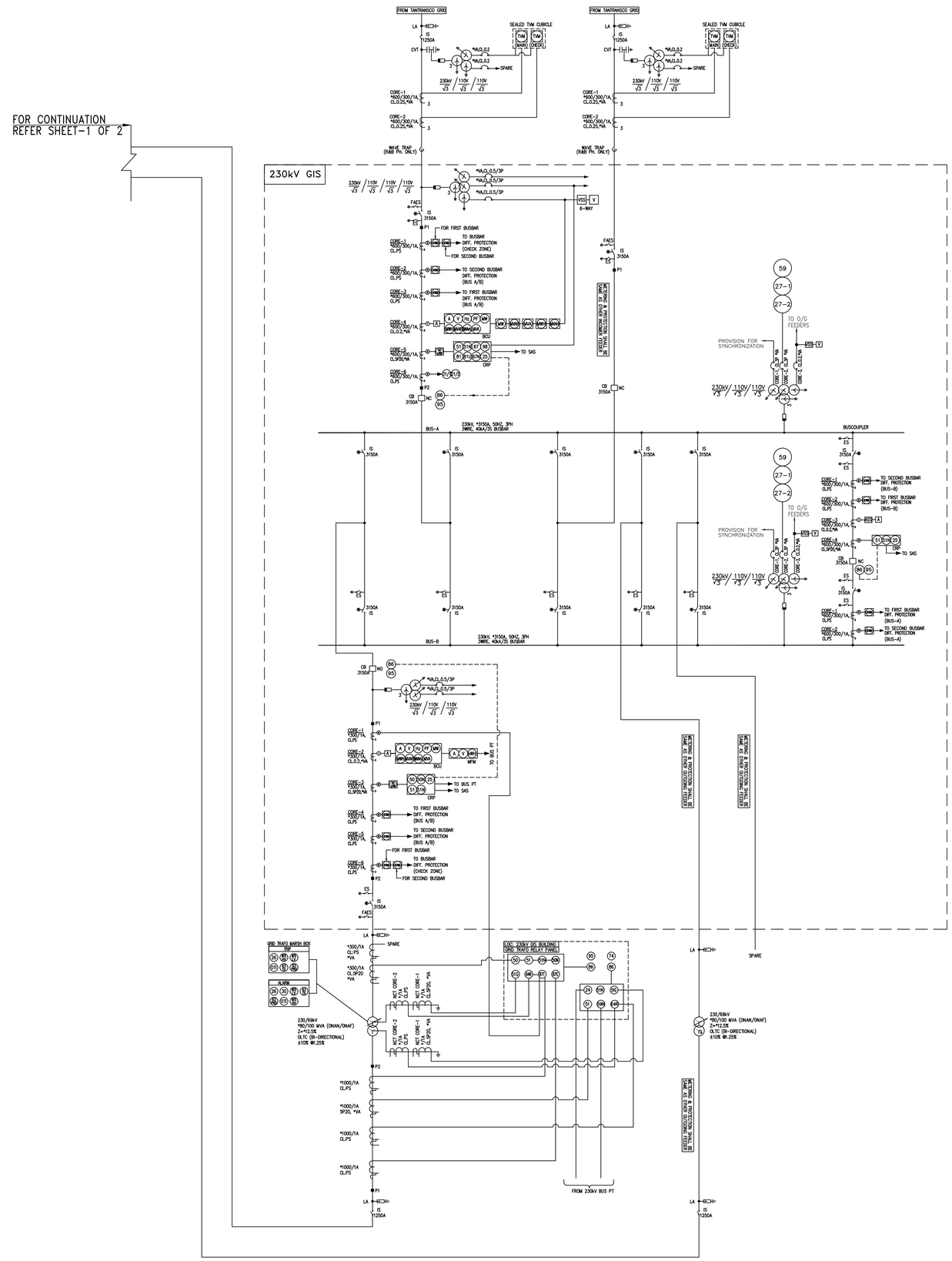
TCE FORM NO. 090 R0

FILE NAME: F-090-Rev-R0.dwg

TITLE: METERING & PROTECTION SLD FOR 230kV & 66kV GIS

DWG NO: TCE.12416A-EL-4005-CP-40049

FOR CONTINUATION
REFER SHEET-1 OF 2



NOTES:

1. FOR LEGEND, NOTES, ABBREVIATIONS AND REFERENCE DRAWINGS REFER SHEET-1 OF 2.

R0	SIGN.										HA	DG	22-07-2022
	INITIALS	AKJ	BRS	HA		HA							
	REVISIONS												
P2	SIGN.										HA	DG	12-04-2022
	INITIALS	AKJ	BRS	HA		HA							
	REVISIONS												
P1	SIGN.										HA	DG	17-03-2022
	INITIALS	AKJ	BRS	HA		HA							
	REVISIONS												
P0	SIGN.										HA	DG	28-01-2022
	INITIALS	AKJ	BRS	HA		HA							

ISSUE		DRN	DSN	CHD	CV	EL	IC	ME		PE/PM	APPD	DATE
		CLEARED										

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FILE NAME : F-090-Rev-R0.dwg

CHENNAI PETROLEUM CORPORATION LIMITED
POWER & UTILITIES FACILITIES OF CPCL'S 9MMTPA
CAUVERY BASIN REFINERY (CBR) PROJECT AT NAGAPATTINAM, TAMILNADU.

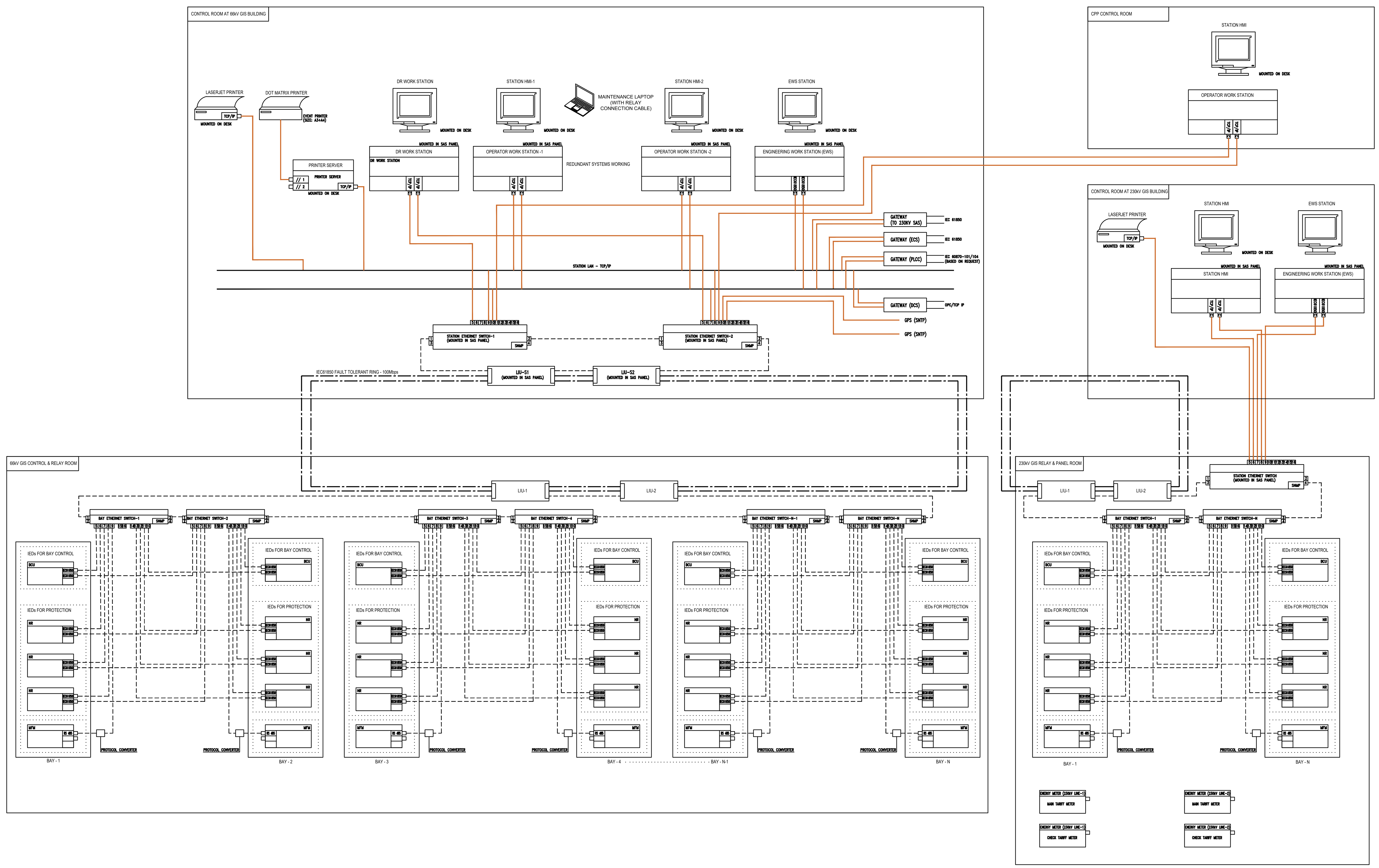
TITLE: METERING & PROTECTION SLD FOR 230kV & 66kV GIS

TATA CONSULTING ENGINEERS LIMITED
BENGALURU

SCALE : NTS
DC & DISC : PBU-EL
DWG NO. TCE.12416A-EL-4005-CP-40049
SHEET 2 OF 2
ISSUE R0

TCE FORM NO. 090 R0

EXHIBIT-7 ATTACHMENT-8



LEGEND: –

CAT RJ45 CABLE

ARMORED FO SINGLE MODE DUPLEX CABLE

ARMORED FO SINGLE MODE 6–CORE CABLE

LIU – MULTIMODE LIGHT INTERFERENCE UNIT

HMI – HUMAN MACHINE INTERFACE

SAS – SUBSTATION AUTOMATION SYSTEM

SNTP – SIMPLE NETWORK TIME PROTOCOL

OPC – OBJECT LINKED ENABLE PROCESS CONTROL

BCU – BAY CONTROL UNIT

IED – INTELLIGENT ELECTRONIC DEVICE

GPS – GLOBAL POSITIONING SYSTEM

DR – DISTURBANCE RECORDER

ECS – ELECTRICAL CONTROL SYSTEM

MWS – MAINTENANCE WORK STATION

RSTP – RAPID SPANNING TREE PROTOCOL

NOTES: –

1. SUPPLY, LAYING, SPLICING & TERMINATION OF ALL CABLES ARE IN GIS LSTK CONTRACTOR SCOPE.
2. SAS ARCHITECTURE SHALL BE PROVIDED WITH IEC 61850 RSTP.
3. SAS ARCHITECTURE SHOWN IS MINIMUM FUNCTIONALITY REQUIRED FOR THE SUBSTATION AND ANY ADDITIONAL COMPONENT REQUIRED SHALL BE CONSIDERED FOR THE SAFE AND SUCCESSFUL OPERATION AND INLINE WITH THE TANTRANSCO GRID.
4. ETHERNET SWITCHES, GATEWAYS, SERVERS SHALL BE PROVIDED WITH DUAL POWER SUPPLY UNITS.
5. HARDWARE FAILURE OF ANY DEVICE SUCH AS ETHERNET SWITCHES, GATEWAYS, SERVERS, BCU, IED, FIBER OPTIC CONNECTIVITY, LAN CONNECTIVITY, COMMUNICATION FACILITY AND FAILURE OF ANY INTERNAL & EXTERNAL AUX. POWER SUPPLIES SHALL BE ANNUNCIATED IN THE STATION HMI.
6. ETHERNET SWITCHES SHALL HAVE PLUGGABLE PORTS AND SHALL HAVE MINIMUM OF 2 SPARE PORTS.
7. THE DIGITAL INPUTS, ANALOG INPUT SIGNALS FROM VENTILATION SYSTEM, FIRE ALARM SYSTEM, AC/DC SYSTEM, SHALL BE CONSIDERED IN THE BUS COUPLER BAY CONTROL UNIT.

HOLD LIST: –

--NIL--

NOTES: –

1. TCE.12416A–EL–4005–AU–40001 KEY SINGLE LINE DIAGRAM FOR CPP.
2. TCE.12416A–EL–4005–GA–40046 ELECTRICAL EQUIPMENT LAYOUT FOR 66KV MAIN DISTRIBUTION (CPP) & 230KV SUB STATIONS.

ISSUE		DRN	DSN	CHD	CV	EL	IC	ME	PE/PM	APPD	DATE
R0	INITIALS	AKJ	BRS	SS		HA			HA	DG	22-07-2022
P1	INITIALS	AKJ	BRS	SS		HA			HA	DG	12-04-2022
P0	INITIALS	AKJ	BRS	SS		HA			HA	DG	25-03-2022

Purpose : only for P issues

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CHENNAI PETROLEUM CORPORATION LIMITED
POWER & UTILITIES FACILITIES OF CPCL'S 9MMTPA CAUVERY BASIN REFINERY (CBR) PROJECT AT NAGAPATTINAM, TAMILNADU.

TITLE:

SUBSTATION AUTOMATION SYSTEM (SAS) ARCHITECTURE FOR 66kV & 230kV GIS

TATA CONSULTING ENGINEERS LIMITED
BENGALURU

SCALE : NTS
DC & DISC: PBU & EL
DWG NO. TCE.12416A–EL–4019–CD–40053
SHEET: 1 OF 1
ISSUE R0
SIZE A0
FILE NAME :
TCE FORM NO. 090 R0

TCE.12416A–EL–4019–CD–40053
FOR 66KV & 230KV GIS

Annexure- Technical Amendment to Section 2

CORRIGENDUM-02

CORRIGENDUM NO: TCE.12416A-EL-GIS-40101-02

BIDDING DOCUMENT NO: 12416A-EL-GIS-40101

TENDER ID: 2022_DGMMC_8573_1

NAME OF WORK: GRID POWER – 230kV & 66kV DISTRIBUTION NETWORK

PROJECT: 9MMTPA CBR PROJECT AT NAGAPATTINAM TAMIL NADU

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
1.	VOLUME I	PREMABLE TO SCHEDULE OF PRICES (Page No. 576 of 2608)	Sl. No. 2.1	PRICE SCHEDULE (FORM SP-4)	**Modification to description in Table Sl.No 2.1** 230/69kV, **100MVA** Power Transformers
2.	VOLUME I	PREMABLE TO SCHEDULE OF PRICES (Page No. 578 of 2608)	Sl. No. 2.2.1	PRICE SCHEDULE (FORM SP-5) BREAKUP OF SERVICE PRICE	**Modification to description in Table Sl.No 2.2.1** 230/69kV, **100MVA** Power Transformers
3.	VOLUME II	(PART-1 of 4) Section C1 (Page 599 of 2608)	2.25	Scope of Work Construction Power	**Modification to clause:** Construction power supplies shall be arranged as under:

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
					a) One power supply near to the 66kV GIS building **shall be arranged by Owner (i.e. 415V) for the construction power requirement of 66kV GIS building**. b) **Bidder shall make arrangement at their cost a dedicated Diesel Generator for the construction power requirement at 230kV GIS area** **Further distribution from (a) and (b) is in the scope of Bidder.**
4.	VOLUME II	(PART-1 of 4) Section C2 (Page 607 of 2608)	3.14	Scope Matrix Electrical Cable trays, covers, supports, racks other cabling accessories within the battery limit of this package.	**Modification to remarks column in the table:** The clause is replaced as under: Wherever pipe rack /cable rack is available, bidder to make use for above ground cabling. **Cable trays and its supporting accessories on cable racks between 230kV GIS and 66kV GIS shall be provided by Owner. Cable trays within battery limit and the pipe rack/cable rack shall be in the scope of bidder.**
5.	VOLUME II	(PART-1 of 4) Section C2 (Page 611 of 2608)	3.38	Scope Matrix Electrical Construction Power	**Modification to remarks column in the table:** The clause is replaced as under: Construction power supplies shall be arranged as under: a) One power supply near to the 66kV GIS building **shall be arranged by Owner (i.e. 415V) for the construction power requirement of 66kV GIS building**.

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
					b) **Bidder shall make arrangement at their cost a dedicated Diesel Generator for the construction power requirement at 230kV GIS area** **Further distribution from (a) and (b) is in the scope of Bidder.**
6.	VOLUME II	(PART-3 of 4) (Page 1188 of 2608)	A.4.1.4	Plant FGL under "Site Grading"	**Modification to existing clause:** **"A.4.1.4 Plant FGL : Min. 0.6 m above Design Flood Level of the area or based on drainage outfall level" shall stand replaced by the following:-** **A.4.1.4 Plant FGL: 3.80 m above MSL.**
7.	VOLUME II	(PART-1 of 4) Section C4 (Page 637 of 2608)	5.1.1 (h)	230kV GIS Specification Circuit breakers	**Modification to existing clause:** The sub clause is replaced as under The circuit breakers shall be of **single** interrupter design (**1** break in series per pole) up to 40 kAIC subject to satisfactory operation of the Circuit Breaker for Short Line Faults and Terminal Faults Test duties without the need of external devices.
8.	VOLUME II	(PART-1 of 4) Section C4 (Page 639 of 2608)	5.1.3 (c)	230kV GIS Specification Interrupter Contacts	**Modification to existing clause:** The sub clause is replaced as under: Where **single break** per pole interrupters is used, these shall be so designed that a fairly uniform voltage distribution is developed across

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
					them. Grading capacitors across contacts may be used only to have a uniform voltage gradient across the contacts.
9.	VOLUME II	(PART-1 of 4) Section C4 (Page 659 of 2608)	10.3.3	230kV GIS Specification Type Tests	**Modification to existing clause:** The clause is replaced as under: The **earlier** type tests carried out at reputed testing laboratory shall be enclosed with the Bid. The test **certificates** must have been **valid as per CEA regulations**. If not, the Type tests must be carried out and the price shall be considered in bid.
10.	VOLUME II	(PART-1 of 4) Section C5 (Page 711 of 2608)	5.1.1 (h)	66kV GIS Specification Circuit breakers	**Modification to clause:** The sub clause is replaced as under The circuit breakers shall be of **single** interrupter design (**1** break in series per pole) up to 40 kAIC subject to satisfactory operation of the Circuit Breaker for Short Line Faults and Terminal Faults Test duties without the need of external devices.
11.	VOLUME II	(PART-1 of 4) Section C5 (Page 713 of 2608)	5.1.3 (c)	66kV GIS Specification Interrupter Contacts	**Modification to clause:** The sub clause is replaced as under Where **single break** per pole interrupters are used, these shall be so designed that a fairly uniform voltage distribution is developed across them. Grading capacitors across contacts may be used only to have a uniform voltage gradient across the contacts.

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
12.	VOLUME II	(PART-1 of 4) Section C5 (Page 733 of 2608)	10.3.3	66kV GIS Specification Type Tests	**Modification to clause:** The clause is replaced as under The **earlier** type tests carried out at reputed testing laboratory shall be enclosed with the Bid. The test **certificates** must have been **valid as per CEA regulations**. If not, the Type tests must be carried out and the price shall be considered in bid.
13.	VOLUME II	(PART-1 of 4) Section C8 (Page 780 of 2608)	1.1.10	Grid Transformers	**Addition of New Clause 1.1.10:** Bidder to consider power transformers with Dissolved Gas Analyzer (DGA) monitoring system.
14.	VOLUME II	(PART-1 of 4) Section C9 (Page 788 of 2608)	4.13	Service Transformers	**Addition of New Clause 4.13:** Bidder to consider Energy Efficiency level 3 for 6.6/0.433kV Service transformers.
15.	VOLUME II	(PART-1 of 4) Section C4.6	-	Tubular Bus conductors, Insulators, BPI & Erection hardware	**Addition of new Section C4.6** Bidder to refer Section C4.6 for specification of Tubular Bus conductors, Insulators, BPI & Erection hardware. Refer Attachment -1
16.	VOLUME II	(PART-1 of 4) Section C4.7	-	High Mast Lighting System	**Addition of new Section C4.7:** Bidder to provide high mast lighting at 230kV switchyard area which can have provision to accommodate lightning protection rods. Bidder to refer Section C4.7 for specification of high mast lighting. Refer Attachment - 2

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
17.	VOLUME II	(PART-1 of 4) Section C10.1 to C10.4	-	EHV, HV, MV, Control cable specification	**Addition of new Sections C10.1 to C10.4** Bidder to refer attached Section C10.1 to C10.4 for detailed cable specification. Refer Attachment – 3 to 6
18.	VOLUME II	(PART-1 of 4) Section C11 (Page 845 of 2608)	2.0	HVAC Specification	**Modification to para 2.0:** To cater the air conditioning requirement of 66 kV GIS room, chilled water coil AHUs with **Air cooled chiller** to be considered.
19.	VOLUME II	(PART-1 of 4) Section C11 (Page 845 of 2608)	2.1, 2.2 & 2.3	HVAC Specification	**Modification to clause at 2.1, 2.2 & 2.3:** To cater the air conditioning requirement of 66 kV Relay room, Panel room & Control room, **Air Cooled Package Air Conditioner (PAC)** to be considered. **Chemical filter and Hydrocarbon and toxic gas (H_2S) detection shall be provided in fresh air duct of control room.**
20.	VOLUME II	(PART-1 of 4) Section C11 (Page 846 & 847 of 2608)	3.0, 3.1 & 3.2	HVAC Specification	**Modification to clause at 3.0,3.1 & 3.2:** To cater the air conditioning requirement of 230 kV GIS room, Relay & Panel room, Control room **Air cooled Package Air Conditioner (PAC) to be considered.** **Chemical filter and Hydrocarbon and toxic gas (H_2S) detection shall be provided in fresh air duct of control room.**
21.	VOLUME II	(PART-1 of 4) Section C11 (Page 846 of 2608)	2.4, 2.8 & 2.10	HVAC Specification	**Modification to clause at 2.4,2.8 & 2.10:** To cater the air conditioning requirement of Operator/Engineer's room, Maintenance room & Store room, **Split/Cassette AC** to be considered.

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
22.	VOLUME II	(PART-1 of 4) Section C11 (Page 846 & 847 of 2608)	2.5 & 3.4	HVAC Specification	**Modification to clause:** Dry ventilation to be consider for Battery room, with supply through fresh air intake louvers and exhaust through exhaust fan. Ventilation air requirement shall be calculated based on minimum 15 ACPH or heat dissipation method, whichever results in higher flow rate. Explosion proof type exhaust fan shall be used. Slight negative pressure to be maintain inside the Battery room. **Hydrocarbon and toxic gas(H_2S) detection shall be considered in fresh air duct.**
23.	VOLUME II	(PART-1 of 4) Section C11 (Page 846 of 2608)	2.6 & 2.7	HVAC Specification	**Modification to clause:** Dry ventilation to be considered for Filling station and Cable Vault, with supply through fresh air intake louvers and exhaust through exhaust fans. Ventilation air requirement shall be calculated based on minimum 15 ACPH or heat dissipation method, whichever results in higher flow rate. **Hydrocarbon and toxic gas(H_2S) detection shall be considered in fresh air duct.**
24.	VOLUME II	(PART-1 of 4) Section C11 (Page 847 of 2608)	3.3, 3.5 & 3.6	HVAC Specification	**Modification to clause:**

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
					To cater the air conditioning requirement of Office room, Maintenance room & Store room, **Split/Cassette AC** to be considered.
25.	VOLUME II	(PART-1 of 4) Section C11 (Page 850 of 2608)	4.23	HVAC Specification	**Modification to clause:** For chilled water pump, selection shall be based on 0.7 CMH/TR and selection for condenser water pump shall be based on 1 CMH/TR.
26.	VOLUME II	(PART-1 of 4) Section C11 (Page 850 of 2608)	4.24(iv), 4.24(ii) (c), 5.1	HVAC Specification	**Deleted:** Points 4.24(iv), 4.24(ii) (c),5.1 stands deleted.
27.	VOLUME II	(PART-1 of 4) Section C11 (Page 850 of 2608)	4.25 (New)	HVAC Specification	**Addition of new clause 4.25 under Design Requirement** 10 % factor of safety is to be consider on sensible and latent heat load each. Equipment selection to be done with 10 % factor of safety.
28.	VOLUME-II	(PART-1 of 4) Section C11 (Page 850 of 2608)	4.26 (New)	HVAC Specification	**Addition of new clause 4.26 under Design Requirement** Along with Chilled water coil AHU's, Bidder to include: • Back washing facility of water lines for cleaning condensers • Reusable Strainers at water inlet points with indicators for choking

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
29.	VOLUME II	(PART-1 of 4) Section C11 Page 850 of 2608	4.27 (New)	HVAC Specification	**Addition of new clause 4.27 under Design Requirement** Centrifugal Fans, filters, Pumps shall be of latest applicable IS standards. Piping material, works shall be as per latest IS standards. All applicable codes and standards for all equipment will be as per IS/equivalent only. Performance curves and selection charts for fans, filters, etc. and selection charts and calculation for cooling coil and heating coil to be provided. The specified inside design conditions shall be guaranteed by the bidder. For ventilation system, the openings for air outlets / return air, duct sizing and floor openings for exhaust air / return have been chosen judiciously to ensure proper circulation / air distribution and replacement of air. However, it is the responsibility of the Vendor to ensure this and if necessary, he should suggest changes in location of air outlets / floor openings to ensure fulfillment of the above requirements and shall be incorporated by the Owner, if feasible. All equipment supplied shall have performance not less than those specified. If bidder feels that higher capacity equipment is required to

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
					meet the specified conditions, the same has to be substantiated by the bidder with supporting calculations. After completion of the installation, Vendor shall balance the system and make necessary adjustments for all equipment until all guaranteed performance requirements are satisfied. After completing the adjustments, Vendor shall conduct acceptance tests of the installation in the presence of Owner during which the installation shall meet the guaranteed performance requirements to the satisfaction of Owner and all inside design conditions specified shall be maintained, within the specified tolerances. If the performance is not achieved by the Vendor, Vendor shall be given the option of making adjustments after which the tests shall be repeated at the Vendor's expense. The repeat test shall be carried out within the stipulated time. All instruments and services required for the above tests shall be provided by Vendor. The test reports shall be submitted for Owner's approval before handing over the plant. Vendor shall ensure that all instruments installed in the ventilation systems as well as all instruments required for conducting acceptance tests shall be only calibrated instruments. Vendor shall ensure that calibration of all instruments shall be carried out by any certified laboratory having traceability to national standards.

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
					Vendor shall submit such calibration certificates meeting the above requirements to Owner for approval prior to installations/ conducting of acceptance tests.
30.	VOLUME II	(PART-1 of 4) Section C11 (Page 913 of 2608)	1.9.4	Data Sheet HVAC System_ Air handling Unit	**Modification to clause:** MOC of AHU Outer and inner skin shall be, 0.8 mm pre powder coated GSS and 0.8 mm plain GSS respectively.
31.	VOLUME II	(PART-2 of 4) (Page No. 968 & 969 of 2608)	EXHIBIT-2	Metering & Protection SLD for 230kV & 66kV GIS	**Modification of Metering & Protection SLD for 230kV & 66kV GIS (EXHIBIT-2):** **Exhibit -2 attached with Tender Specification is replaced. Refer Attachment - 7**
32.	VOLUME II	(PART-2 of 4) (Page No. 977 of 2608)	EXHIBIT-7	Substation Automation System (SAS) for 230kV & 66kV GIS	**Modification of Substation Automation System (SAS) for 230kV & 66kV GIS (EXHIBIT-7):** Exhibit -7 attached with Tender Specification is replaced. Refer Attachment -8
33.	VOLUME II	(PART-2 of 4) (Page 1086 of 2608)	EXHIBIT-16	Civil	**Additional drawing (Exhibit-16)** Contour drawing of entire refinery area is attached. Refer Attachment 9
34.	VOLUME II	(PART-4 of 4) Section G (Page 2349 of 2608)	SECTION-G	Civil	**Revised Soil investigation report (SECTION G):**

Sr. No.	Part of the Bidding Document	Document Reference	Clause/ Item No	Subject	MODIFICATIONS/ ADDITIONS/ DELETIONS
					The soil investigation report attached with tender document is superseded with the latest soil investigation report conducted in CPP area attached with the corrigendum. Refer Attachment – 10

All other terms & conditions, stipulations, specifications etc. of Bidding Document including Corrigendum/Amendments, if any, issued earlier shall remain unaltered.

Enclosure

Attachment 1 to 10.

WORK DETAILS :		GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK				
BIDDING DOCUMENT :		SPECIFICATION NO. 12416A-EL-GIS-40101				
Sl No	REFERENCE OF ENQUIRY DOCUMENT				BIDDERS QUERY	OWNER/CONSULTANT REPLY
	PART / VOLUME NO	PAGE NO	CLAUSE NO	SUBJECT		
1	Volume -II -Section CI - Scope of Work	597 of 2608	Clause No 2.9	2Nos. Grid Transformers (i.e. 230/69kV), 230kV SF6 to Air sealing ends, 66kV cable sealing ends, 66kV Isolators, 230kV LAs, 66kV LAs, RTCC panels for transformers as per attached Single Line Diagram	Whether we have to provide Cabling sealing end for all the 66KV GIS Feeders if so kindly provide cable size for each feeder. Kindly clarify	Bidder understanding is correct. Cable sealing ends for all 66kV GIS feeders at 66kV GIS shall be considered as part of the bidder scope along with other cable sealing ends pertaining to CPP as mentioned in scope matrix Electrical (Volume-II, part 1 of 4, Section C2). Bidder can follow the minimum size of cable as 630sq.mm. Cable sizing is in the scope of bidder. Cable sizes shall be considered based on the down stream transformer ratings mentioned in Metering & Protection SLD for 230kV & 66kV GIS, Volume-II, Part 2 of 4, Exhibit-2.
2	Volume -II -Section CI - Scope of Work	598 of 2608	Clause No 2.11	PLCC/FO/OPGW or any other approved communication between 230kV GIS and TANTRANSCO feeding substation.	Kindly provide the Remote end communication equipment details	Bidder to supply, erect and commission the necessary communication equipment for both the substations (i.e. 230kV GIS refinery end and feeding substation remote end) in coordination with TNEB/TANTRANSCO as per their requirements.
3	Volume -II -Section CI - Scope of Work	598of 2608	Clause No 2.12	RLDC connection including required gateways, communication and all other software and hardware from 230kV GIS (if any) for power import shall be provided by GIS LSTK contractor	Kindly provide the RLDC Remote end communication equipment details	All equipment / systems including gateways, communication and all other software and hardware at 230kV GIS and RLDC shall be provided by bidder meeting the TNEB/TANTRANSCO requirements.
4	Volume -II -Section CI - Scope of Work	598of 2608	Clause No 2.14	415V AC Distribution boards for connection to distribution transformers, LV power and Lighting distribution boards and their associated accessories	We understand that our scope of supply of AC distribution Board, LV Power and Lighting distribution boards and their associated accessories are limted to 230KV /66 GIS Building scope only. Kindly confirm	Bidder understanding is correct. Supply of AC distribution Boards, LV Power and Lighting distribution boards and their associated accessories etc. are limited to 66kV GIS Building, 230KV GIS building and its associated outdoor equipment only.
5	Volume -II -Section C2 - Scope Matrix Electrical	600 of 2608	Sl No 2.1.1	Engineering Electrical load list /consumer list	As per our understanding we have to provide only load list pertaining to 220KV & 66KV GIS scope of work only. What is consumer List ???. Kindly Clarify	Bidder understanding is correct. Providing electrical load list is limited to 66kV GIS, 230kV GIS and its associated outdoor equipment scope of work only. The consumer list is same as load list and the word "consumer list" can be ignored.
6	Volume -II -Section C2 - Scope Matrix Electrical	600 of 2608	Clause No 2.1.2	CT sizing calculations for Relaying & metering etc.	As per our understanding we have to provide Caculations pertaining to 220KV & 66KV GIS scope of work only. Kindly Clarify	bidder understanding is correct. CT sizing calculations pertaining to 66kV GIS, 230kV GIS and its associated outdoor equipment are in bidder scope.
7	Volume -II -Section C2 - Scope Matrix Electrical	600 of 2608	Clause No 2.1.3	Cable sizing calculations (EHV / HV / MV / LV)	As per our understanding we have to provide Caculations pertaining to 220KV & 66KV GIS scope of work only. Kindly Clarify	Bidder understanding is correct. Cable sizing calculations pertaining to 66kV GIS, 230kV GIS and its associated outdoor equipment are in bidder scope.
8	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.1.4	Cable tray sizing calculations	As per our understanding we have to provide Caculations pertaining to 220KV & 66KV GIS scope of work only. Kindly Clarify	Bidder understanding is correct. Tray sizing calculations pertaining to 66kV GIS, 230kV GIS and its associated outdoor equipment are in bidder scope.
9	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.1.5	Lighting (indoor / Outdoor) calculations	As per our understanding we have to provide Caculations pertaining to 220KV & 66KV GIS scope of work only. Kindly Clarify	Bidder understanding is correct. Lighting calculations pertaining to 66kV GIS, 230kV GIS and its associated outdoor equipment are in bidder scope.
10	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.1.6	Earth lead sizing, Earth Grid/Earth mat sizing calculations (including below & above ground earthing calculations)	As per our understanding we have to provide Caculations pertaining to 220KV & 66KV GIS scope of work only. Kindly Clarify	Bidder understanding is correct. Earthing sizing calculations pertaining to 66kV GIS, 230kV GIS and its associated outdoor equipment are in bidder scope.
11	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.1.7	Lightning protection calculations (Risk assessment, numbers and size of down comers etc.)	As per our understanding we have to provide Caculations pertaining to 220KV & 66KV GIS scope of work only. Kindly Clarify	Bidder understanding is correct. Lightning protection calculations pertaining to 66kV GIS, 230kV GIS and its associated outdoor equipment are in bidder scope.
12	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.1.8	Relay Settings	As per the remarks Column Fault current values will be provided by EPCM-4 Contractor, Based on the fault current details provided by EPCM-4 Contractor we have to calculate and provide the Relay settings for 220KV/66KV GIS package only , all other areas Relay Co-ordination study and settings will be carried out by others. kindly confirm our standing is correct or not	Bidder understanding is correct. Relay settings / Relay co-ordination study pertaining to 66kV GIS, 230kV GIS and its associated outdoor equipment are in bidder scope.

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13	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.2	Obtaining statutory approvals such as Factory inspectorate, local inspectorate, local statutory authorities such as grid and any other as required to complete the work including documentation	As per the scope of work , we will have to coordinate with CEA and take necessary Drawings approvals , Submission of completion report, recive the defect report and submit the rectification report and take necessary safety certificate for energisation of the 220KV/66KV switchyard and auxilary works covered in the LSTK package. All other approvals are excluded from LSTK contractors scope, further necessary FEEs and charges shall be paid by customer based on the demand notice by CEA. Kindly confirm	All the necessary approvals for the 230/66kV substation shall be in bidder scope. All the related fees shall be in bidder scope.
14	Volume -II -Section C1 - Scope of work	597 of 2608	Clause No 2.5	Scope of work, Outdoor equipment are in GIS Bidder scope. But Specification not available for Erection hardware, ACSR Conductor, IPS Tube, insulator hardware, Insulators, etc…	Kindly provide the specification	Refer corrigendum-2, Sr. No. 15.
15	Volume -II -Section C2 - Scope Matrix Electrical	607 of 2608	Sl No 3.16	Supply & Installation of Cable trays for EHV Cables from 66kV GIS to Generator transformers, 66kV GIS to CPP auxiliary transformers and 66kV GIS to DG auxiliary transformers which is comes under Others scope.	We presume that necessary earthing will also be the part of others. Kindly confirm	Confirmed.
16	Volume -II -Section C8 - Grid transformers	780 of 2608	Sl No 3.1.19	Power Transformers having oil capacity more than 2000 liters/10MVA shall be protected with Auto actuated High velocity water spray system.	Whether Hydrant system is part of this scope. Kindly clarify	Fire protection system for 230kV & 66kV GIS is part of other's scope.
17	Volume -II -Section C2 - Scope Matrix Electrical	602 of 2608	Clause No 2.3.1	SLDs for 230kV & 66kV GIS including their outdoor equipment, ACDBs, Lighting panels and power panel distributions, DC distribution, UPS distribution, Construction power distribution etc	All the drawings, SLD and others equipments covered in the Scope of GIS Substation LSTK contract only is part of this scope all others are excluded. Kindly confirm our understaning is correct	Scope of GIS LSTK package is described in various sections of the tender specifications. Not just the drawings
18	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.3.2	Control System & SAS architecture		
19	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.3.3	Detailed I/O list		
20	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.3.4	Control and Trip logic diagrams, Block interlock diagrams (BIDs) for various 230kV and 66kV feeders		
21	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.3.5	Control wiring diagrams / logic diagrams as required for various 230kV and 66kV feeders		
22	Volume -II -Section C2 - Scope Matrix Electrical	601 of 2608	Clause No 2.3.6	Any other SLDs as required		
23	Volume -II -Section C2 - Scope Matrix Electrical	602 of 2608	Clause No 2.4	Layout Drawings	As per the Scope matrix we have to prepare and submit the Layout drawings for the scope of works covered under GIS Substation LSTK package only. All the required basic inputs will be provided by TCE/CPCL. Kindly confirm our understanding is correct.	Bidder's scope includes all basic and detail design of all equipment/systems in the GIS LSTK package. Owner will provide data available with them.
24	Volume -II -Section C2 - Scope Matrix Electrical	602 of 2608	Clause No 2.5	Schedules	As per the Scope matrix we have to prepare and submit the Schedules for the scope of works covered under GIS Substation LSTK package only. All the required basic inputs will be provided by TCE/CPCL. Kindly confirm our understanding is correct.	Bidder's scope includes all basic and detail design of all equipment/systems in the GIS LSTK package. Owner will provide data available with them.
25	Volume -II -Section C2 - Scope Matrix Electrical	603 of 2608	Clause No 3.2.3	Tariff Metering panels As per the comments given in the remarks column you have indicated In case tariff metering panels are required at source substation as per TANTRANSCO grid code, same shall be considered.	Normally Tariff meters are provided at the consumer point i.e Point of supply location only. Since we cant approach TANTRANSCO/TANGEDCO at this stage, only after award of contract and upon receipt of necessary approval from CPCL only we can start laisioning activities, in view of this assessing the requirement at this stage is not feasible.In view of this we suggest any additional traiff metering is required by TANTRANSCO/ TANGEDCO shall be provided at mutually aggred rates. Kindly confirm	Deviation is not acceptable. Requirements of TNEB/TANTRANSCO authorities shall be complied without any additional costs

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26	Volume -II -Section C2 - Scope Matrix Electrical	604 of 2608	Clause No 3.5	110V UPS System with integral Distribution Board and its further distribution for 230kV GIS building	Whether we have to provide the complete UPS system including necessary Battery back up or CPCL will provide the feeders for 230KV GIS building also in line with 66KV GIS Building. If we have to provide the UPS system what is the Back up time required(UPS back up in Hrs) Kindly confirm	Bidder to provide the complete 110V UPS system including necessary battery back up for 230kV GIS building alone. For 66kV GIS building UPS supply, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical. The back up time required for UPS is 30mins.
27	Volume -II -Section C2 - Scope Matrix Electrical	604 of 2608	Clause No 3.6	110V UPS sub DB and its further distribution for critical power supply to SAS etc. for 66kV GIS building	In the remarks column you have indicated , Two Nos of 110V UPS feeders to feed the 110V UPS sub DB (which is supplied by GIS LSTK contractor) shall be provided by Owner. Whether we have to provide the incoming cable from Owners source of supply,if yes kindly provide the size of the cable and distance from Owners UPS DB location to 66KV GIS Location. Kindly Confirm	Incomer cables to 110V UPS Sub DB at 66kV GIS building to be considered by bidder. Cable sizes required shall be decided by bidder based on connected load on the Sub DB and length from the CPP control room. Route length from UPS located at CPP control room to UPS sub DB at 66kV GIS building is 480M.
28	Volume -II -Section C2 - Scope Matrix Electrical	604 of 2608	Clause No 3.8	220V sub DCDB and its further distribution for critical lighting supply for 66kV GIS building	In the remarks column you have indicated , Two Nos of 220V DC feeders to feed the 220V sub DCDB (supplied by GIS LSTK contractor) shall be provided by Owner. Whether we have to provide the incoming cable from Owners source of supply,if yes kindly provide the size of the cable and distance from Owners UPS DB location to 66KV GIS Location. Kindly Confirm	Incomer cables to 220V Sub DCDB at 66kV GIS building to be considered by bidder. Cable sizes required shall be decided by bidder based on connected load on the Sub DCDB. Route length from 220V DCDB located at STG Electrical Building to 220V sub DCDB at 66kV GIS building is 450M.
29	Volume -II -Section C2 - Scope Matrix Electrical	605 of 2608	Clause No 3.12	Supply & Laying of 66KV Cables and its terminations	As indicated in the remarks column we have to carry out supply, Laying,termination of 66KV Cables from the Various Transformers to 66KV GIS Switchgear. Other 66KV Cables Supply,Laying & terminations are excluded from the scope of GIS LSTK contractor scope. Kindly provide the trench layout and typical EHV cable laying drawings for our understanding and consideration of the same for submitting the commercial offer. Apart from the cables mentioned in the remarks column , LSTK contractor has to include the 66KV cables from Grid Transformer to 66KV GIS switchgear. Kindly confirm	1. Supply, Laying, termination of 66KV Cables from CPP auxiliary transformers (2Nos), CPP DG transformers (2Nos), CPP GTGs/STGs generator transformers (7Nos), grid transformers (2Nos) to 66KV GIS Switchgear along with their outdoor LAs, isolators (as applicable) are in bidder scope. Cable terminations at 66kV GIS side for other 66KV outgoing feeders are in bidder scope. 2. For detailed cable tray routing between Grid Transformer at 230kV GIS to 66KV GIS switchgear refer Volume-II, Part 2 of 4, Exhibit-10.
30	Volume -II -Section C2 - Scope Matrix Electrical	606 of 2608	Clause No 3.13	LIUs, Relays, Patch cords and connectors, pigtails, splicer for 66kV cable differential protection required at refinery substations shall be supplied by GIS LSTK contractor. CT's required for 66kV cable differential protection at GIS side shall be considered by GIS LSTK contractor. However,required CT parameters shall be shared by GIS LSTK contractor to respective refinery substation contractors. Supervision of commissioning of 66kV cable differential relays for refinery substations shall be by GIS LSTK contractor.	This Scope is not Clear, Since the details of Refinary substation are not avilable, further commissioning of GIS LSTK package will be independent of Refinary substations. We request you to limit the scope of LSTK work to 230KV /66KV GIS substation and associated auxilary works only. In case if we have to consider Required LIUS,Relays, Patchcards, Pig tails etc in the scope of GIS LSTK package kindly provide the quantities of the same to consider.	Deviation is not acceptable. All required hardware including LIUs, Relays, Patch cords and connectors, pigtails, splicer etc. required on either side is included in the scope of bidder. The installation of these hardware on refinery substation side will be done by others. The bidder responsibility includes installation of this hardware on 66kV GIS end and Commissioning of the entire system.
31	Volume -II -Section C2 - Scope Matrix Electrical	607 of 2608	3.14	Cable trays, covers,supports, racks other cabling accessories within the battery limit of this package	We request you to provide the over all plot plan indicating the location of various buildings /Sub stations, CTG and STG area along with the routing of pipe rack to calculate the quantity of cable trays , cable tray supports , earthing materials and any other items required for completing the work. Kindly confirm	For cable trays between 230KV GIS and 66KV GIS refer corrigendum-2, S.No. 4. For location of various buildings /Sub stations, GTG and STG area Volume-II, Part 2 of 4, Exhibit-11.
32	Volume -II -Section C2 - Scope Matrix Electrical	607 of 2608	3.19	Lighting System	Our scope of Lighting,Small power & others are limited to 220KV/66KV Gis Buildings and Switchyard area to receive the Grid Power. All the equipments,materials including light fittings, Power sockets, welding sockets ,distribution boards etc required for this will be covered in the LSTK contract.Other areas are excluded from the scope of LSTK Contract. Kindly confirm	Bidder understanding is correct and confirmed.
33	Volume -II -Section C2 - Scope Matrix Electrical	609 of 2608	3.31	Control & instrumentation cabling between bidder's equipment/ switchboards (from respective marshalling panel) to ECS panel, plant DCS.	Kindly provide drawings (Over All plot plan) indicating the location of CPP Control room to enable us to estimate the quantity & type of cable required for connecting from marshallaing panel to ECS panel & Plant DCS.	For cable trays between 230KV GIS and 66KV GIS refer corrigendum-2, S.No. 4. For location of various buildings /Sub stations, GTG and STG area Volume-II, Part 2 of 4, Exhibit-11.

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34	Volume -II -Section C2 - Scope Matrix Electrical	610 of 2608	3.32	Electrical Control Panel (ECP) of Mosaic type for 66kV GIS	As per the scope matrix we have to install the ECP in the CPP control room. We understand that required space will be provided by TCE/CPCL in the CPP control room. Further we request you to provide the location drawings and the distance from the proposed 66KV GIS substation to CPP Control room to estimate cable quantity and other materials required.	Required space for ECP (Electrical Control Panel) would be provided by owner. For location of various buildings /Sub stations, GTG and STG area Volume-II, Part 2 of 4, Exhibit-11.
35	Volume -II -Section C2 - Scope Matrix Electrical	610 of 2608	3.34	Design engineering, layout design, installation & commissioning of Tele-Communication, Public Address System and Fire detection & alarm system for 230kV & 66kV GIS building.	As per the scope matrix Layout design ,installation and commissioning of Tele communication, Public address system and fire detection & alaram sytem part of LSTK contract, All the materils will be supplied by others. Kindly provide the list of materials supplied by others to enable us to estimate the consumables and others to be included as part of the insatallation of LSTK package, Further our gurantee is only for the erection workmenship only since the materials are supplied by others our scope of gurantee is excluded for the materials and equipments supplied by others. TCE/ CPCL has to provide the supplier assistance during testing and commissioning of the system free of charge. and the duration of their requirement will be discussed and agrred after award of the contract. Kindly confirm	Design, installation and commissioning of Tele communication, Public address system and fire detection & alarm system, List of materials along with BOQ based on the design shall be provided by bidder and supply of materials will be by others. Regarding guarantee for the equipment supplied by others, bidder understanding is correct All the required assistance during testing and commissioning of the systems shall be arranged by bidder
36	Volume -II -Section C2 - Scope Matrix Electrical	610 of 2608	3.35	Supply of material for the systems such as Tele- Communication, Public Address System and Fire detection & alarm system for 230kV & 66kV GIS buildings		
37	Volume -II -Section C2 - Scope Matrix Electrical	611of 2608	3.39	Supply and installation of 66kV Lightning arrestors (36Nos) required for CPP auxiliary transformers, DG Transformers and Generator transformers.Foundations shall be by others, structures of LAs, cable sealing ends,including conductor,conductor connectors and other misc accessories are in GIS contractor scope	As per the scope matrix we have to supply 66KV Las as per the Qty provided in the remarks column along with necessary mounting structures and terminal connectors including suitable ACSR conductor only and not clear about the cable sealing ends. Kindly clarify	LAs, necessary mounting structures and terminal connectors including suitable ACSR conductor, along with Cable sealing ends are part of bidder scope.
38	Volume -II -Section C2 - Scope Matrix Electrical	613of 2608	3.49	RLDC connection including required gateways, communication and all other software and hardware from 230kV GIS (if any) for power import shall be provided by GIS LSTK contractor.	Kindly provide the details of the equipments at RLDC to select the suitable hardware and software to meet the integration requirement	All equipment / systems including gateways, communication and all other software and hardware at 230kV GIS and RLDC shall be provided by bidder meeting the TNEB/TANTRANSCO requirements.
39	Volume -II -Section C2 - Scope Matrix Electrical	615 of 2608	2.4	Roads, fence, gate, storm water drain network, Rainwater harvesting pits, Trenches, duct banks,painting, plumbing &sanitary works, architectural finishes,etc	Our scope of works for Roads,fence,gate & storm water drain etc are limited upto LSTK Contractor boundary limit only. All other areas not under the scope of LSTK Contractor. Kindly confirm	Confirmed.
40	Volume -II -Section C2 - Scope Matrix Electrical	615 of 2608	2.6	Forming of plant FGL as per Topography survey & matching with the refinery FGL	As indicated in the remarks column this activity will be carried out by others and we will recive the area as per the final FGL fixed by CPCL/TCE. All the civil works will be carried out based on this FGL. Kindly confirm	Confirmed.
41	Volumne -II-I	GENERAL		TYPE TESTS	As per the tender documents most of the equipments Type test validity shall be with in 5 Years. We request you to consider the Type Test validity in line with the Guide lines issued by CEA and the same were accepted by most of the Central / state Power utilities (PGCIL,NTPC,NHPC and all state power utilities). Due to the pendamic for the last 2 years most of the equipment vendors / suppliers have workd with 30 to 50% capcity and are recluctant to repeat the type tests due to time constraint . Further conducting type tests where in there is no change in design and material configuration is not advised and accepted by various manufacturers who are qualified for supplying the major portion of the equipments required for the project, further the project completion is very short, conducting or repeating the type tests including getting the slot in the test labs will hamper the delivery & completion of the project as per the Time schedule. Kindly accept the type test in line with the CEA guidelines.	Refer corrigendum - 2, Sr. Nos. 9 & 12

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	COMMERCIAL					
42	NIT / Vol - I & ITB / Vol-I	Pg 5 & Pg 4 of 70	3	Type of Bid	We refer to the suject NIT clause which mentions the bidding type to be Domestic Competitive while ITB mentions the same to be International competitive bidding. Kindly Clarify	This is Domestic Competitive Bidding. Refer BDS Sl.no.3
43	NIT / Vol - I	Pg 8	4.1.2	Bidder Qualification Criteria	We refer to the suject clause which mentions about signing and submission of MOU/Agreement with GIS manufacturers. Request you to kindly share the format	Bidder to use their format for signing the MOU/Agreement
44	ITB / Vol - I	Pg 36 (Sheet 12 of 70)	13.5.3	Commitment from Chief Executive	We refer the suject clause which calls for the submission of commitment from Chief executive. As per company Board resolution and the POWER of ATTORNY issued by the authorised person the concrend Division President is responsible for delivering the project. In line with this we will submit the commitment letter . Request you to kindly share the format for the same.	Commitment may be given by the Authorized person. Bidder to use their format
45	GCC / Vol I & SCC / Vol - I	Pg 332 & Pg 523 (Sheet 22/24)	Appendix V	Bid Security Format	Two Bid Security formats are available in the tender,however we will follow the format issued as Annexure -VIII has part of SCC. Kindly Confirm	Confirmed.
46	SCC / Vol - I	Pg 484 (Sheet 38 of 55) and Pg 506 (Sheet 5 of 24)	Cl. 68.1.1 and Cl. 2.1 (i) (b)	Advance Bank Guarantee	Clause 68.1.1 calls for submission of bank gauaratee equivalluent to 110% of the mobilisation advance whereas Clause 2.1(i)(b) Terms of Payment calls for submission of advance bank guarantee of equivalent value. We understand that mobilisation advance bank guarantee shall be equivalent to the advance amount needs to be submitted. Kindly confirm our understanding is correct.	SCC Clause 68.11 is for Mobilization advance and BG shall be equal to 110% of the mobilization advance amount. Annexure IV to SCC Clause 2.1(i)(b) is for advance payment under Supply for placement of orders for equipment identified in the billing break up
47	SCC / Vol - I	Pg 486 (Sheet 40 of 55) and Pg 516 (Sheet 15 of 24)	68.1.9 and Annexure VI (ii)	Credit Rating of Bank Sanctioning the bank guarantee	We wish to submit that the bank guarantee shall be submitted in line with Annexure VI of SCC (List of acceptable banks). The ratings of the financial institution is something beyond the control of the Contractor and as such issuing a fresh bank guarantee everytime on account of change in rating of the bank is not possible.We request you to kindly withdraw this clause.	Bidder to comply as per tender terms.
48	SCC / Vol - I	Pg 492 (Sheet 46 of 55)	73	Terms and conditions for Post Warranty Comprehensive Annual Maintainence Contract (PWCAMC)	We request to kindly issue the format for signing the agreement with OEM for the Post warranty AMC contract. We also request you to suitably word the format in such a manner that the OEMs for all the equipments indicated in SP-7 are onboard for executing the AMC portion directly with the Client at the bidding stage itself.	Bidder to use their format
49	ITB / Vol - I	Pg 44 (Sheet 20 of 70)	19.3	Original Documents	Kindly confirm that only the following documents in original to be submitted with in 7 days from the date opening of Techno Commercial Bid. 1. EMD bank guarantee 2. Documents in support of BQC 3. Integrity Pact	Refer to NIT Sr. No 7 clause XXXV
50	ITB / Vol - I	Pg 49 (Sheet 25 of 70)	22	Alternative Bids	We understand that an OEM (GIS Manufacturer) can bid directly and support EPC bidders with their products for the project in line withBQC clause 4.1.2.(i) Kindly confirm our understanding is correct.	Understanding not correct. Tender Clause is clear. Bidder to comply as per tender terms.
51	ITB / Vol - I	Pg 57 (Sheet 33 of 70)	41	SAP Related Activties	The subject clause mentions about the assistance to be provided by the Contractor for CPCL ERP- SAP system for the execution of work, as & when required by CPCL. Kindly confirm the duration of assistance and number of persons to be deputed.	Assistance if required to be provided to update in the Owner ERP-SAP System.
52	Integrity Pact / Section-10	Pg 99 (Pg 5 of 5)	1	Other Provisions	We refer to Sl.No.1 of Section 10, which indicates that the person signing the Integrity pact shall not approach the courts while representing the matter to IEM. Kindly clarify.	Please read the complete sentence, which is clear. Bidder to comply as per tender terms
53	NIT & Appendix-II (Procurement Policies)	Pg 16 & Pg 101	NIT Sl. No. xxiv and Appendix II, Sl.No. 6	Purchase Preference	Is Purchase preference applicable to this project. Kindly confirm	Tender clause is clear. Bidder to comply as per tender terms.

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54	Indian Oil GCC Conditions / Vol - I	Pg 159 (Pg 21 of 192)	Cl. 2.7.0	CANCELLATION OF CONTRACT	In the unlikely event of cancalation of Contract due to any reasons whatsoever it may be we request you to consider the following. 1)Equipments / Materials ordered and are in the process of manufacuring , in transit, deliverd at site shall be taken over by the customer and all the payments for the Equipments / Materials shall be paid in full as per the order placed by the contractor. 2) All the establishment cost (Towards mobilisation of site office and other infrastructure etc) shall be reimbursed at actuals as per the invoice submitted by the Contractor. 3) All the cost towards BG charges, insurance charges and all other stautory fees paid by the contractor for this project shall be reimbursed in full. 4) All the stautory documents including PBG submitted by the contractor shall be returned immediately along with necessary charges. 5) Cost towardes Design & Engineering charges, Documnts preparation and submission charges and any other prelimery activities carried out for implementation of the project shall be reimbursed at mutually aggred prices. 6) Cost to cover the charges towards contractors Supervision, overheads and profit shall be paid @ 20% over and above the charges indicated above.	Bidder to comply as per tender terms.
55	Indian Oil GCC Conditions / Vol - I	Pg 173 (Pg 33 of 192)	Cl. 3.0.5.13	Make Of Materials	We understand that the bidder has the liberty to propose additional vendors in line with the tender conditions , (List of Additional / proposed vendors will be submitted along with Techno Commercial BID), further we will submit their credentials in the event of order. Kindly confirm our understanding is correct.	Bidder to follow the project vendor list attached with the tender document which is applicable for bought out items. Any additional vendors required will be subject to approval from the owner during detail engineering.
56	Indian Oil GCC Conditions / Vol - I	Pg 198 (Pg 52 of 192)	Cl. 4.4	Price Adjustment For Slippage on Completion	We under stand that TCE/ CPCIL will reduce the LSTK price for slippage in Mechanical completion as per the formula given in this section, however this slipages is applicable only due to reasons is solely attributable to the contractor . In case of any slippage due to any other reasons including force majeure, Price Adjustment shall not be applicable to the LSTK contractor	Bidder to comply as per tender terms.
57	Indian Oil GCC Conditions / Vol - I	Pg 329 (Pg 181 of 192)	Article 4, Cl. 4.1	Jurisdiction and Governing Law	The clause mentions the jurisdiction to be in New Delhi, but else where the same has been mentioned as Chennai. Kindly clarify.	Refer to Annexure to SCC Annexure -VII Form of Contract Article 4 (page 520/2608)
58	Annexure-I / Vol 1	Pg 502 (Sheet 1 of 24)	Annexure-I	Time Schedule	Sl. No. (d) in the notes mentions that the work front will be handed over in phases. Kindly confirm the planned phase wise schedule of site handing over.	This would be discussed with the successful bidder during Kick of Meeting
59	Form M Checklist / Vol I	Pg 553 & Pg 27	Form M	Form M Checklist	We refer to Checlist (Form M) which calls for "Declaration against Bid security" as per Appendix 3 to ITB. Kindly share the Appendix 3 as the same is not available in the documents issued.	Refer ITB attachment -II (page 64/2608)
60	General / Vol I	-	-	General	We understand that this will be indivisible works contract with two separate orders ie, one for Supply and the other for Services . Kindly confirm our understanding is correct.	One Contract will be issued
61	General / Vol I	-	-	General	We request you to kindly issue overall plot plan indicating the prposed location of 220KV/ 66KV GIS.	For detailed cable tray routing layout refer Volume-II, Part 2 of 4, Exhibit-10.
62	General / Vol I	-	-	General	We understand that there will be a separate entry for this project to avoid entering the existing plant (brown field) .	No separate entry. This is a green field project
63	General / Vol I	-	-	General	Necessary Land will be provided by CPCL near the Sub station area to construct our site office and stores	Space will be provided as per clause No. 69.3 of Volume-I, GCC
64	General / Vol I	-	-	General	Due to volitile market condition, we request you to kindly consider the price variation for all the Electrical equipments , Erection & Civil works as per IEEMA PRICE VARIATION FORMULA applicable prior to 1 month from the date of submission of Part 1 Bid	Comply to the tender specification

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	PART / VOLUME NO	PAGE NO	CLAUSE NO	SUBJECT		
65	Volume -I	Clause No 44	Page No 473 of 2608	Capatilisation Cost	We request you to clarify the Capatilisation rates for Transformer Losses and also request you to provide the Maximum acceptable losses for Power Transformers (Iron Loss, Copper Loss & Aux Loss)	As we are considering one cost as per Appendix-I of Volume I. Hence, capitalization costs for various losses are not applicable
66	Volume -I	Clause No 44.4	Page No 473 of 2608	Capatilisation Cost	Aux Power consumption provided by us are based on the Design of Civil buildings size which is the basis for Aux power consumption, in case during the detailed Engineering if size of building gets incresded from the propsed size accordingly aux power consumption of various systems will change. This needs further detailed discussions.	Bidder shall provide in his Bid document the proposed building layout accommodating various equipment in the contract. In case the building size has to be increased later, after award of contract to accommodate various equipment meeting the requirements of tender specification, it shall be accommodated by the bidder without any additional cost. Aux power consumption guaranteed shall be met
67	Volume -II & BOQ	-	Page No 956 of 2608	BOQ -Form SP 8 & Volumne II Section F 11	In the BOQ we have to submit the Aux power consumption for HVAC system only, however in Section F-XI schedule of aux power consumption calls for HVAC,Lighting, DC & UPS. Kindly clarify what aux power consumption details we have to submit in the BOQ	Bidder to provide auxiliary power consumption for HVAC system and transformers.
68	General	-	-	Submission of revised Price Bid	Based Part I Bid evaluation by CPCL/ TCE, if any substantial changes / modifications are proposed we request CPCL/TCE to allow us to submit the revised price bid in line with the revised requirements.	Bidder to comply as per tender terms.
69	Volume -1	Pg 175 & Pg 457	GCC Cl. 3.08	Reimbursement of GST	We understand that GST shall be released with the progressive payments. Kindly confirm our understanding is correct.	Bidder understanding is correct
70	Volume-1	Pg 585 of 2608	20	Form SP-7	Kindly confrm that "Extended Warranty" of 2 years mentioned in the price schedule shall be only applicable for the equipments for which AMC is to offered i.e., SAS, Battery Chargers and UPS.	Note 2 in for SP-7 is clear. Bidder to comply as per tender terms.
71	Volume - I	Pg 585 of 2608	Note 4 of Form SP7	The successful bidder shall enter upon a suitable agreement with OEM/sub-vendor covering all relevant aspects and shall transfer the contract in the name of CBR at the quoted price before placement of order to OEM/Sub vendor. (In case bidders fails to enter into an agreement with OEM/Sub vendor then post order owner will get an offer from OEM/sub-vendor directly and any positive price implication will be backcharged to Bidder).	Kindly send us the Aggrement format along with payment terms & conditions to enable us to receive the offer in line with CPCL/TCE requirement from the vendor.Further CPCL will place direct order based on the prices submitted in SP7 on sub vendor and LSTK contractor will be relived from this scope. Kindly confirm	Bidder to use their own format.
72	Volume -I	Pg 508 of 2608	Annexure -IV to SCC	Terms of Payment 2.2 For Mandatory Spares 5% (five percent) of the DDP price excluding GST of imported materials/indigenous materials as indicated in the Bill of Materials, on providing Gate Passes and after carrying out all activities to facilitate capitalization of Mandatory Spares through entering its receipt in Owner's ERP system, against Contractor's certified running Accounts Bill(s).	We will be supplying the Mandatory spares as per the approvel given by CPCL/TCE. We request you to make Balance payment against receipt & inspection of spares at site. Since this is not having any relevence with project completion & commissioning of the system. Kindly confirm	Bidder to comply as per tender terms
73	-	-	-	3% (three percent) of the DDP price excluding GST of imported materials/indigenous materials as indicated in the Bill of Material on issue of Commissioning and Performance Test Certificate against Contractor's certified running Accounts Bill(s).		
74	-	-	-	2% (two percent) of the DDP price excluding GST of imported materials/indigenous materials as indicated in the Bill of Material on completion of all jobs against Contractor's certified Final Bill.		
75	Volume -I	Pg 513 of 2608	Annexure -IV to SCC	(D) ELECTRICAL & PLANT COMMUNICATION WORKS ii. 40% (Forty percent) on testing loops and system on pro-rata basis against the CONTRACTOR's certified Running Account Bill(s). Note: For the purpose of payment of second milestone of 40%, "testing loops and system shall mean "continuity & erection protocol" in respect of electrical cables, earthing strips and cable trays.	We request you to Kindly modify this payment as 90% on completion of Erection & Installation. Since before and after laying of Cables we will be Checking IR Values and contunity test before closing the tenches etc, further during the termination we will be once again carryout IR values and continuity testing hence we request you to modify this clause. Erection activities will be carried out based on the approved erection protocol only. Kindly confirm	Bidder to comply as per tender terms

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76	Volume -I	Pg 514 of 2608	Annexure -IV to SCC	H - POST WARRANTY COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT(PWCAMC	We request TCE / CPCL to enter in to a direct aggrement with the vendors based on the Quoted prices submitted by the LSTK Contractor which will facilitate equipment supplier more responsive to attend any service calls without delay. This will reduce the downtime of the equipment / plant. Kindly confirm	Refer to BOQ SP-7- Note No 4. (585 of 2608)
77	-	-	-	Cable Sizing	During pre bid discussions we have been informed that all the cable sizing will be caaried out by LSTK Contractor for the scope covered in this package. We will follow the cable sizing (Both EHV,HV ,LV & Control cables) shall be as per IS / IEC norms which is generally followed by all the power utilities and other indutries. Kindly confirm	Cable sizing (for EHV, HV, MV, LV & Control cables) as per IS / IEC norms is acceptable.
78	Volume II - 1	Pg 607 of 2608	Cl. 3.14	Cable Trays and support	Providing required cable tray supports and cable trays for laying of EHV cables on the pipe racks are part of LSTK contract.whether we can deceide the size of cable tray & suports or is there any standard drawing we have to follow. Kindly clarify.	Cable trays and supports over pipe rack between 230/69kV Grid transformers and 66kV GIS Building shall be supplied by others and inside 230kV switchyard area and 66kV GIS buildings is by bidder. However, 66kV, 6.6kV and other cables shall be supplied and installed by bidder.
79	Volume II - 4	-	-	Cable Cellar	As per the soil investigation report, the water table is at a depth of 1.5 m. In view of this, cable cellar will be constructed from 1.5m depth below ground and balance above ground. This is to avoid uncessary flooidng of the cabel cellar during rainy seasons. Kindly confirm the same is acceptable to you or not.	Cable cellar construction can be referred from Page 1172 of 2608, clause 6.0, Volume-II, Part 3 of 4, DESIGN PHILOSOPHY FOR ELECTRICAL FACILITIES.
80	-	-	-	General	For the outgoing feeders which are not part of the scope of the LSTK contract, kindly furnish the size and the number of runs of cable for the outgoing feeders to enable us to supply the suitable end termination kits. We will provide only necessary end termination kits suitable for the cables identified by TCE/ CPCL, however we request you to exclude providing of services for carrying out end terminations. since there is no time line specified for laying of cables by others. Kindly Confirm	Bidder can follow the minimum size of cable as 630sq.mm. Exact cable sizes shall be furnished during detail engineering stage. Bidder scope shall include supply, installation / carrying out end terminations of refinery substation cables at 66kV GIS end only.
81	-	-	-	General	We request you to kindly provide the GIS building size (LXWXH) to ensure that all the bidders are evaluated on the same platform. Optimisation if any can be taken up during post award/detailed engineering stage.	Bidder shall submit proposed building layout drawings during the bidding stage to accommodate all equipment. If the building size increases after award of contract, to accommodate the equipment being supplied meeting the requirements of the tender specification, It shall be accommodated by bidder without any additional cost.
82	Volume -II	Pg 598 of 2608	Clause no 2.24 - Section CI- Scope of Work	Fireproof sealing system comprising fire stops and fire breaks for the cable and cable trays, any wall/floor openings. Fireproof painting for cables of length not less than one meter below the switchgear panels, field junction boxes, motor terminal boxes and cable joins etc. shall be provided as per IS:12459.	Kindly provide the type of fire proof sealing required , whether it is morter based or any other type	Fire proof ceiling shall be considered as mortar based and any other type based on owner requirement will be decided during detail engineering.
83	Volume II - 1	Pg 602 of 2608	Section CI- Clause 2.4.1	Service transformers (6.6/0.433kV) and 6.6kV isolators are required for 230kV GIS building only.	In the layout drawing it was mentioned that slab above transformer bay. Whether these service transformers are outdoor type or indoor type with roof slab and side walls. Kindly confirm	Service transformers are of outdoor type and slab above transformers and side fire walls shall be provided.
84	Volume II - 1	Pg 634 & 635 of 2608	Section C4- Clause 4.12.1 - g	The PD system shall be provided with a monitoring system locally within the Substation and shall also have provision for remote connection to SCADA system through Fiber Optic Communication links. All required devices for a total monitoring locally and remotely shall be provided	We will provide PD monitering system in 220KV GIS Control room and Provision only will be made for remote connection to SCADA. Whether we have to provide Fiber optic communication links along with FO cable and other associated accessories till remote end. Kindly confirm	The PD monitoring systems in respective GIS control rooms of 230kV GIS and 66kV GIS shall be connected to the SCADA system (SAS) along with all the necessary FO cable and accessories.

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85	Volume II - 1	Pg 604 of 2608	Section C2-Scope Matrix - Clause 3.7	110V DC system with integral DB and its further distribution for switchgear control supply in the remarks columnOne 110V DC System and its integral DB shall be located in 66kV GIS building and another set shall be located in 230kV GIS building.	Whether you need both 220V & 110V DC system in 220KV GIS Control room. All our 230KV GIS system control supply requirement will be 220V DC only (Closing & Tripping Coils and other auxluries) and this will be used for emergency lighting also. In view of this providing of 110V Dc system in 220KV GIS control may not be required. Further in the tentitaive layout drawing provided also not shown. Kindly confirm the requirement of DC system in 230KV GIS Control room	Comply to the tender specification
86	General	-	-	In both the layouts issued (230KV GIS & 66KV GIS) you have not indicated the BUS PT feeders	Kindly confirm the requirement	Bus PTs shall be provided. Bus PT feeders are already indicated in Metering & Protection SLD for 230kV & 66kV GIS, Volume-II, Part 2 of 4, Exhibit-2. Bidder to follow the same.
87	General	-	-	We propose to have BCU in LCC of 230KV GIS & 66KV GIS from where we will take suitable soft signal to respective control rooms . This will avoid number hard wired control cables from LCC to CRP. This will reduce the number of cable runs from LCC to CRP and all other associated accessories.	Kindly confirm whether this proposal is acceptable.	Comply to the tender specification
88	Volume II-3	(Page 1188 & of 2608) or (102 of 1259) V-3	A.4.1.4	Design Considerations	Please provide the Contour level / Existing Ground Level (EGL) & Finished Ground level (FGL) for proposed plant.	Contour drawing shall be shared to bidders. Finished ground level (FGL) is 3.8M above MSL (Mean Sea Level) throughout the refinery premises. (Refer corrigendum-2, Sr. No. 33)
89	Volume II-3	(Page 1188 & of 2608) or (102 of 1259) V-3	A.4.2	Road layout & Width	Please provide the road layout and width of the road for proposed plant	The width of the roads & the layout within the switchyard area is to be decided as per the bidder requirement and as per OISD 118 latest edition.
90	Volume II-3	(Page 1190 & of 2608) or (104 of 1259) V-3	A.4.5	Storm Water Drainage	Please provide the drain layout for proposed plant. Please confirm drain shall be both sides of the roads	Drain shall be as per the requirement and to be decided by the bidder.
91	Volume II-3	(Page 1190 & of 2608) or (104 of 1259) V-3	A.4.5.5	Drain disposal	Please provide the drain disposal location with its distance for proposed plant.	The drain disposal location shall be informed during detailed engineering after award of contract
92	General	-	-	Boundary wall	We understands that the present scope of works are in the well established plant. There is no specific requirement of Boundary walls for the same. Customer to confirm the same.	Confirmed. However, Chainlink fencing with gate provision is in bidder scope.
93	General	-	-	Standard drawings	Please provide the standard drawings paving, roads etc.	Bidder to prepare or consider the same as per the design basis requirement.
94	General	523 Of 2608	SCC	Bank Guarantee	We refer to the Sl. No.1 in the format of bank guarantee (AnnexureVIII). **" Provided that if the aforesaid work tendered for any part thereof shall be awarded to the Tendered on or before the said date, whether on the basis of accompanying tender or any other basis, then the validity of this guarantee/undertaking shall stand automatically extended for all claims and demands made by the Corporation for a further three months**." Kindly remove this clause. Our bank is not agreeing for the above clause as the bank is already giving a claim period of 12 months 9in line with banking guidelines) over and above the validity period. Request you to kindly modify or remove the subject clause.	Bidder to comply as per tender terms.
95	General	524 of 2608	SCC	Bank Guarantee	We refer to Sl. No, 7 in the bank guarantee format (Annexure VIII) which calls for the claim to be transmitted to bank through "**post or by Fax"**. Our bankers are not accepting this and are requesting us to make the same as **"Post or Courier."** Request you to kindly modify the same.	Bidder to comply as per tender terms.
96	General	-	-	Earthing	Our scope of earthing is limited to the area of 230KV GIS SS , 230KV Outdoor yard and 66KV GIS substation only. Kindly confirm	Confirmed
97	General	-	-	Service Transformer	Kindly confirm the rating of Service Transformer near 230KV GIS substation whether it is -500KVA or 2500KVA, since somewhere in the specification it is indicated has 2500KVA	Service Transformer Rating of 500kVA as per overall Key SLD for CPP shall be considered.

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98	General	-	-	Key SLD	In the key SLD you have indicated 66KV Isolator before the DG transformer for connection of 66KV EHV cable . Kindly confirm who will provide the 66KV Isolator, if it is part of the GIS LSTK contractor scope, kindly provide the type of isolator required along with its specification	66kV Isolators are part of bidder scope. For details please refer Volume-II, Section C4.4
99	General	-	-	Layout	As per the layout GTG & STG transformer to be connected with 66KV cable along with LA, however as per the layout there is no space provision. Kindly confirm the arrangement	Bidder can accommodate the 66kV cable along with LAs as sufficient space is available from Road edge to Fence.
100	General	-	-	Scope Matrix	As per the scope matrix cable trays & cable tray supports from STG/ GTG/DG Transformers shall be provided by others to facilitate laying of 66KV Cables and other control cables . Kindly confirm our understanding is correct.	Bidder understanding is correct
101	General	-	-	Layout	From the end of pipe rack up to 66KV GIS Substation necessary cable trences and ERC will be provided by others (As indicated in the drawings) We presume that Cable tray supports & Cable trays required for grid power cables will also be provided by others in the RCC trenches. Kindly confirm our understanding is correct.	Bidder understanding is correct. Necessary cable trenches along with required hardware will be provided.
102	General	-	-	CRP SAS /Protection SLD	We have seen in TANTRANSCO, projects 230kV Line and Transformer bays to be equipped with Main-1 & Main -2 (Distance protection (21) and transformer Difference (87T) relays with separate CT. However, we find that in the subject package, there is only one Main relay. Kindly clarify. Request you to also kindly provide the 230kV line distance.	Comply to the tender specification
103	General	-	-	CRP SAS /Protection SLD	We refer to the subject SLD, wherein bus Busbar Protection is taken from GIS CT and for 230/66kV 100MVA Transformer Protection- 87T Transformer Differential is taken from bushing CT. The Gas Insulated Bus duct is only protected with Over Current protection only. Kindly clarify.	Refer corrigendum-2, Sr. No. 31.
104	General	-	-	CRP SAS /Protection SLD	In 230kV & 66kV Bus bar protection in low impedance there is option to enable check zone within Relay. Kindly clarify whether you require separate CT for check zone?	Comply to the tender specification
105	Vol II -I Section C11	-	-	HVAC specification	It has been indicated that air conditioning is required for GIS Hall also. Generally, all the state utilities like TANTRANSCO, APTRANSCO, TSTRANSCO, KPTCL, GETCO, UPPTCL, MAHATRANSCO, DTL and other PSU like NPCIL, PGCIL and NTPC all are providing Air conditioning for Control room, Maintenance room, Office room Store room and passage etc. All other areas like GIS hall, Cable vault, Tiolets and Battery etc. are provided with Dry ventilation with supply of fresh air through fresh air fans with minimum One (1) Air change per hour or 17CFM per person whichever is higher with suitable exhaust system. Kindly confirm whether the same is acceptable.	Comply to the tender specification
106	VOLUME II (PART-1 of 4) Section C4	624 of 2608	4.1.10	The switchgear and all its components and accessories shall be designed for minimum maintenance during service.	Service continuity requirements are not mentioned very specifically. Hence, it is requested to please specify the requirements.	Comply to the tender specification.
107	VOLUME II (PART-1 of 4) Section C4	625 of 2608	4.1.15	All supporting steel work shall be hot dip galvanised. All welding in GIS shall confirm the applicable codes and standards.	The details of galvanization is not provided such as minimum weight and thickness of zink coating. Please furnish the details.	The details of galvanization weight and thickness of zinc coating, refer painting specification, Volume-II, part 3 of 4, specification no. B416-000-06-41-PLS-01.
108	VOLUME II (PART-1 of 4) Section C4	628 of 2608	4.5.2	**GIS Gas Sections** The GIS shall be fully gas tight. The sealing system shall also effectively ensure against the ingress of moisture, dust and other contaminants into gas compartments. Double 'O' ring design be adopted to ensure gas tightness. All gas compartments shall contain suitable agent to absorb moisture and any other decomposition products of SF6 gas.	The equipment specific design requirements shall be as per OEM type tested design and applicable IS/ IEC standards and, accordingly, double 'O' ring design is not applicable.	Tender specification shall be complied.

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109	VOLUME II (PART-1 of 4) Section C4	630 of 2608	4.5.11	**For circuit breaker:** (d) "Over pressure" alarm level (for all compartments) This alarm level shall be provided to indicate abnormal high pressure rise in the gas compartment. Two sets of potential free contacts for remote indication/ annunciation shall be provided.	It is to clarify that all gas compartments are at same pressure in genearal and hence, over-pressure alarm is not required.	Tender specification shall be complied.
110	VOLUME II (PART-1 of 4) Section C4	631 of 2608	4.10.3	**SF6 Gas Monitoring Devices** Two potential free electrical contacts shall be provided exclusively for each of the above alarm/ trip conditions for wiring to supervisory control system. These contacts shall be in addition to those required for local indication and trip and shall be wired to the cable termination blocks in the local control panels.	Due to space constraints, provision for additonal potentil free contacts shall not be feasible.Contact mulltiplication/ multiplier can be used. Please review th requirement anf confirm.	Tender specification shall be complied.
111	VOLUME II (PART-1 of 4) Section C4	634 of 2608	4.12	**Partial Discharge (PD) Monitoring system.**	As per details provided in technical specification, requirement of continuous online PD monitoring system is confirmed, howeveve, following may please be clarified, 1. Whether Separate continuos online monitoring system is to be coonsidered. 2. In general, continuous online PD monitoring system is applicable for voltage level above 230kV. Please confirm the requirement for contious online PD monitoring system.	Tender specification requirements shall be compiled with. 1. Separate continuous online monitoring system is required. 2. PD monitoring system is required for 230kV and 66kV GIS.
112	VOLUME II (PART-1 of 4) Section C4	637 of 2608	5.1.1	**Circuit Breakers** e) The Circuit Breakers shall have a First Pole to Clear factor of 1.5.	For system with effectively neutral earthing/ soildly grounded, first pole to clear factor of 1.3 is sufficient to meet the requirement. Hence the requirement of 1.5 may please be reviewed.	Comply to the specification requirement
113	VOLUME II (PART-1 of 4) Section C4	637 of 2608	5.1.1	**Circuit Breakers** h) The circuit breakers shall be of double interrupter design (2 breaks in series per pole) for 40 kAIC and can be of single interrupter design up to 40 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.	For system voltage of above 420kV only, double interrupter design for Circuit Breaker is applicable.	Single interrupter design for circuit breaker is acceptable. Refer corrigendum-2, Sr. Nos. 7 & 10.
114	VOLUME II (PART-1 of 4) Section C4	639 of 2608	5.1.3	**Interrupter Contacts** c) Where two breaks per pole interrupters are used, these shall be so designed that a fairly uniform voltage distribution is developed across them. Grading capacitors across contacts may be used only to have a uniform voltage gradient across the contacts.	For system voltage of above 420kV only, double interrupter design for Circuit Breaker is applicable. Hence, This requirement can not be complied. Please review.	Single interrupter design for circuit breaker is acceptable. Refer corrigendum-2, Sr. Nos. 8 & 11.
115	VOLUME II (PART-1 of 4) Section C4	642 of 2608	5.2.7	**DISCONNECT SWITCHES AND GROUND SWITCHES** The grounding switches shall be equipped with snap spring-operated high-speed operating mechanism with provision for manual operation.	This arrangement cannot be povided with Maintenance Earthing Switch, however with High Speed Earthing Switch, this arrangement is possible. Please review the requirement.	Comply to the tender specification.
116	VOLUME II (PART-1 of 4) Section C4	656 of 2608	8.4	**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.	GIS OEMs shall not able to submit any type tests related to seismic withstand capability, however, design calculations shall be provded. Please review.	Comply to the tender specification.
117	VOLUME II (PART-1 of 4) Section C4	656 of 2608	9.0	**SPECIAL TOOLS**	The special tools mentioned under this head shall be provided for both GIS i.e. 230kV & 66kV GIS or it shall be combined for both the GIS. Please confirm.	Special Tools shall be considered separately for 230kV and 66kV GIS.
118	VOLUME II (PART-1 of 4) Section C4	659 of 2608	10.3.3	**Type Tests** The type tests shall be carried out at reputed testing laboratory, the tests must have been carried out during last 5 years. Type test certificates to this effect shall be enclosed with the Bid. If not, the Type tests must be carried out and the price shall be considered in bid. Also, if specified in Section C, type test shall be carried out on the equipment.	The validity of the type tests shall be as per CEA guidelines updated time to time. Please confirm.	Refer corrigendum - 2, Sr. Nos. 9 & 12.
119	Vol-II-1	pg 603/2603	3.22	SCAP for synchronization	We understand that scope is limited to cabling works from GIS to SCAP and providing necessary support for integration. SAS interface with SCAP is not shown in architecture(pg 976/2608).	Supply and installation of Cables between GIS and SCAP is by others. Necessary provision for integration of GIS with SCAP is in the scope of bidder. Hardwired interface has been defined in the block diagram.
120	Vol-II-1	pg 603/2603	3.2.3	Tariff Metering panels	Tariff Metering is required and to be located at receiving of Tr Line end in 220kV yard. No other Tariff meters are required. Kindly confirm.	Deviation is not acceptable. Requirements of TNEB/TANTRANSCO authorities shall be complied without any additional costs.

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121	Vol-II-1	Page 604 of 2608	3.2.4	Relay panels for various feeders of 230kV & 66kV GIS substations.	We understand that for transformer Feeders in 66kV GIS Main protection shall in HV side Relay Panel. We do envisages HV Side ralay panel in scope of GIS LSTK Contractor. Kindly confirm	Bidder understanding is correct.
122	Vol-II-1	Page 605 of 2608	3.11	Supply of incoming power cables (i.e. HV (6.6kV) MV (415V) & LV (240V)), control and instrumentation cables for incomers from CPP substation building to 230kV & 66kV GIS.	We understand incoming Feeder cable from CPP is to be supplied only. ETC of same is in not scope scope of GIS LSTK Contractor. kindly confirm.	Bidder understanding is not correct. Supply, Erection, Testing and commissioning of incomer cables are in bidder scope.
123	Vol-II-1	Page 604 of 2608	3.8	220V sub DCDB and its further distribution for critical lighting supply for 66kV GIS building	We understand incoming Feeder cable from CPP is to be supplied only. ETC of same is in not scope scope of GIS LSTK Contractor. kindly confirm.	Bidder understanding is not correct. Supply, Erection, Testing and commissioning of incomer cables are in bidder scope.
124	Vol-II-1	Page 605 of 2608	3.12	Cables shall be sized based on below transformer ratings and lengths provided in remarks column.	Kindly specify minimum cable size if any.	Minimum cable size required shall be 630sq.mm.
125	Vol-II-1	Page 606 of 2608, Page 968 of 2608	3.13	LIUs, Relays, Patch cords and connectors, pigtails, splicer for 66kV cable differential protection required at refinery substations shall be supplied by GIS LSTK contractor. CT's required for 66kV cable differential protection at GIS side shall be considered by GIS LSTK contractor. However, required CT parameters shall be shared by GIS LSTK contractor to respective refinery substation contractors. Supervision of commissioning of 66kV cable differential relays for refinery substations shall be by GIS LSTK contractor.	We understand that 1. Each outgoing feeder requires Differential Protection. 2. GIS LSTK contractor scope is suppying and supervision of LIUs, Relays, Patch cords and connectors, pigtails, splicing at Remote end S/s only. ETC work at Remote to done by Others. 3. Optical cable supply and lying for differetial protection is in scope of others for all outgoing feeder. kindly confirm.	1. Bidder understanding is correct 2. All required hardware including LIUs, Relays, Patch cords and connectors, pigtails, splicer etc. required on either side is included in the scope of bidder. The installation of these hardware on refinery substation side will be done by others. The bidder responsibility includes installation of this hardware on 66kV GIS end and Commissioning of the entire system. 3. Bidder understanding is correct for all outgoing feeders except CPP auxiliary, Grid and DG Transformer feeders, GTG & STG incomer feeders which are in bidder scope.
126	Vol-II-1	Page 607 of 2608	3.15	Supply and installation of Cable trays and its accessories, supporting structures etc., within the 66kV GIS building it includes all incomers and all outgoing feeders.	Kindly specify Nos of cable runs to estimate cable trays for outgoing feeders cables which supply is in not scope of GIS LSTK Contractor.	Bidder can follow the minimum size of cable as 630sq.mm. Exact cable sizes shall be furnished during detail engineering stage.
127	Vol-II-1	Page 608 of 2608	3.21	Buried main earthing conductor at ground and floor slab. Above ground Earthing for all equipment being supplied under this package	Kindly specify the area for Buried main earthing is in scope of GIS LSTK Contractor.	It is confirmed that buried main earthing is in the scope of bidder. Refer GIS and switchyard Equipment layout, Volume II, part 2 of 4, Exhibit 3 for required details.
128	Vol-II-1	Page 610 of 2608	3.32	Electrical Control Panel (ECP) of Mosaic type for 66kV GIS (Monitoring of Incomer feeders, Bus couplers and bussectionalizers. Control and monitoring of EDG and 6.6kV Switchgear (incomer feeders, bus-coupler and outgoing transformer feeders) and 415V PCC/PMCC/EPMCC (Incomer feeders and bus coupler)). ECP for 66kV GIS shall be located in the CPP control room.	We understand that ECP to be supplied for only 66kV GIS is in scope of GIS LSTK Contractor. ECP for 6.6kV Switchgear (incomer feeders, bus-coupler and outgoing transformer feeders) and 415V PCC/PMCC/EPCC (Incomer feeders and bus coupler)) is not in scope of GIS LSTK Contractor. Kindly confirm.	Bidder understanding is not correct. ECP for 230kV GIS is located in 230kV GIS building shall be suppled and installed by bidder. Common ECP for 66kV GIS, 6.6kV Switchgear (incomer feeders, bus-coupler and outgoing transformer feeders) and 415V PCC/PMCC/EPCC (Incomer feeders and bus coupler)) is in the scope of bidder.
129	GeneraL	GeneraL	GeneraL	Order of precedence.	Kindly specify order of precedence in case of conflict in variation sections of tender documents.	Order of precedence of documents, Refer Volume-II, part 1 of 4, clause 1.0, Section C9: Auxiliary Systems
130	-	-	-	General	Please specify the cable size / MVA requirement required for 66kV Cables for plant feeders not in LSTK contractor scope .	MVA rating for the plant feeders can be referred as per Metering & Protection SLD for 230kV & 66kV GIS, Volume-II, Part 2 of 4, Exhibit-2.
131	Vol II-1	598 of 2608	2.22	Scope matrix	Battery limit for 66kV GIS area is GIS building only. Any other work like earthing , lighting or other major / minor civil works is not tin the scope of LSTK Contractor. Outside GIS hall is in scope of CPP package.	Bidder understanding is not correct and for exact details refer electrical scope matrix (Volume-II, part 1 of 4, Section C2).
132	Vol II-1	598 of 2608		Scope matrix	We understand that sufficient provision shall be made on pipe racks for laying of 66kV/ 6.6 kV cables.	Bidder understanding is correct.
133	Vol II-1	598 of 2608		Scope matrix	We don't envisage providing any cable supports/ trays on pipe rack (others scope) for 66kV / 6.6 kV Cable laying. LSTK contractor scope is only limited to laying cables.	Cable trays and supports over pipe rack between 230/69kV Grid transformers and 66kV GIS Building shall be supplied by others. However, 66kV, 6.6kV and other cables shall be supplied and installed by bidder.
134	Vol II-1	605 of 2608	3.12	Scope matrix	Please confirm that the given lengths for 66kV cables are route lengths, not cable lengths.	Confirming that 66kV cable lengths are only approximate route lengths.
135	Vol II-1	634 of 2608	4.12	PD monitoring	We understand that required PD monitoring system is continuous online type, not portable type.	Bidder understanding is correct and PD monitoring required is of continuous online type.
136	Vol II-1	634 of 2608	4.13.2	BUSBAR ASSEMBLIES	Please note that Gas partition shall be as per type tested design of GIS OEM for both 220kV & 66kV GIS.	Tender specification shall be complied..
137	Vol II-1	635 of 2608	4.13	BUSBAR ASSEMBLIES	Please provide the service continuity requirement.	Comply to the tender specification.

Sl No	REFERENCE OF ENQUIRY DOCUMENT				BIDDERS QUERY	OWNER/CONSULTANT REPLY
	PART / VOLUME NO	PAGE NO	CLAUSE NO	SUBJECT		
138	Vol II-1	659 of 2608	10.3	Type tests	We don't envisage conducting any type test for GIS . Valid type test reports shall be submitted with validation crigteria as per CEA guidelines.	Refer corrigendum - 2, Sr. Nos. 9 & 12.
139	Vol II-1	843 of 2608	4	Tests	We don't envisage conducting any type test for EHV/HV cable . Valid type test reports shall be submitted with validation criteria as per CEA guidelines.	Tender specification shall be complied.
140	Vol II-1	-	-	-	Please provide detailed technical specifcation for the following: EHV/HV cable - 66kV, 6.6kV. Given specification is not sufficient.	Refer corrigendum-2, Sr. No. 17.
141	Vol II-1	811 of 2608	9.4	Cable carrier system	Trench section to be designed for accomodating owner's cables also. Please specify the number of tiers to be reserved for the same.	Bidder to comply to the tender requirement.
142	Vol II-1	812 of 2608	10.5	LIGHTING SYSTEM	We don't envisage any provision of dc critical lighting on pipe racks as it is outside the battery limit of LSTK contractor.	Comply to the tender specification. Details will be furnished during detail engineering stage.
143	Vol II-2	992 of 2608	-	Surge arresters	Due to shortage of space , please clarify if we can go ahead with only GIS bay SA for GTG/STG bays. Else, please specify if any special requirement for SA mounting is there.	Comply to the tender specification.
144	Volume-II	598 of 2608	2.11	PLCC/FO/OPGW or any other approved communication between 230kV GIS and TANTRANSCO feeding substation	i) We understand that only PLCC system is required for 220kV incoming lines. Any FOTE is not required. Please confirm.	PLCC or FO system as required by TNEB/TANTRANSCO authority shall be provided.
145	Section-C1				ii) Also we understand that our scope is limited to PLCC system for local end only. Any remote end PLCC is not in bidders scope. Please confirm.	PLCC or FO on both ends of the line is included in the Scope of Contract
146	Volume-II	598 of 2608	2.12	RLDC connection including required gateways, communication and all other	We understand that our terminal point is up to supply of gateway alongwith associated system at local end only. Any work at RLDC end is not in scope. Please confirm.	Bidder to coordinate with TNEB/TANTRANSCO and provide required hardware including communication hardware, gateways at local end and remote end for data exchange to RLDC
147	Section-C1			software and hardware from 230kV GIS (if any) for power import shall be provided by GIS LSTK contractor.		
148	Volume-II-3	1188 of 2608	A.4.1.1	SITE GRADING	we understand that the tree roots & vegetation removal in switchyard area is not in scope of GIS LSTK package.	Bidder understanding is correct.
149	Volume-II-3	1188 of 2608	A.4.1.2	SITE GRADING	we understand that the contouring & site grading of switchyard area is not in scope of GIS LSTK package.	Bidder understanding is correct.
150	-	-	-	Technical Requirement	The detailed technical requirement, parameters w.r.t GIS and major equipment is missing in the specification. Kindly provide the detailed technical parameters/Specification.	Follow tender specification requirements
151	Vol-I	Page 8 of 2608	4.1.2.i	..... The Bidder, along with the bid, shall submit M**emorandum of Understanding (MoU) /Agreement** with maximum three (3) GIS manufacturer(s) to supply, carry out erection supervision, testing, commissioning of the GIS.	We understand, there is no specific format(as per CPCL's tender documents) for the MOU to be signed with 220kV GIS manufacturer and bidder may sign the same in its own standard format. Please confirm.	Bidder to use their own format
152	-	-	-	Mobilization Advance- Interest bearing advance	We request TCE/CPCL to provide the Interest free Mobilization advance.	Bidder to comply as per tender terms
153		Page 235of 2608	6.5.1.0	**MODE OF PAYMENT** All payments to be made by the OWNER to the CONTRACTOR under or in terms of the Contract shall be paid by Bank Transfer to the designated account of the contractor.	We request you to accept Mode of payment as Sight LC for all the payments except advance.	Bidder to comply as per tender terms
154	Vol-I(SCC)	Page 457 of 2608	14	**FIRM PRICE:** The prices shall be kept FIRM till the completion of work and no escalation will be admissible.	At per reffered clause, the prices quoted by the bidder shall remain FIRM till the completion of the work. Considering the substantial variation in the prices of raw materials of major items(viz. Power Transformer, GIS, Cables, other HV equipment, etc) and lot of uncertainty linked with these prices in future as well, we request to keep the provision of Price variation for both supply as well services.	Bidder to comply as per tender terms
155	-	-	-	**General**	Please note that Vol-1 & Vol-II part 1 & 2 are TCE specification, whereas Vol-2 part-3 & 4 are enclsoing EIL specifcation. In case of conflict in design basis / job specification / technical specifcation , what will be the order of precedence.	Order of precedence of documents, Refer Volume-II, part 1 of 4, clause 1.0, Section C9: Auxiliary Systems

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156	VOLUME II (PART-3 of 4)	Page 1746 of 2608	-	Suppliers List for 9 MMTPA CBR Project	For SWITCHBOARD-EHV-GAS INSULATED, only one vendor is mentioned in the approved supplier list . We understand that all vendors who meet qualifying requirements, will be eligible to quote for 230 & 66kV GIS in this tender.	Bidder understanding is correct,
157	VOLUME II (PART-3 of 4)	-	-	Suppliers List for 9 MMTPA CBR Project	Please specify the procedure for registration of new vendors not presently available in given supplier list.	If the vendor list is having more than 4 vendors for specific equipment then addition of new vendor shall not be entertained. However, Registration of new vendors with detailed profile and experience criteria shall be discussed during detail engineering stage.
158	VOLUME II (PART-3 of 4)	-	-	5.6.1.2 EHV SWITCHBOARD **LCC mounting** As per vendor standard design for 66KV & Separate free standing for 230KV GIS	Please note that mounting of LCC shall be as per standard type tested design of GIS supplier	Comply to the tender specification.
159	VOLUME II (PART-2 of 4)	Page 964 of 2608	-	Key Single lIne diagram for CPP, Sh 1 of 4	For 230kV & 66kV GIS, no Bus PT/Bus E/s or bay PT is not shown in SLD. Please clarify.	Bus PTs shall be provided. Bus PT feeders / Bay PT feeders are already indicated in Metering & Protection SLD for 230kV & 66kV GIS, Volume-II, Part 2 of 4, Exhibit-2. Bidder to follow the same.
160	VOLUME II (PART-1 of 4)	Page 964 of 2608	-	BIDDER QUALIFICATION CRITERIA (BQC) (TECHNICAL) 4.1 The Bidder shall meet following technical qualification criteria: 4.1.1 The Bidder, as a manufacturer of Gas Insulated Substation (GIS) of rating minimum 230kV voltage class, should have executed and completed a Contract, on **single point reasonability** involving Detailed Engineering,.....	Please clarify the understanding for single point reasonability	To be read as "single point responsibility".
161	VOLUME II (PART-1 of 4)	Page 709 of 2608	4.12	Partial Discharge (PD) Monitoring system	Please specify whether Online PD monitoring system will be common for 230& 66 kV GIS or independent for respective GIS	Online PD monitoring system shall be independent for 230kV and 66kV GIS
162	VOLUME II (PART-1 of 4)	Page 731 of 2608	-	9.0 SPECIAL TOOLS	Please specify if the SF6 maintenance equipment or other special tools are to be supplied separately for each GIS.	Details has to be provided by OEM and same shall be approved by Owner.
163	Vol-I	BDS Sl. No. 11, ITB 18.1, Page 24 of 2608	-	PERIOD OF VALIDITY OF BIDS Bid shall remain valid for a minimum period of 06 (Six) Months from date of submission of bid.	Nowadays, prices of major commodities are fluctuating a lot and hence it is very difficult to keep the price valid for six months. We request you to kindly reduce the period of validity of bid from 06 (six) months to 03 (three) months.	Bidder to comply as per tender terms
164	Vol-I	Cl. 3, NIT Sl. No. 4, Page 5 of 2608	-	Time Schedule for completion. Grid Power - 230 kV & 66 kV distribution network Mechanical Completion within 17 Months plus one Month for Commissioning (ready for back charging) from the date of issue of Fax of Acceptance (FoA).	Considering the scope and complexity of work, we request you to kindly extend the tme schedule for completion from 18 months to 24 months.	Bidder to comply as per tender terms
165	Vol-I	Cl. 14.5, Page 37 of 2608	-	Rates/Prices quoted by Bidder, shall remain firm, fixed, and valid till the completion of the Works and will not be subject to variation on any account except as otherwise specifically in the Bidding Documents.	Nowadays, prices of major commodities are fluctuating a lot and hence we request you to kindly accept variable prices for all commodities as per price variation formula of IEEMA without any ceiling.	Bidder to comply as per tender terms
166	Vol-I	Cl. 69.2, Page 487 of 2608	-	Construction Power	We understand that construction power shall be made available by M/s. CPCL near the substation construction site. Kindly confirm.	It is confirmed that construction power is available near to 66kV GIS building. However, for 230kV GIS, bidder shall arrange a dedicated Diesel Generator for the construction power requirement. (Refer corrigendum-2, Sr. Nos. 3 & 5)

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167	Vol-I	Cl. 69.3.1, Page 488 of 2608	-	Land for temporary facilities: ..... Owner shall provide space of 2,500 square meters (maximum) within the refinery plant boundary for setting up of Site Office, fabrication yard and Warehouse etc. The Contractor shall pay the license fee @ Rs 1000/- (Rupees One Thousand only) per month for the land of an area upto 500 (five hundred) square meters and Rs 200/- (Rupees two hundred only) for each additional 100 (one hundred) square meters or part thereof, per month or part thereof for any land made available to the Contractor within the provisions hereof, and the Owner shall be entitled (without prejudice to any other mode of recovery) , to recover license fee from the Running/Final Bill(s) of the Contractor and/or any other payments due to the Contractor from time to time under this or any other contract. Any development work required for the same shall be performed by the Contractor.	We request you to please provide the land for temporary facilities (like Contractor's site office and store) free of cost to the Contractor.	Bidder to comply as per tender terms
168	Vol-II, Part 4 of 4	Section G	-	Geo Technical Investigation Work	We understand that the Bidder shall follow the Geo Technical investigation report provided along with the tender specification during both tender stae and project execution stage. Any cost implication due to variation in report during project execution stage shall be suitably compensated by M/s. CPCL. Kindly confirm.	For 66kV GIS building design, bidder to consider CPP area bore hole data attached as per corrigendum-2, Sr. No. 34. And for 230kV Switchyard and GIS building design, bidder to consider BH-11 bore hole data attached as per corrigendum-2, Sr. No. 34. No compensation will be provided during execution stage.
169	General	Contract Structure	-	-	It is our understanding that two separate contracts will be issued in the event of award to bidder. First Contract, for Ex-works Supply and Second Contract for Services (i.e. Freight & Insurance, Erection, Civil works, Testing & Commissioning). Kindly confirm.	Single Work Order will be issued comprising of line items for Supply and Services.
170	Volume-II Part 3 of 4, Document No. B416-999-16-50-EDB-1001, Rev No. 0 Page 30 of 52 Volume-II Part 1 of 4, Section C8: Grid Transformers, SHEET 3 OF 6, Clause no. 1.1.9	-	-	Fire fighting system for transformers having oil quantity greater than 2000 Litres shall be Nitrogen Injection Fire Protection System (NIFPS). Power Transformers having oil capacity more than 2000 liters/10MVA shall be protected with Auto actuated High velocity water spray system.	As per Scope matrix defined in Volume-II Part-1 of 4, Section C2, clause no. 3.36, we understand that any kind of Fire Protection System for Transformer is not in our scope. Please confirm	Confirmed
171	Volume-II Part-1 of 4, Section C2, clause no. 3.34, 3.35 & 3.36	-	-	Scope of Fire Fighting System	As per refer clause we understand following regarding the scope of Fire Fighitng System 1. Design, Intallation & Testing & Commissioning of only Fire detection & Alarm System shall be in our scope & same shall be supplied by others. 2. Any kind of Fire Protection system for GIS Substation under present scope shall be designed & supplied by others. Please confirm.	1) Bidder understanding is correct 2) Bidder understanding is correct
172	Volume-II Part-1 of 4, Section C1	-	-	Scope clarification of Fire Fighting System	We understand that no water based fire protection system is envisaged for this tender, hence Fire Water Pump House & Tank is also not in present scope	Bidder understanding is correct
173	Volume-II Part-1 of 4, Section C2, clause no.3.41 DATA SHEET ELECTRICALLY OPERATED TRAVELLING (EOT) CRANE	-	-	Remarks: Independent for each switchgear building. Monorail is required only for 66kV GIS building.	There is descripency in the referred clause of Technical Specification. As per Scope matrix, Monorail shall be provided in 66kv GIS Hall, however as per Datasheet, EOT Crane shall be provided. We understand that Single Girder EOT Crane shall be provided in 66KV GIS Hall as well. Please confirm.	It is confirmed that EOT crane shall be provided separately for both the GIS buildings. 1. 66kV GIS Building: 5 Ton EOT crane 2. 230kV GIS Building: 7.5 Ton EOT crane Minimum Capacity of the Crane shall be 20% more than the heaviest component to be handled in the respective building.

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174	Volume-II Part-1 of 4, Section C11, clause no. 4.1	-	-	For Vapour Absorption Refrigeration (VAR) based AC system, each system consisting of a VAM Unit (1 Working +1 Standby)	Please provide the Input source (Hot Water/Steam) of VAM Chiller & Input Parameters (Temperature etc.)	VAM is not applicable for GIS buildings. Hence, bidder to provide Air/water cooled chiller.
	Civil Queries					
175	Section - C12 : Civil and Structural works,Cl : 1.2.1, Surface conditions and foundations, Pg 2 of 13	-	-	-	As per the referred clause we understand that soil investigation is in the scope. Please confirm. Please confirm for cost implication, As in case there is any varitaion in Soil Investigation values, resulting implication in Substructure design.	For 66kV GIS building design, bidder to consider CPP area bore hole data attached as per corrigendum-2, Sr. No. 34. And for 230kV Switchyard and GIS building design, bidder to consider BH-11 bore hole data attached as per corrigendum-2, Sr. No. 34. No compensation will be provided during execution stage.
176	Section - C12 : Civil and Structural works,Cl : 1.2.2, Topographical and site grading, Pg 3 of 13	-	-	-	From the referred clause we understand that topographical survey and site grading is not in the scope of work & contractor will get leveled land for working. Please confirm. Also please confirm the level of land to be provided to contractor If so please confirm the approximate amount of cutting/Filling in the switchyard area and in the area of 66kV GIS.	Topography survey & Site grading is not in bidder scope. Finished ground level (FGL) is 3.8M above MSL (Mean Sea Level) throughout the refinery premises. Refer corrigendum-2, Sr. No. 33 for contour drawing.
177	Section - C12 : Civil and Structural works,Cl : 1.1, scope of work, Pg 2 of 13	-	-	-	We assume switchyard scope of work is within the fencing around the switchyard area boundary fencing and 66kV GIS Building which is not in switchyard area is in scope.Please confirm.	Confirmed. For switchyard area the boundary is 100x100Mtr as per Exhibit-10, Volume-II, part 2 of 4.
178	Section - C12 : Civil and Structural works,Cl : 1.2.4.1, Switchyard structures, Pg 3 of 13 & Engineering design basis (Civil, Structural & Architectural) Cl : B.4.3.6,Electrical switchyard structure and Transmission Tower, Pg 33 of 64	-	-	-	Please confirm the type of equipment support structure for switchyard equipment structures, Tubular or lattice.	Bidder to decide based on the requirement specified in the Design Basis.
179	Drg No: TCE.12416A-EL-4005-GA-40046 Titled "Electrical equipment layout for 66kV Main Distribution (CPP) & 230kV sub stations	-	-	-	As shown in the tender layout, please confirm the requirement of fire wall between two 500kVA Service Transformers.	Fire wall shall be provided between two 500kVA Service Transformers. In addition to that concrete roof above transformers shall be provided.
180	Section - C12 : Civil and Structural works,Cl : 1.2.4, Switchyard structures,Pg 3 of 13	-	-	-	Please confirm the safety factors for the structural design of Towers, Beams and equipment support structures for Normal and SCF conditions.	Bidder to decide based on the compliance of the project Design Basis, Tender specifications and respective codal requirement
181	Section - C12 : Civil and Structural works Cl :1.3, General requirement of building/structures, Pg 5 of 13	-	-	-	Please confirm the specifications for the following 1) Main Transformers foundation design 2) Service Transformer foundation design. 3) Fixing the size of common oil pit 4) Fencing aroung the switchyard area boundary	Bidder to decide based on the compliance of the project Design Basis, Tender specifications and respective codal requirement

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182	Drg No: TCE.12416A-EL-4005-GA-40046 Titled "Electrical equipment layout for 66kV Main Distribution (CPP) & 230kV sub stations	-	-	-	Please confirm the specification for outdoor metering cubicle with shed.	Bidder shall follow as per the TNEB/TANTRANSCO requirements.
183	Section - C12 : Civil and Structural works Cl :1.3, General requirement of building/structures,Pg 5 of 13	-	-	-	Please confirm the plinth height for buildings.	Bidder to decide based on the compliance of the project Design Basis, Tender specifications and respective codal requirement
184	Drg No: TCE.12416A-EL-4005-GA-40046 Titled "Electrical equipment layout for 66kV Main Distribution (CPP) & 230kV sub stations	-	-	-	In the referred layout Rail cum road is not indicated for Grid Transformers. Please confirm the requirement of the same.	Layout attached is indicative with minimum requirements. However, bidder shall provide rail cum road for grid transformers. Also, Any additional requirement which require for smooth functioning of system shall be considered by bidder.
185	Section - C12 : Civil and Structural works Cl :1.11, Roads, Drains and Sewage Disposal, Pg 12 of 13	-	-	-	Please confirm whether the drains are of PCC or RCC.	Bidder to decide based on the requirement specified in the Design Basis.
186	Section - C12 : Civil and Structural works Cl :1.12, Rain water harvesting, Pg 13 of 13	-	-	-	Please confirm the capacity of rain water harvesting	Bidder to decide based on the compliance of the project Design Basis, Tender specifications and respective codal requirement
187	Engineering Design Basis (Civil, Structural & Architectural) Cl B.4.2.2 CONCRETE, Pg. 1210 of 2608	-	-	-	Pl confirm where SCC is required	Bidder to decide as per the requirement.
188	Section - C12 : Civil and Structural works Cl :1.11, Roads, Drains and Sewage Disposal, Pg 12 of 13	-	-	-	We understand the road has to be constructed only in 220kV GIS Substation under the S/S Block as shown in Drawing TCA12416A-ME-6000MP-60001. No road except this is under the contractor scope	Conformed. Roads within the switchyard area is in bidder scope. However, Road Layout shall be modified by the bidder if required.
189	General	-	-	-	We understand that no UG tank is required below building for Service water, Fire Fighting, Rain water harvesting etc, pl confirm	Rain water harvesting pits shall be provided all around the building by bidder. However, the quantity will be reviewed during detail engineering stage based on calculations. No UG tanks are envisaged for Service and fire water. Overhead tanks and necessary piping shall be considered for Service water by bidder within his battery limit.
190	Section - C1 : Scope of works Cl :2.29	-	-	-	respective point is not clear for waste water mangment scope, pl clarify. Also please confirm the Outfall point for Storm water Drain, Waste water & Sewage Disposal	Terminal points will be shared during detail engineering at any one corner within the GIS battery limit
	Electriical Queries					

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	PART / VOLUME NO	PAGE NO	CLAUSE NO	SUBJECT		
191	Volume-II-2/Key single line diagram for CPP/ DWG No.-TCE.12416A-EL-4005-AU-40001/ page no- 3 of 125	-	-	66kV Feeders from 11/69kV transformer to 66kV GIS building.	As per the SLD ,we understand that the following 66kV transformer feeders from 11/ 69kV transformer to 66kV GIS building including accociated Outdoor 66kV LA is not under present scope of bidder. 1.GTR-1 2. GTR-2 3. STR-1 4. STR-2 please confirm bidder understanding is correct OR not. If above 66kV feeders are under pesent scope of feeder, please specify the connecting philosophy(whether it is through 66kV cable laying, flexible conductor OR IPS tube) between 66kV transformer feeders to 66kV GIS buiding. please confirm.	Bidder understanding is not correct. Supply, Laying, termination of 66kV Cables on both ends of CPP auxiliary transformers (2Nos), CPP DG transformers (2Nos), CPP GTGs/STGs generator transformers (7Nos), grid transformers (2Nos) to 66KV GIS Switchgear along with their outdoor LAs, isolators, cable sealing ends, cable termination kits are in bidder scope. Supply and installation of cable termination kits at 66kV GIS side for other 66KV outgoing refinery feeders are in bidder scope. Connection from 66kV GIS to cable sealing end (near the transformer) shall be through 66kV cables. From sealing end to Isolators / LAs up to transformer shall be through IPS tube / ACSR conductor. All necessary terminal connectors for various equipment are included in the bidder scope.
192	Volume-II-2/Key single line diagram for CPP/ DWG No.-TCE.12416A-EL-4005-AU-40001/ page no- 3 of 125	-	-	66kV Feeders from 220/66kV power transformer to 66kV GIS building.	We undersatnd that supply, laying of 66kV EHV cable including its termination kits from 230/69kV power transformer to 66kV GIS building is not under our present scope of work. Please confirm our understanding. If it is under bidder scope of work, please let us know , accordingly kindly provide the 66kV EHV power cable size and route length between them.	Bidder understanding is not correct. Supply, laying of 66kV EHV, 6.6kV and other cables including its termination kits from 230/69kV grid or power transformer to 66kV GIS building is in bidder scope of work. For detailed cable tray routing layout, refer Volume-II, Part 2 of 4, Exhibit-10. Accordingly bidder to size the cables.
193	Volume-II-2/Key single line diagram for CPP/ DWG No.-TCE.12416A-EL-4005-AU-40001/ page no- 3 of 125	-	-	6.6KV Emergency switchboards	As per the SLD , we understand that supply of 6.6KV switchboards , 6.6kV incoming power cable and outgoing power cable from 6.6kV switchboars including its termination kits is not present scope of bidder. Please confirm the bidder understanding is correct OR not. If it is under pesent scope of bidder , please let us know and let us know where shall be the location of 6.6kV emergency switchboards.	Supply of 6.6kV Switchgear is not in bidder scope. Bidder understanding is not correct in 6.6kV cables for feeding 230kV GIS. The applicable scope indicated as per Volume-II, part 2 of 4, Key single line diagram for CPP, (DWG No.- TCE.12416A-EL-4005-AU-40001, page no- 3 of 4) is part of bidder scope. For further scope clarity, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical and other documents as applicable.
194	Volume-II-2/Key single line diagram for CPP/ DWG No.-TCE.12416A-EL-4005-AU-40001/Sheet 3 of 4 / page no- 5 of 125	-	-	scope of LT switchboards for 66kV GIS building.	As per the LT AC-DC SLD, we understand that our scope of work is limited for only following below items in 66kV GIS building 1. 1NOS. 415V ACDB 2. 2NOS. 220V SUB DCDB 3. 2NOS. 110V NI-CAD BATTERY ALONG WITH CHARGER. 4. 2NOS. 110V DCDB 5. 2NOS. 110V UPS SUB DB Please confirm bidder understanding is correct OR not. If any other LT switchboards is required please let us know.	Bidder understanding is not correct. Further all DBs including MLDB, Auxiliary switchboards etc. required for 66kV GIS building are also part of bidder scope. For further scope clarity, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical and other applicable tender documents..
195	Volume-II-2/Key single line diagram for CPP/ DWG No.-TCE.12416A-EL-4005-AU-40001/Sheet 3 of 4 / page no- 5 of 125	-	-	scope of LT switchboards for 220kV GIS building.	As per the LT AC-DC SLD, we understand that our scope of work is limited for only following below items in 66kV GIS building 1. 1NOS. 415V ACDB 2. 1NOS. 415V ELDB 3. 4NOS. 110V UPS SYSTEM 4. 2NOS. 110V UPS DB 5. 2NOS. 220V NI-CAD DC battery along with charger 6. 2NOS. 110V NI-CAD DC battery along with its charger 7. 2NOS. 220V DCDB 8. 2NOS. 110V DCDB Please confirm bidder understanding is correct OR not. If any other LT switchboards is required please let us know.	bidder understanding is not correct. Further all DBs including UPS, DC System, MLDB, Auxiliary switchboards etc. required for 230kV GIS building are also part of bidder scope. For further scope clarity, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical and other applicable tender documents.

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196	Volume-II-2/Key single line diagram for CPP/ DWG No.-TCE.12416A-EL-4005-AU-40001/Sheet 3,4 of 4 / page no- 5 of 125	-	-	scope of LT switchboards for utility boiler, STG building and GTG electrical building - 1,2.	we understand that 415V,220V & 110V LT switchboards for utility boiler, STG building and GTG electrical building - 1,2. is not under present scope of bidder. Please confirm our understanding.	Bidder understanding is correct.
197	Volume-II-2/Key single line diagram for CPP/ DWG No.-TCE.12416A-EL-4005-AU-40001/Sheet 3 of 4 / page no- 5 of 125	-	-	Incoming 415V power cable from PCC -1 AND EPMCC TO 415V ACDB	As per the SLD , we understand that supply ,laying of 415V power cable from 415V PCC-1 AND 415V EPMCC to 415V ACDB of 66kV GIS building is not under present scope of bidder . Please confirm bidder understanding is correct OR not. If it is under present scope of work plesae let us know the required cable size and route length between them .	Bidder understanding is not correct. Supply, laying of 415V incomer power cable to 415V ACDB at 66kV GIS building is in the scope of bidder. Route length from 415V PCC-1 and 415V EPMCC to 415V ACDB of 66kV GIS building is 480M accordingly bidder to select the cable size. For further scope clarity, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical.
198	Volume-II-2/Key single line diagram for CPP/ DWG No.-TCE.12416A-EL-4005-AU-40001/Sheet 3 of 4 / page no- 5 of 125	-	-	Incoming power cable from 220V DCDB to 220V SUB DCDB	As per the SLD , we understand that supply ,laying of power cable from 220V DCDB from STG ELEC building to 220V SUB DCDB of 66kV GIS building is not under present scope of bidder . Please confirm bidder understanding is correct OR not. If it is under present scope of work plesae let us know the required cable size and route length between them .	bidder understanding is not correct. Supply, laying of incomer power cables to 220V Sub DCDB at 66kV GIS building is to be considered by bidder. Route length from 220V DCDB located at STG Electrical Building to 220V sub DCDB at 66kV GIS building is 450M accordingly bidder to select the cable size. For further scope clarity, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical.
199	Volume-II-2/Key single line diagram for CPP/ DWG No.-TCE.12416A-EL-4005-AU-40001/Sheet 3 of 4 / page no- 5 of 125	-	-	O/G feeders from LT switchboards in 220kV & 66kV GIS building.	we understand that the power cable of outgoing feeders from 415V ACDB which shall run outside the GIS building is not under present scope of work. Our scope of work is only limited to cater the load requirements of 66kV & 220kV GIS building.	Bidder understanding is not correct. For further scope clarity, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical.
200	Volume-II-2/ Drawing No.-Exhibit 10 / page no- 30 of 125	-	-	PIPE/CABLE RACK	As per the Exhibit-10 drawing , bidder understanding is that supply of pipe/cable rack is not under present scope of work . Only required cable trays ,cable trays cover and supports for laying of 66kV EHV power cables which is marked in Exhibit-10 drawing is under bidder scope.	Refer corrigendum-2, Sr. No. 4.
201	General	-	-	Control room building and GIS building	can we optimize the size of Control room and GIS building as per the actual requirements.Please confirm.	Bidder shall provide in his Bid document the proposed building layout accommodating various equipment in the contract. In case the building size has to be increased later after award of contract to accommodate various equipment meeting the requirements of tender specification, it shall be accommodated by the bidder with out any additional cost.
202	General	-	-	Earthing Philosophy	We understand that the earthing philosophy of present scope of work shall be based on IEEE-80 standards. Please provide the specification for earthing.	Bidder to follow earthing philosophy as per IEEE 80 / IS 3043
203	General	-	-	230/69kV Grid transformer	we understand that supply of 230/69kV Grid transformer is under present scope of bidder. Please confirm.	Confirmed
204	General	-	-	220KV Line side terminations on Tower	we understand that associated tension hardware and insulator for 220kV line side terminations on tower is not under present scope of bidder. Please confirm our understanding is correct OR not.	Confirmed

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205	Instructions to bidders (ITB)	Cl. No. 13.5.2	COMPLETE SCOPE OF SUPPLIES/ WORK	Bidder shall identify the key persons responsible for the above activities of work by identifying the relevant persons and submitting the bio-data of such Personnel…. Bidder shall furnish the bio-data of all key personnel as mentioned above who are working within Bidder's Organization.	We understand that the said bio-date of key persons to be furnished after award of contract and not along with the Bid. Kindly confirm.	Bidder to comply as per tender terms
206	Instructions to bidders (ITB)	Cl. No. 19.0	BID SECURITY	Bidder shall submit Bid Security in the form of EMD as detailed in NIT. Bidder shall also furnish a Bid Security Declaration shall be furnished by the bidder in the format Attachment-II to ITB	Bank details for SFMS confirmation is required for BG Processing. Kindly confirm.	Ref to Annexure to SCC Annexure-VI (page 517/2608)
207	Instructions to bidders (ITB)	Cl. No. 43.7	Termination of Contract	CBR/CPCL shall be entitled to immediately terminate this Contract upon written notice to the Party, without any liability whatsoever, if any of the following events occur :….....	**Termination of Contract - Contractor's Rights** Please confirm that upon breach of contract or any of its obligation including delay in payments to contractor etc, the contractor also reserves the right to terminate the contractor without any contractual liability/default. Upon such termiantion, the contractor agrees to accept from the OWNER the following nalemly, i) The cost of settling and paying claims for cancellation or completion of pending orders and/or subcontractors. ii) The cost of protecting, securing and/or maintaining the works. iii) Payment for the supplies actually performed by the contractor, calculatedon the basis of the relative milestone achieved as derived from the payment schedule specified in the special conditions of contract. v) The cost of material taken over by the owner vi) An allowance, if any due, as determined by the engineer-in-charge (whose decision shall be final) to cover the cost of contractor actual mobilisation and de-mobilisation at job site for the work to the extent-uncovered by payments under items (i) to (iv) above.	Bidder to comply as per tender terms
208	GCC, Volume-I, Chapter 4.0, Section-8	Cl. No. 8.20.3.0	STATUTORY APPROVALS	Statutory Approval of Oil Industry Safety Director (OISD) is also required to be taken by the CONTRACTOR and any deficiency(ies) as pointed out by Internal and External audit team of OISD shall be rectified by the CONTRACTOR within the scope of relative supply and/or Work at no extra cost to the OWNER.	We request to modify the scope of approval from OISD shall be in CPCL Scope.	bidder to comply as per tender terms
209	SCC	Cl. No. 38.0	BUILDING AND OTHER CONSTRUCTION WORKER'S WELFARE CESS	The BOCW cess shall be deducted at the applicable rates on the total cost of construction.	Kindly provide clarity on BOCW cess applicability on tender price. As per our understanding BOCW cess @ 1% only on civil portion of the contract, this in conformity with the Hon'ble Supreme Court judgment, vide SLP (C) No. 8630 of 2020 in the matter of UTTAR PRADESH POWER TRANSMISSION CORPORATION LTD. order dt. 12th May 2021. As per BOCW law in government contract ,employer needs to be recover and deposited hence clarity required. In the recent DMRC DE-04 tender, DMRC confirmed 15% contract value will be considered as Civil contract and 1% BOCW shall be deducted on the 15% of contract value. Request your acceptance on the same BOCW on the Civil portion of contract.	Tender conditions are clear bidder to comply as per tender terms.

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210	SCC	Cl. No. 73.1	POST WARRANTY COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT(PWCAMC)	The Bidder shall indicate a separate price for the 5 (five) years Post Warranty Comprehensive Annual Maintenance Contract (PWCAMC) in his bid in FORM SP-7 for the listed Item as per technical portion of bidding document & as per preamble to Schedule of price.	Considering EPC contractor not having dedicated team for O&M activity, hence we request CPCL/TCE to remove the same from Bidder's scope.	bidder to comply as per tender terms
211	SCC	Cl. No. 80	Price Variation	The price variation shall be applicable on basic supply price of bulk steel material for site fabrication/construction for permanent incorporation in work e.g. Structural steel, Reinforcement bars, Steel Gratings, CS Plates, MS anchor bolts, MS insert plates and chequered plate only	The duration of contract is 18 Months. Based on the individual items, the raw material composition varies indivually. Arriving weightage coefficient in a single formulae is not feasible considering individual items may vary to any extend. For Price varition of electrical projects, IEEMA is generally followed, which covers widely all electrical items likeTransformer, Cables, Cable tarys, Switchgear, battery, Structures, erection and Civil works etc. The Price Variation formula indicated in the tender is generic and does not correctly reflect the actual price change of some of the major equipment in this volatile market. We would like to bring to your notice that the weightage factors are mainly dependent on the composition of the raw materials of the equipment viz. Transformers, Cables (MV, LV, Control & Instrumentation), Switchgear, Structures, Earthing Materials etc. Hence, arriving at the single material, labour, constant weightage factor for entire contract is not realistic. In this regards, we request you to kindly consider standard IEEMA formulae for the equipments/material/works/civil works. this is being followed by Metro customers and other electrical customers (government utilities).	Bidder to comply as per tender terms
212	Volume-II, Part-I, Section: C4	Cl. No. 10.3.3	Type Tests	The type tests shall be carried out at reputed testing laboratory, the tests must have been carried out during last 5 years. Type test certificates to this effect shall be enclosed with the Bid. If not, the Type tests must be carried out and the price shall be considered in bid. Also, if specified in Section C, type test shall be carried out on the equipment	We request CPCL/TCE to modify the as per latest CEA guidilines dtd. 01.11.21, the Type test certificate of GIS & Hybrid Switchgear shall be valid till 15 years, Transformer/Reactor Fittings/CB/Isolator/LA/Wave Trap/Instrument Transformer/Cables/Conductors shall be valid till 10 years. Considering Electrical Equipment Manufactures are following Govt. of India CEA Guidilines and they may refused to accept the said 5 years validity. Request for your reveiw and acceptance.	Refer corrigendum-2, Sr. Nos. 9 & 12.
213	NIT	Cl. No. 4	BIDDER QUALIFICATION CRITERIA (BQC) (TECHNICAL)	Bidder shall associate with the manufacturer who has supplied GIS of rating minimum 230kV voltage class. The Bidder, along with the bid, shall submit Memorandum of Understanding (MoU) /Agreement with maximum three (3) GIS manufacturer(s) to supply, carry out erection supervision, testing, commissioning of the GIS. The MoU/ Agreement shall be converted into definite contract agreement between successful bidder and any one of the qualified GIS manufacturer(s) after award of job and before signing of contract with CPCL, but not later than 30 (thirty) days from the date of award to successful bidder. Such agreement shall be valid till the end of the defect liability period.	Please provide the MOU Format for GIS Manufacturer.	bidder to use their own format.

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214	SCC	ANNEXURE-IV	TERMS OF PAYMENT	-	We request you to consider the following payment terms: **Supply :** 10% as Interest-free Initial Advance 80% after receipt of materials at site 5% on successful completion of Erection, Testing & Commissioning. 5% against Handing Over. **Mandatory Spares:** 10% as Interest-free Initial Advance 80% after receipt of materials at site 10% against Handing Over. **Design & Engineering Service:** 10% as Interest-free Initial Advance 90% on pro-rata basis against progressive submission of drawings. **Erection, Testing & Commissioning:** 10% as Interest-free Initial Advance 80% on pro-rata basis against progressive completion of works 10% on successful completion of Erection, Testing & Commissioning.	Bidder to comply as per tender terms
215	General	-	General	-	We request to confirm the CPCL will issue incumberance free land for construction work and staring date will be handing over of land only. Please confirm.	Bidder to comply as per tender terms
216	General		General		We request CPCL/TCE to confirm the source of fund for this package.	Query not relevant to the tender.
217	General	-	General	-	**Non-availability of Change in Laws and Regulations.** We request to incoporate the below change in law clause in the subject contract: If, after the date seven (07) days prior to the date of Bid Opening, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed in India (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the costs and expenses of the Contractor and/or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract. These adjustments shall be applicable for all transactions between the Employer and the Contractor for supply of goods and services under the Contract but shall not be applicable on procurement of raw materials, intermediary components etc. by the Contractor for which the Employer shall be the sole judge.	Where ever required, the conditions is included in the tender conditions.
	Technical Queries					
	Electrical					
218	Volume-II-1, Section C3	Clause no.3.32	-	Electrical Control Panel (ECP) of Mosaic type for 66kV GIS (Monitoring of Incomer feeders, Bus couplers and bus sectionalizers. Control and monitoring of EDG and 6.6kV Switchgear (incomer feeders, bus-coupler and outgoing transformer feeders) and 415V PCC/PMCC/EPMCC (Incomer feeders and bus coupler)). ECP for 66kV GIS shall be located in the CPP control room.	As per referred clause, ECP for 6.6kV Switchgear and 415V PCC/PMCC/EPMCC shall be in GIS LSTK scope. We presume that supply of any cable and accessories for integration of said system to ECP shall not be in bidder's scope. Please confirm whether bidder's understanding is in order.	Bidder understanding is not correct, this is included in bidder scope.

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219	Volume-II-1, Section C4 & Section C5	-	-	-	Please furnish the detailed Bay configuration for each type of 220kV & 66kV GIS Bays.	For details bidder to refer Volume-II, Part 2 of 4, overall key SLD for CPP (Exhibit-1), Metering and Protection SLD for 230kV & 66kV GIS (Exhibit-2) and other applicable tender documents.
220	Volume-II-1, Section C5	Clause no.5.1.1.n)	-	Single pole type circuit breakers with individual operating mechanism shall have capability for 1-Phase and/or 3-phase auto-reclosing requirement to meet the operating duty cycle.	Generally Single phase Auto reclosing is provided only 220kV & above. Hence, we presume that for 66kV bays only 3-phase auto reclosing will be applicable.	Bidder understanding is correct.
221	Volume-II-1, Section C6	Clause 4.2	-	Bus Bar Protection Numerical type, distributed redundant busbar protection scheme based on" low impedance" principle for selected bus arrangement shall be provided. It shall have check feature, discriminating zones, CT supervision and in-out switch.	As per referred clause, we understand that decentralised redundant type of busbar protection scheme to be provided for both 220kV and 66kV GIS. Please confirm whether Bidder's understanding is in order.	Bidder understanding is correct.
222	Volume-II-1, Section C8	Clause 1.0	-	Neutral CTs for protection shall be mounted in terminal box only and shall be easily accessible for maintenance and testing purpose. The neutral CT shall be so mounted that even the fault between neutral and earth is reflected in REF protection.	Please furnish the following Neutral CT details for grid transformers: a) Number of cores b) CT ratio c) CT parameters such as accuracy class, VA burden, knee point voltage, magnetizing current etc.	For details, bidder to refer Volume-II, Part 2 of 4, Metering and Protection SLD for 230kV & 66kV GIS (Exhibit-2)
223	Volume-II-1, Section C9	Clause no.3	-	MV & LV POWER CABLES For MV & LV power cables specification refer Section C.2_Auxiliary Systems. CONTROL CABLES For control cables specification refer Section C.2_Auxiliary Systems. LIGHTING WIRES For LV power cables specification refer Section C.2_ Auxiliary Systems.	Please furnish the Section C.2_Auxiliary system for power and control cable specification.	Refer corrigendum-2, Sr. No. 17.
224	Volume-II-1, Section C9	Clause 9.4.b) and Clause 9.4.f)	-	All the EHV/HV cables shall be laid in the bottom most tier of cable rack, and MV Power cable above and Control & instrumentation above MV power with minimum separation of 300 mm minimum between each type.	As per referred clause, we understand that 66kV power cable shall be laid above ground on cable tray. Further, we assume that the cable shall be laid in flat formation. Please confirm whether bidder's understanding is in order.	Cables could be in concrete Cable trenches or above ground in cable/pipe racks. Cables shall be laid in trefoil formation
225	Volume-II-1, Section D1.3	Sl No. 7 & 13	-	-	Please specify the rating (inductance & current rating) of 220kV Wave trap.	Wave trap current rating can be consider as 1250A. Inductance value can be decided based on carrier frequency. The values shall be as per TNEB/TANTRANSCO requirement.
226	Volume-II-1, Section D4	Sl No. 22	-	Losses	Please specify if any Ceiling limits are there for transformer losses. If so, please specify the Maximum losses allowable for 220/66kV, 80/100MVA transformer.	As we are considering one cost as per Appendix-I of Volume I. Hence, capitalization costs for various losses are not applicable
227	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	a) We presume that the supply of MV/LV cables to 415V ACDB, 220V Sub DCDB and 110V UPS Sub DB are excluded from the scope of this package. b) Also we do not envisage any cable trench, trays & Supports for the above cables outside the switchyard boundary. Please confirm.	a) Bidder understanding is not correct and all are in bidder scope. For further scope clarity, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical and other tender specification documents. b) All items included in the tender specification is included in the scope
228	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001 & Sr.No. 3.12 of Section C2	-	-	As the GIS end cable termination kits are to be supplied by Bidder, Please furnish the 66kV cable sizes for all the outgoing feeders.	Bidder can follow the minimum size of cable as 630sq.mm. Exact cable sizes shall be furnished during detail engineering stage.
229	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	As per Metering and Protection SLD for 230kV & 66kV GIS, Sh. 2, Drg. No. TCE.12416A-EL-4005-CP-40049, GIS type indoor VT needs to be considered for all incoming and outgoing 230kV & 66kV feeders. However, same is not shown in referred Key SLD. Kindly clarify the actual requirement.	Details mentioned in Metering and Protection SLD for 230kV & 66kV GIS, Sh. 2, (Drg. No. TCE.12416A-EL-4005-CP-40049) shall be followed.

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230	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	a) We presume that the supply of MV/LV cables to 415V ACDB, 220V Sub DCDB and 110V UPS Sub DB are excluded from the scope of this package. b) Also we do not envisage any cable trench, trays & Supports for the above cables outside the switchyard boundary. Please confirm.	Query is repeated above.
231	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	As per Metering and Protection SLD for 230kV & 66kV GIS, Sh. 2, Drg. No. TCE.12416A-EL-4005-CP-40049, GIS type indoor VT needs to be considered for 230kV & 66kV GIS bus bars. However, same is not shown in referred Key SLD. Kindly clarify the actual requirement.	Query is repeated above.
232	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	We understand that supply of following mentioned boards are not in scope of GIS LSTK : 1. 6.6kV Emergency board (at DG house) 2. 6.6kV HT board (at STG Electrical Building) 3. 415V PCC-1 & 2 (at STG Electrical Building) 4. BOP PMCC (at STG Electrical Building) 5. 415V EPMCC (at STG Electrical Building) 6. HVAC MCC (at STG Electrical Building) 7. 110V & 220V DC system (at STG Electrical Building) 8. 110V UPS system (at CPP control room) Please confirm whether bidder's understanding is in order.	1. Confirmed. 2. Confirmed. 3. Confirmed. 4. Confirmed. 5. Confirmed. 6. Confirmed. 7. Confirmed. 8. Confirmed.
233	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	As per clause 3.12 of section C2, we understand that following items are not in GIS LSTK scope of supply. 1. Generator transformer 2. 66/6.9kV Auxiliary Transformer 3. DG Transformer 4. DG set Please confirm whether bidder's understanding is in order.	1. Confirmed. 2. Confirmed. 3. Confirmed. 4. Confirmed.
234	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	We presume that the number of Outgoing & Incoming feeders for 220kV & 66kV GIS shall be consider as per attached SLD and GIS Hall shall be constructed only for the number of bays as indicated in SLD. Please confirm whether bidder's understanding is in order.	Bidder understanding is correct and also bidder to consider spare bays and space for future bays.
235	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	As per referred drawing, it is shown that High speed earth switch is required for 220kV GIS & 66kV GIS. As a standard utility practice we request CPCL to accept High speed Earth switch only for Incoming line bays. For transformer bays the same is not required. Please confirm.	Comply to the tender requirement
236	Volume-II-2, EXHIBIT - 3	Metering and Protection SLD for 230kV & 66kV GIS, Sh. 2, Drg. No. TCE.12416A-EL-4005-CP-40049	-	-	Please furnish the CT parameters such as accuracy class, VA burden, knee point voltage, magnetizing current etc. for 220kV GIS as same is not available in referred drawing.	Minimum CT parameter details are already indicated in Metering and Protection SLD. For details bidder to refer Volume-II, Part 2 of 4, Metering and Protection SLD for 230kV & 66kV GIS (Exhibit-2)
237	Volume-II-2, EXHIBIT - 7	Substation Automation System architecture for 66kV & 230kV GIS - Drg. No. TCE.12416A-EL-4019-CD-40053	-	-	As per the SAS Architecture drawing, from individual IEDs to Bay level Ethernet switch(es) redundant (1+1) links are shown. As the Communication protocol is on IEC 61850 RSTP, we presume that one link will be sufficient from IED to bay level Ethernet switches. However, we shall provide Redundnat ring at the Station level. Please confirm.	Comply to the tender requirement

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238	Volume-II-2, EXHIBIT - 7	Substation Automation System architecture for 66kV & 230kV GIS - Drg. No. TCE.12416A-EL-4019-CD-40053	-	-	As per the SAS Architecture drawing, we understand that all the status & control signals of the Substation shall be routed to the ECS through a dedicated Gateway on IEC 61850 Protocol. Please confirm.	Bidder understanding is correct. However, the gateway should allow routing of all types of signals.
239	Volume-II-2, EXHIBIT - 10	Cable routing layout between 230kV GIS and 66kV GIS	-	Cable routing on Pipe/Cable rack (Cable trays, Cable tray cover, supports etc. by GIS LSTK contractor) Pipe/Cable racks will be by others	We request CPCL to exclude Cable trays. Cable tray cover and supports for 66kV cable from the scope of GIS LSTK as Pipe/Cable racks are also not in the scope. Bidder's scope shall be restricted within the substation boundary. Please confirm.	Refer corrigendum-2, Sr. No. 4.
240	Volume-II-3, Electrical Design Basis	Clause 5.6.5	-	-	As per protection & metering SLD for 415V ACDB for 230kV GIS, switch fuse unit at outgoing side of 415V ACDB shall be of draw out type, however as per Key SLD for CPP (Drg. No. TCE.12416A-EL-4005-AU-40001, Sh. 3 of 4) and as per referred clause, we understand that SFU shall be fixed type. Please confirm whether bidder's understanding is in order.	Drawout type feeders shall be considered.
241	General - PLCC/FOTE	-	-	-	We presume that the PLCC & FOTE are available at the remote end stations & our scope is restricted only to the CPP Switchyard end. Please confirm. Also please clarify the following details: a) Make & Model number of Remote end PLCC b) Make & Model number of Remote end FOTE c) Transmission capacity of FOTE (STM-1/STM-4/STM-16)	Bidder to supply, erect and commission the necessary communication equipment for both the substations (i.e. 230kV GIS CPP switchyard end and feeding substation remote end) in coordination with TNEB/TANTRANSCO as per their requirements
242	General - Line Length	-	-	-	a) Please specify the location of Remote end TANTRANSCO substation b) Please furnish the transmission line distance between the existing TANTRANSCO substation to proposed 220kV outdoor switchyard.	Will be submitted during detail engineering stage.
243	General - Tariff meter	-	-	-	Kindly clarify the following points related to tariff metering : a) Technical specification for Main & Check Tariff Meters. b) Tariff metering panels are required at TANTRANSCO end or not	a) Main and check meters shall meet the requirements of TNEB/TANTRANSCO authority. b) Tariff metering panels are required at TNEB/TANTRANSCO end also.
244	General - 220kV Line	-	-	-	Please furnish the Conductor type & size of O/H Transmission line coming from TANTRANSCO end to 220kV Outdoor switchyard incomers.	Will be submitted during detail engineering stage.
245	General - 220kV Line	-	-	-	We presume that Transmission line side insulator & Hardware for the 230kV incoming lines are in the scope of other contractor. Please confirm.	Bidder understanding is correct. However with in the outdoor switchyard area all transmission line insulators and hardware is included in the scope of bidder
246	General - Control cable	-	-	-	As per Engineering Design Basis (Electrical), clause No. 5.6.16, Note-5, Control cable shall be twisted pair, individual as well as overall screened/ shielded type. We propose twisted pair cables only for Analog signals. For other, control, status & alarm cables, we propose to use control cables with cores (such as 2C, 3C, 5C etc). Please confirm.	Comply to the tender requirement
247	General	-	-	-	In case of contradiction between Individual equipment technical-specification, Engineering Design Basis and tender drawings please confirm the order of precedence to be followed.	Order of precedence is indicated in volume-II, part 1 of 4, clause 1, section:C9
248	General	-	-	-	Please furnish the following details: a) List of Mandatory spares b) Special Tools & Tackles	a) List of Mandatory spares can be referred from Volume-II, part 3 of 4, clause 6.1, ENGINEERING DESIGN BASIS ELECTRICAL (B416-999-16-50-EDB-1011). b) Bidder to recommend the special tools & tackles required.
249	General	-	-	-	Please furnish feeder wise IO List for ECS & ECP.	For ECS a dedicated data link shall be provided allowing unlimited data exchange. For ECP the list shall prepared by bidder during detailed design.

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250	General	-	-	-	As the Substation buildings are located in an isolated location and the electrical installations including transformers are contained inside the building, we do not envisage any specific requirements to be considered for hazardous atmosphere. Please confirm. Otherwise please specify the hazardous area classification that need to be followed for this project, in order to have an uniform bidding platform for all the bidders.	Bidder to consider GIS buildings are located in safe areas,
251	General	-	-	-	For RLDC communication, we shall provide all necessary hardware & software required at CPP Substation end. At RLDC end we do not envisage supply of any hardware & software and integration works. Please confirm.	Bidder to coordinate with TNEB/TANTRANSCO and provide required hardware including communication hardware, gateways at local end and remote end for data exchange to RLDC
	Civil					
252	Volume-II-3, Section 2, B416-999-81-41-EDB-1001	A.4.1.5	Site Grading	-	Unit HPP above FGL : (0.3 m to 0.5 m) Please clarify HPP point pertaining to Switchyard	Same for all the plant. Bidder to follow as per the plot plan. FGL is 3.8m above MSL and HPP (Highest paving point) will be 0.6m above FGL i.e. 4.4m (min). as per approved design basis.
253	Volume-II-3, Section 2, B416-999-81-41-EDB-1001 & Volume II-1	A.4.11 & Volume-II-1 Section C.12.	Fencing and Compound Wall & Civil and Structural Works	-	Switchyard Fencing is only bidder scope and compound wall/ Boundary Wall is not in bidder scope kindly confirm.	Confirmed.
254	Volume-II-1 - Section C.12. 12416A-EL-GIS-40101 & TCE-12416A-EL-4005-GA-40046 (2 sheets)	Volume-II-1 - Section C.12. Cl.1.2.3	GIS Building (66 kV & 230 kV)	-	GIS rooms on First floor only in 66 kV GIS Building. 220 kV GIS is rest on Ground only. Please confirm for 220 kV Cable vault is not required.	Bidder understanding is correct.
255	TCE-12416A-EL-4005-GA-40046 (2 sheets)	-	230 kV & 66 kV GIS Building Layout	-	Please confirm whether the size of the building mentioned in the layout to be followed or we can optimize the size of the building as per the requirement.	Bidder shall provide in his Bid document the proposed building layout accommodating various equipment in the contract. In case the building size has to be increased later after award of contract to accommodate various equipment meeting the requirements of tender specification, it shall be accommodated by the bidder with out any additional cost.
256	Volume-II-3, Section 2, B416-999-81-41-EDB-1001	A.4.1.4	Site Grading	-	Please furnish the Finished ground level since site grading is a CPCL scope also confirm no of terraces in the substation.	Finished ground level (FGL) is 3.8M above MSL (Mean Sea Level) throughout the refinery premises.
257	General	-	Retaining Wall & Stone Pitching	-	we presume that site grading is not in the scope of contract, Retaining wall and stone pitching also not in contactor scope.	Site grading is not in the scope of the bidder. Retaining wall and stone pitching are not applicable as the ground is flat.
258	General	-	230 kV GIS cum CRB Building	-	Please clarify 230 kV CRB Building is ground Floor only.	Bidder understanding is correct.
259	General	-	Depth of Filled up soil	-	Please furnish contour along with spot levels to access the depth of filling.	Contour drawing shall be referred as per corrigendum-2, Sr. No. 33.
260	General	-	Sallow Foundation	-	Please confirm whether minor equipment foundations rest on filled up soil.	To be decided as per the Soil investigation report shared in corrigendum-2, Sr. No. 34.
261	General	-	Soil Report	-	Please confirm bore log is conducted after site grading from finished ground level.	Borelog could be conducted before site grading works.
262	General	-	Transformer Foundation	-	Please confirm we propose pedestal type for transformer foundation.	Rail and road shall be considered for transformer foundation.
263	General	-	EOT crane	-	Please furnish the minimum capacity of EOT Crane for 230 kV GIS and 66 kV GIS and monorails if any and also specify minimum hook height from FFL.	1. 66kV GIS Building: 5 Ton EOT crane 2. 230kV GIS Building: 7.5 Ton EOT crane Minimum Capacity of the Crane shall be 20% more than the heaviest component to be handled in the respective building.
	Mechanical					

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264	Volume-II-3,	Clause-2.4.1-Air Conditioning System,Sl.no.7	-	-	G1 environment shall be maintained inside GIS hall ,Relay and office rooms.Please confirm.	G1 environment is not required for GIS hall, Relay room and office room. It is required to maintain for the areas as per tender specification only.
265	Volume-II-3,	Clause-2.4.1-Air Conditioning System,Sl.no.7	-	-	Bidder understands that G1 environment is not required in cable cellar area . Ventilation system shall be considered without chemical filters.Please confirm.	Confirmed.
266	Volume-II-3,	Clause-2.4.1.1 -Air Conditioning System,Sl.no.3.2-Pg-1154/1259	-	-	It has been mentioned that Package units may be provided for smaller capacity requirements upto 45 TR. We presume that if TR capacity of particular area (Ex: GIS Hall) is 60TR we will consider 2 PAC rooms with 30 TR capacity each.Please confirm. 1) PAC room-1- 15TR x 3 (2W+1S) 1) PAC room-2- 15TR x 3 (2W+1S)	Based on tonnage capacity, Water cooled screw chiller are required for Air conditioning of GIS hall. If a particular area tonnage capacity is up to 45 TR, then bidder need to consider the PAC as per the tender specification.
267	Volume-II-3,	Clause-2.4.1.1 -Air Conditioning System,General	-	-	Please provide the detailed specification for HVAC equipments (PAC,AHU,Insulation,DX unit,ventilation fans …)	This is an EPC specification and minimum details will be indicated and bidder can refer the datasheets attached with tender.
268	Volume-II-1, Section C	Clause no 3	-	Fire Protection System	As per clause, We understand that Design, Supply, Installation and T&C of water based fire protection system, gas based fire protection system and fire extinguishers is not in scope of bidder. Please confirm	Confirmed.
269	Volume-II-1, Section C	Clause no 3	-	Fire Protection System	As per clause, We understand that supply of FDA system is not in scope of bidder. Quantity will be shared to client while doing detailed engineering for procurment. Please confirm	Confirmed. Refer exact scope from Volume-II, part 1 of 4.
	Commercial Queries					
270	ITB	Clause No. 19	BID SECURITY	Bidder shall submit Bid Security in the form of EMD as detailed in NIT. Bidder shall also furnish a Bid Security Declaration shall be furnished by the bidder in the format Attachment-II to ITB	In Attachment-II of ITB the benficiary name is mentioned as "Indian Oil Corporation Limited, (Refineries Division)". Kinldy clarify the same.	Refer to Annexure to SCC Appendix - VIII for BG format to submit EMD (page 523/2608).
	Technical Queries					
	Electrical					
271	General - Remote End	-	-	-	We understand that supply and integration of differential relay with panel at TANTRANSCO end shall not be in bidder scope of supply. Please confirm whether bidder's understanding is in order.	Requirements of transmission authorities shall be complied.
272	Volume-II-2, EXHIBIT - 1	Electrical equipment layout for 66kV Main distribution (CPP) & 230kV sub-stations - Drg. No. TCE.12416A-EL-4005-GA-40046, Sh 2 of 2	-	-	As per cable routing layout between 230kV GIS and 66kV GIS, 1. 230kV GIS room dimension is of 23.1 x 14 Mtr., however, same is shown as 25.2 x 12 Mtr in referred drawing. 2. 66kV GIS room 60.5 x 15 Mtr., however, same is shown as 60.5 x 11Mtr in referred drawing. 3. 230kV Control building dimension and individual room geometry shown in cable routing layout between 230kV GIS and 66kV GIS are not matching with referred drawing. Kindly confirm the actual requirement.	Bidder shall provide in his Bid document the proposed building layout accommodating various equipment in the contract. In case the building size has to be increased later after award of contract to accommodate various equipment meeting the requirements of tender specification, it shall be accommodated by the bidder with out any additional cost.
273	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	The rating of 230kV outdoor isolator is shown as 1000A which is a non-standard rating. Considering the fault level of 40kA for 3sec, the standard type tested rating will be 1250A. Further the GIS bay equipment are rated for 3150A & the outdoor isolator is rated at 1000A. Please check & confirm.	Confirmed that 230kV GIS bay equipment are rated for 3150A & the outdoor isolator shall be rated for 1250A.
274	Volume-II-2, EXHIBIT - 2	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40002	-	-	As per Section C2 - Scope matrix electrical, Sr. No. 3.40, supply of 48V DC system for PLCC shall be in scope of GIS LSTK, however, same is not shown in referred SLD. Kindly confirm the requirement and provide the 48V DC system diagram.	48V DC system required for PLCC/FO etc. is included in the scope of the bidder. 48V DC configuration shall be as per other 110V/220V DC system indicated in the specification

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275	Volume-II-2, EXHIBIT - 1	Key Single line Diagram - Drg. No. TCE.12416A-EL-4005-AU-40001	-	-	We understand that for spare 230kV GIS bay, outdoor GIB and SF6 to air bushing need not to be considered. Please confirm whether bidder's understanding is in order.	Bidder understanding is correct.
276	Volume-I , Price Schedule (Form SP-2)	Sr. No. 1	-	PROCESS DESIGN , DETAILED ENGINEERING preparation of Datasheets, Smart plant P&IDs, PFDs, specifications for procurement, GAD, & Layouts, 3D Model, Hazop /Hazid, SIL, engineering fabrication drawings, Procurement & Construction schemes, Control Logics, Cause & Effect diagrams, Electrical System studies, Statutory approval from various Statutory state & central Government bodies, approval of drawings &documents from OWNER/Consultant submission of Final Technical documents, AS BUILT Documents and 3D Model, Pre-commissioning, Commissioning and Operating manuals for all units including packages as per Bidding Document requirements	We understand from pre-bid discussion that the present scope 230kV switchyard area and 66kV GIS area are under clean environment. Hence, we understand there is no need to perform Hazop/Hazid studies. Please confirm whether bidder's understanding is in order.	Confirming that both 230kV and 66kV GIS buildings are located in safe area
277	Volume-I	Clause 4.9.7.2	-	The CONTRACTOR/ Engineering Subcontractor shall extensively use latest design software including 3D Modelling with PDS/PDMS software.	We request client to accept 3D modelling using other reputed design software like revit / other equivalent software. Please confirm.	Bidder to follow SP3D 2020 version for 3D modelling
278	Volume-II-1	Sr.No. 2.1	-	Calculations shall be carried out on reputed software	We understand that Design calculations can be performed with Bidder's own format as discussed during the pre-bid meeting. Please confirm.	Mutually agreed format for design calculations can be decided during detail engineering stage.
279	Volume-II-1	Sr.No. 3.12 & 3.20	-	Sr. No. : 3.12 - Supply and installation of EHV Cables and cable terminations (on both ends of cable) from 66kV GIS to Generator transformers, 66kV GIS to CPP auxiliary transformers and 66kV GIS to DG auxiliary transformers Sr. No. : 3.20 - EHV & HV cable termination kits, EHV & HV cable jointing kits	From the referred clauses we understand that only the 66kV cable termination kits for the GTG, STG, CPP Aux trafo & DG Trafo are in the scope of Bidder. Cable termination kits for other feeders including the spare GTG bay are not in the scope of this package. Please confirm. If the same need to be supplied under present scope, please clarify the following: a) Whether cable termination kit for both GIS end & remote end are in scope? b) Please furnish the cable size & number of runs per phase for each feeder in order to consider suitable termination kits.	a) Supply, Laying, termination of 66kV Cables on both ends of CPP auxiliary transformers (2Nos), CPP DG transformers (2Nos), CPP GTGs/STGs generator transformers (7Nos), grid transformers (2Nos) to 66KV GIS Switchgear along with their outdoor LAs, isolators, cable sealing ends, cable termination kits are in bidder scope. Supply and installation of cable termination kits at 66kV GIS side for other 66KV outgoing refinery feeders are in bidder scope. b) Cable size & number of cable runs shall be decided by bidder.
280	Volume-II-1, Section-C9	Clause 4.0	-	-	Please specify the Energy Efficiency level for the 6.6/0.433kV Service transformers in line with Amendment no. 4 (March 2021) to IS 1180.	Refer corrigendum-2, Sr. No. 14.
281	General	-	-	-	Please furnish the technical specification for 66kV & 6.6kV cables.	Refer corrigendum-2, Sr. No. 17.
282	General	-	-	-	In case of contradiction between Scope Matrix and tender drawings please confirm the order of precedence to be followed.	Scope matrix and drawings complement to describe the overall scope:
	Mechanical					
283	Volume-II-3,	Clause-2.4.1 (2.4.1.1-General)-Air Conditioning System,Sl.no.3.2	-	-	We would like to inform that we are considering individual AHU units for control rooms & GIS hall.Please confirm.	Confirmed, inline with tender specification
284	Volume-II-3,	Clause-2.4.1 (2.4.1.1-General)-Air Conditioning System,Sl.no.3.2	-	-	Bidder understands that Sub station is located in safe zone ,Hence we are not considering any chemical filters for HVAC system.	Bidder understanding is correct.
285	Volume-II-3,	Clause-2.4.1 (2.4.1.1-General)-Air Conditioning System,Sl.no.3.2	-	-	We are not considering any smoke extraction system specifically for buildings.Please confirm.	Confirmed, inline with tender specification
286	Volume-II-3,	Clause-2.4.1 (2.4.1.1-General)-Air Conditioning System,Sl.no.3.2	-	-	Location of HVAC Out door units shall be located on Terrace.Please confirm.	Confirmed, bidder to consider suitable canopy for the outdoor equipment

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	Technical Queries					
	Electrical					
287	Volume-I	Clause 4.9.7.2	-	The CONTRACTOR/ Engineering Subcontractor shall extensively use latest design software including 3D Modelling with PDS/PDMS software.	Kindly provide the version of PDS/PDMS software to be used for 3D modelling.	Bidder to follow SP3D 2020 version for 3D modelling
288	General	QR Section	Volume -I, NIT caluse No 4	BQC	In performance certificate GIS rating may be 220KV in place of 230 KV as asked in the QR document but equipment is rated for 245 KV only	We note that the equipment is rated for 245kV. So 220kV in place of 230kV is acceptable.
289	General	Scope of work	Volume -I, NIT caluse No 4	Bay details	The QR document doesn't say anything regardinG no of bays as experience.	Comply to the tender requirement
290	General	Scope of work	Volume -I, NIT caluse No 4	Feeder Load list	We require complete boardwise detail load list and number of feeders along with CT and breaker ratings for resoective switchboards like 415 for different MCC, UPS DB etc	Complete GIS system is in bidder scope. Hence bidder to decide the complete details of 415V ACDB, UPS DB and DCDB
291	General	Scope of work	Volume -I, NIT caluse No 4	Load lists of plant equipments	We require different outgoing loads for varous feeders. Ratings of various items as stipulated in technical specifcication/SLD further sizing & calculation for respective equipment are not in bidders scope.	Load list shall be prepared by bidder based on the detail design carried out by the bidder.
292	General	Scope of work	Volume -I, NIT caluse No 4	Price schedule BOQ6 training for maintenance enginner for 2 days	Kindly proide details of excately which items trainings are required from bidders end.	For training requirement on items, refer Volume-II, part 1 of 4, clause 12.0, Section C9: Auxiliary Systems
293	-	-	Volume -I, NIT caluse No 4	Volume -II DG house items like 10 MVA 6.6KV DG	We understand that the supply of 10MVA, 6.6KV DG is not in LSTK bidders scope . Kindly clarify	Confirmed.
	PLCC					
294	-	-	-	Volume-II, PLCC	we are not considering any PLCC and PLCC related items along with Coaxial cables, SDH equipments, EPBAX or DPC for remote end substations. We are only considering PLCC scope at CPCL end.	PLCC and PLCC related items as required by TNEB/TANTRANSCO authority shall be provided. PLCC system and PLCC related items shall be provided at 230kV GIS at refinery and feeding remote substation.
	Tariff Meter Panel					
295	-	-	-	Volume-II, PLCC	Kindly clarify which make of Tariff meter is required.kindly confirm the requirement of summation meter	Make of Tariff meter will be as per TNEB/TANTRANSCO Authority approved makes, which will be informed during detail engineering.
	Control and Relay panel for Future Bays					
296	-	-	-	Volume -II -2 SLD	Kindly clarify requirement of control and relay panel for Future bays as indicated in SLD	Control and relay panels for Future bays are not required. However, control and relay panels are required for spare feeder bays.
	Power Transformer 230/69 KV 80/100 MVA					
297	-	-	-	Volume -II -2 SLD	Kindly confirmthe requirement of transformer related accessories like DGA, drying system etc	Refer corrigendum-2, Sr. No. 13.
	FFPS					
298	-	-	-	Technical speification of Fire Fighting system	regarding Fire fighting we understand that required presurre to be maintained by scope and separate pumping arrangement for the same is not in bidder scope	Bidder understanding is correct
	Battery limit					
299	-	Scope of woek	-	Volume-I	Kindly clarify the battery limit for the present scope of work with respective dimensions.	Bidder can follow the Volume-II for getting scope clarity.
	220KV GIS					
300	Volume -II	220KV Technical Specification	1.1	Required number of 230 kV Cable to Air terminations, SF6 to 230 kV GIB terminations, SF6 to transformer etc. are included in the scope of the BIDDER.	Kindly specify the type of terminations required for each of the typical bays of 230kV GIS	For 230kV GIS, termination shall be through Gas Insulated busduct (GIB). For 66kV GIS, termination shall be through cable terminations.

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301	Volume -II	220KV Technical Specification	1	230kV GIS and its outdoor equipment is envisaged to receive Electrical Power from State Electricity Grid, the voltage level shall be further stepped down to 66 kV through step down transformer (230/66 kV). This power shall be connected to 66	Kindly confirm the location (Indoor/Outdoor) for the required GIS	GIS will be located indoor only.
302	Volume -II	220KV Technical Specification	1.3	SF6 gas maintenance equipment and a hand-held SF6 gas leakage monitor also shall be included in the scope of supply of the BIDDER.	Kindly provide the list of handling required	Details has to be provided by OEM and same shall be approved by Owner.
303	Volume -II	220KV Technical Specification	4.1.12	Dry nitrogen gas filling shall be used during transportation instead of SF6.	For Offered GIS, SF6 Gas at atmospheric pressure shall be filled during transportation	Manufacturer or OEM standard is acceptable.
304	Volume -II	220KV Technical Specification	4.1.21	In view of this continuous busbar without gas segregation is not acceptable.	The requirements of Service continuity, Repair and mainatainance can be ensured without the provision of segregation in the busbar compartment. Request a concurrence on the same.	Comply to the tender requirement.
305	Volume -II	220KV Technical Specification	4.3.1	The GIS shall be of single-phase encloser type for voltage levels of 230kV.	For the offered 230kV, busbar shall be three phase encapsulated and the GIS modules shall be single phase encapsulated, this is the standard type tested design accepted by various utilities in India and abroad. Request a concurrence on the same	Not acceptable. Comply to the tender requirement.
306	Volume -II	220KV Technical Specification	4.4.2	Long bus runs shall be sectionalized into a number of gas compartments such that failure in any gas section does not affect the adjacent gas sections.	The requirements of Service continuity, Repair and mainatainance can be ensured without the provision of segregation in the busbar compartment. Request a concurrence on the same.	Not acceptable. Comply to the tender requirement.
307	Volume -II	220KV Technical Specification	4.5.6	Sensors shall be provided in the GIS enclosure to detect the internal arc flash.	Internal Arc Activity can also be detected by the PD sensors, please confirm if a separate arc detection system is required for the offered GIS.	Online PD monitoring system as per clause 4.12 shall be considered along with internal arc flash sensors.
308	Volume -II	220KV Technical Specification	4.5.16	Gas leakage detectors of an approved type shall be provided.	Kindly provide the technical details for this requirement	Details has to be provided by OEM and same shall be approved by Owner.
309	Volume -II	220KV Technical Specification	4.5.24	The switchgear assembly supply shall include an additional 10% supply of gas complete with containers and monitoring equipment for use during the warranty period.	Kindly provide the list of monitoring equipments required	Details has to be provided by OEM and same shall be approved by Owner.
310	Volume -II	220KV Technical Specification	4.11.8	The minimum outer to outer horizontal clearance between each GIS bus ducts shall be of minimum of 0.75 meter.	The clearance requriement for GIB shall be met for outdoor busduct, kindly confirm	Noted and confirmed.
311	Volume -II	220KV Technical Specification	4.12	Partial Discharge (PD) Monitoring system	Excluded from SE GP T SP GIS scope of supply	Not acceptable. Comply to the tender requirement.
312	Volume -II	220KV Technical Specification	5.1.1	The circuit breakers shall be of double interrupter design (2 breaks in series per pole) for 40 kAIC and can be of single interrupter design up to 40 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.	The offered GIS CB shall be single break type	Refer corrigendum-2, Sr. No. 7 & 10.
313	Volume -II	220KV Technical Specification	5.1.1	However, Voltage grading capacitors may be used across contacts for double interrupter designs for 40kAIC Circuit Breakers.	PIR and CSD are not required for offered GIS requirement, kindly confirm	PIR and CSD (if required) to meet the specification requirements shall be provided.
314	Volume -II	220KV Technical Specification	5.1.2	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	Kindly confirm the X/R ratio and the DC component requirement for GIS CB from the transient studies for offered Power system design	Data will be provided during detailed engineering stage.
315	Volume -II	220KV Technical Specification	5.1.2	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.	For the offered GIS CB the DC compnent shall be 39%, please confirm the suitability for offered requirement	Data will be provided during detailed engineering stage.
316	Volume -II	220KV Technical Specification	5.3.1	Terminals for Tan Delta measurement. These terminals under service conditions shall be connected to Grounding by means of links.	Tan Delta Tests are not applicable for GIS Instrument transformers	All test as per relevant standards shall be carried out.
317	Volume -II	220KV Technical Specification	5.3.2	However, for revenue class metering applications the accuracy class shall be 0.2S for that core.	For GIS VT accuracy class that can be confirmed is class 0.2	Comply with tender specification.
318	Volume -II	220KV Technical Specification	5.3.2	The Voltage Transformer shall be so designed to avoid ferroresonance effects and shall be provided with adequate ferroresonance-suppressor (if required)	Ferroresonance applies to GIS VTs rated 420kV and above, thus not applicable for offered GIS requirement	Noted.
319	Volume -II	220KV Technical Specification	7.1.1	Control panel shall be dead back type, sheet steel enclosed with degree of protection of IP 41 suitable for mounting close to the wall	For offered GIS panels, the Ingress protection class shall be IP43	Noted.

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320	Volume -II	220KV Technical Specification	7.2.9	The mimic strips shall be made of anodised aluminium and shall be screwed onto the panel.	The Mimic strips shall be adhesive strips that shall be stuck to the LCC panel. Request a concurrence on the same	Not acceptable. Comply to the tender requirement.
321	Volume -II	220KV Technical Specification	8.1	Grounding	Supply of Grounding material is excluded SE GP T GIS scope	Not acceptable. Comply to the tender requirement.
322	Volume -II	220KV Technical Specification	8.2	Grounding Tester	Excluded from SE GP T SP GIS scope of supply	Not acceptable. Comply to the tender requirement.
323	Volume -II	220KV Technical Specification	9	SPECIAL TOOLS	Excluded from SE GP T SP GIS scope of supply	Not acceptable. Comply to the tender requirement.
324	Volume -II	220KV Technical Specification	10.3.3	The type tests shall be carried out at reputed testing laboratory, the tests must have been carried out during last 5 years.	As per latest CEA guidelines, Type tests conducted 15years before are acceptable. Request a concurrence on the same.	Refer corrigendum-2, Sr. Nos. 9 & 12.
325	Volume -II	220KV Technical Specification	10.4.4	The GIS Manufacturer shall also indicate the equipment for diagnostic/online monitoring system for the GIS as an optional item.	Kindly provide the complete technical details for this requirement	Manufacturers standards shall be submitted and the same shall be approved by the Owner.
	66KV GIS Specification					
326	66KV GIS Specification	-	1.1	Required number of 66 kV Cable to Air terminations and Cable terminations at GIS etc. are included in the scope of the BIDDER.	Kindly specify the type of terminations required for each of the typical bays of 230kV GIS	For 230kV GIS, termination shall be through Gas Insulated busduct (GIB). For 66kV GIS, termination shall be through cable terminations.
327	66KV GIS Specification	-	1	his power shall be connected to 66 kV GIS at CPP substation through 66 kV cable.	Kindly confirm the location (Indoor/Outdoor) for the required GIS	GIS will be located indoor only.
328	66KV GIS Specification	-	1.3	SF6 gas maintenance equipment and a hand-held SF6 gas leakage monitor also shall be included in the scope of supply of the BIDDER.	Kindly provide the list of handling required	Manufacturers standards shall be submitted and the same shall be approved by the Owner.
329	66KV GIS Specification	-	4.1.4	The GIS Equipment shall be complete with all necessary supports, ladders, galleries, staircases, catwalks, movable platforms or walkways (for accessing the equipment above two (2) meters for maintenance and operation), mechanism cabinets, internal cable raceways etc for each bay and it shall be of modular construction and extendable design.	Ladder shall be provided for access for compact 145kV GIS, provision of walkways, catwalk etc is not envisaged	Noted.
330	66KV GIS Specification	-	4.1.10	Suitable glass window/telescopic port shall be provided in the circuit breaker, disconnect and grounding switch modules for ensuring proper contact making	Considering the safety requirements, provision of obervation window on CB compartment is not envisaged	Manufacturer or OEM standard design is acceptable.
331	66KV GIS Specification	-	4.1.12	Dry nitrogen gas filling shall be used during transportation instead of SF6.	For Offered GIS, SF6 Gas at atmospheric pressure shall be filled during transportation	Manufacturer standard design is acceptable.
332	66KV GIS Specification	-	4.4.3	Cable box where cable-sealing end is installed shall have its own independent gas compartment, with gas monitoring.	For offered 66kV GIS, the Cable termination module and line disconnector shall be incorporated in the same gas compartment	Comply to the tender specification.
333	66KV GIS Specification	-	4.4.5	Compartmentalisation shall be provided for circuit breaker, Busbar, Current transformer, Voltage transformer, Surge arrester, Disconnector along with Earthing switch and Cable sealing end.	For offered 66kV GIS, CT and CB shall be in same gas compartment, also the Cable end and line disconnectors shall be incorporated in the same gas compartment. Request to kindly accept	Comply to the tender specification.
334	66KV GIS Specification	-	4.5.6	Sensors shall be provided in the GIS enclosure to detect the internal arc flash.	Internal Arc Activity can also be detected by the PD sensors, please confirm if a separate arc detection system is required for the offered GIS.	Online PD monitoring system as per clause 4.12 shall be considered along with internal arc flash sensors.
335	66KV GIS Specification	-	4.5.16	Gas leakage detectors of an approved type shall be provided.	Kindly provide the technical details for this requirement	Details has to be provided by OEM and same shall be approved by Owner.
336	66KV GIS Specification	-	4.5.18	The system shall have the facility to pinpoint the exact gas module in the bay where gas leakage problem is there.	We infer that a Continuos gas monitoring system similar to DILO make Room gas monitoring system is required. Please confirm if our understanding is in line with the requirement	Confirmed subject to DILO make system meeting the tender specification requirements.
337	66KV GIS Specification	-	4.12	Partial Discharge (PD) Monitoring system	Excluded from SE GP T SP GIS scope of supply	Comply to the tender requirement.
338	66KV GIS Specification	-	4.15	GIS Earthing	Excluded from SE GP T SP GIS scope of supply	Comply to the tender requirement.
339	66KV GIS Specification	-	5.1.1	The circuit breakers shall be of double interrupter design (2 breaks in series per pole) for 40 kAIC and can be of single interrupter design up to 40 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.	The offered GIS CB shall be single break type	Refer corrigendum-2, Sr. No. 7 & 10.
340	66KV GIS Specification	-	5.1.1	However, Voltage grading capacitors may be used across contacts for double interrupter designs for 40kAIC Circuit Breakers.	PIR and CSD are not required for offered GIS requirement, kindly confirm	PIR and CSD (if required) to meet the specification requirements shall be provided.

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341	66KV GIS Specification	-	5.1.2	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	Kindly confirm the X/R ratio and the DC component requirement for GIS CB from the transient studies for offered Power system design	Data will be provided during detailed engineering stage.
342	66KV GIS Specification	-	5.1.2	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.	For the offered GIS CB the DC compnent shall be 39%, please confirm the suitability for offered requirement	Data will be provided during detailed engineering stage.
343	66KV GIS Specification	-	5.3.1	Terminals for Tan Delta measurement. These terminals under service conditions shall be connected to Grounding by means of links.	Tan Delta Tests are not applicable for GIS Instrument transformers	All test as per relevant standards shall be carried out.
344	66KV GIS Specification	-	5.3.2	However, for revenue class metering applications the accuracy class shall be 0.2S for that core.	For GIS VT accuracy class that can be confirmed is class 0.2	Comply with tender specification.
345	66KV GIS Specification	-	5.3.2	The Voltage Transformer shall be so designed to avoid ferroresonance effects and shall be provided with adequate ferroresonance-suppressor (if required)	Ferroresonance applies to GIS VTs rated 420kV and above, thus not applicable for offered GIS requirement	Noted.
346	66KV GIS Specification	-	7.1.1	Control panel shall be dead back type, sheet steel enclosed with degree of protection of IP 41 suitable for mounting close to the wall	For offered GIS panels, the Ingress protection class shall be IP43	Noted.
347	66KV GIS Specification	-	7.2.9	The mimic strips shall be made of anodised aluminium and shall be screwed onto the panel.	The Mimic strips shall be adhesive strips that shall be stuck to the LCC panel. Request a concurrence on the same	Not acceptable. Comply to the tender requirement.
348	Drawing BOQ & QR Document	-	SLD	BOQ	AS per the SLD we understand that for 66kV GIS is of 55 bays with 2 BUS COUPLER AND Sectionalsier with the Cable termination arrangement although Bus metering has not been shown in the SLD we understand that 2 sets of bus metering VT'sneeds to be considered as per the configuration. Also for 220kV GIS we are having 2 incomer panels,3 outgoing panels with 1 Bus coupler hera also we understand that 1 set of Bus metering VT has to be conisdered.For 220kV GIS all the feeders are with GIB connection.Please confirm whether our understanding is in line with the requirement.	Bidder understanding is not correct. Comply to the tender requirement.
349	Drawing BOQ & QR Document	-	Layout	Layout	As per the layout we understand that the extension is not possible on both the side of the busbar because of space constriants please confirm the same	Space for one bay extension on either side shall be provided.
350	Drawing BOQ & QR Document	-	Layout	Layout	As per the layout LCC is ground mounted for 66kV GIS, we request you to accpet bay mounted LCC for the same it will accommodate all the required features initiated	Comply to the tender requirement.
351	Drawing BOQ & QR Document	-	QR	The sub-contractor(s) is not barred from offering services as a sub-contractor(s) to more than one Bidder.	As per the QR document we undersand that there is no barrier in supporitng the number of EPC's. Please confirm	Refer NIT, Volume-I, clause no.4.2, Page 8 of 2608.
352	Data Sheet 220KV GIS & Accessories	-	c	Rated voltage for equipment (Ur) (kV) 260	Kindly reconfirm the rated Voltage, we understand that for Tantransco and utility specific applications the rated voltage for GIS is 245kV. Kindly re confirm	Noted.
	Commercial Querries					

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353	Volume-1 GCC & SCC	Volume-I	GCC	8.1.1 TAXES, DUTIES AND LEVIES	Please add the following as a seperate clause: In case of change in the rates of any taxes, duties, levies or if new taxes, duties or levies (e.g. GST) are initiated by the Central / State Government / local bodies, then the same will be to the account of Owner/Employer/Purchaser and shall be reimbursed by Purchaser. Change in judicial interpretation and / or any clarification or amendment made by the relevant authorities shall be construed to be a change in the rate of taxes, duties, levies and / or imposition of new tax, duty or levy. If applicable laws, rules and regulations, engineering standards and codes of practice, and decisions or guidance issued by courts or public authorities are amended or added to after the date of Contract signature, Contractor shall be entitled to an adjustment of the Contract, including inter alia an adjustment of the Contract Price to reflect any additional costs to be incurred by Contractor, the time schedules and scope of Works, as necessary in order to compensate for any adverse effects or additional requirements deriving from such changes.	Ref to SCC Clause 12.1 (page 457 of 2608).
354	Volume-1 GCC & SCC	Volume-I	SCC	Additional Clause- Export Reservation clause	Please incorporate the following as a seperate provision in the tender documents: 1 If [Customer] transfers to a third party hardware and/or software and/or technology (including corresponding documentation,) delivered by bidder ("Goods"), or works and services (including all kinds of technical support) performed by bidder ("Services"), [Customer] shall comply with all applicable national and international (re-) export control regulations. In any event of such transfer of Goods and/or Services, [Customer] shall comply with the (re-) export control regulations of the Federal Republic of Germany, of the European Union ("EU") and of the United States of America ("USA"). X.2 Prior to any transfer of Goods and/or Services to a third party, [Customer] shall in particular check and guarantee by appropriate measures that • there will be no infringement of an embargo imposed by the EU, USA and/or by the United Nations by such transfer, by brokering of contracts concerning Goods or Services or by provision of other economic resources in connection with Goods or Services; • such Goods and Services are not intended for use in connection with armaments, nuclear technology or weapons, if and to the extent such use is subject to prohibition or authorization, unless required authorization has been obtained; • the regulations of all applicable sanctioned party lists of the EU and USA concerning the trading with entities, persons and organizations listed therein are considered. X.3 Upon request by bidder, [Customer] shall promptly provide bidder with all information pertaining to the particular end customer, the particular destination and the particular intended use of Goods and Services, as well as any export control restrictions existing. X.4 [Customer] shall indemnify and hold harmless bidder from and against any claim, proceeding, action, fine, loss, cost and damages arising out of or relating to any noncompliance with export control regulations by [Customer], and [Customer] shall compensate bidder for all losses and expenses resulting thereof.	Bidder to comply as per tender terms.

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355	Volume-1 GCC & SCC	Volume-I	SCC	GCC Clause 37-Force Majeure Addition of a new clause	In case there are Export/Import embargoes levied which limit the movement of shipments to the site from a country other than India ,the Contractor shall be unable to deliver the affected shipments to site. The Contractor therefore proposes for the addition of the following clause : Contractor's obligation to fulfill this agreement is subject to the provision that the fulfillment is not prevented by any impediments arising out of national and international foreign trade and customs requirements or any embargos [or other sanctions]."	Bidder to comply as per tender terms.
356	Volume-1 GCC & SCC	Volume-I	SCC	Award of Contract	Please confirm: In case of Award of Contract to Contractor,either: a) Separate Contract for Supply and Services shall be awarded, or b) Composite Contract including Supply and Services shall be awarded to the Contractor.	Single Work Order will be issued comprising of line items for Supply and Services.
357	Volume-1 GCC & SCC	Volume-I	Additional clause	Land Availability	Please confirm whether land where the project needs to be executed is acquired or not by the Employer for this whole project.	Bidder to comply as per tender terms.
358	Volume-1 GCC & SCC	Volume-I	SCC	ANNEXURE-IV TO SPECIAL CONDITIONS OF CONTRACT 1.0 TERMS OF PAYMENT	We understand that all the payments under this contract shall be paid within 30 days from the date of invoice of respective items or from invoicing. Please confirm.	Refer GCC 6.4.8.1 (page 234/2608).
359	Volume-1 GCC & SCC	Volume-I	SCC	8.20.0.9 STATUTORY APPROVALS	Please confirm: 1.Contractor shall not be responsible for statutory approvals,tree cutting, forest clearance, site clearances, access to site and right of way. The same shall be in scope of Employer/Owner. 2.Right of Way shall be in the Owner's/Consultant's scope.	Bidder to comply tender specification.
360	Volume-1 GCC & SCC	Volume-I	SCC	COVID- 19 Clause	Please add the following as a seperate clause in SCC section: The Parties acknowledge the worldwide outbreak of the COVID-19, which is likely to affect the execution of the Agreement. The Parties agree, that Supplier shall be entitled to reasonable adjustments of the Delivery Schedule/ milestones/ delivery dates as well as to reimbursement of costs to the extent the delay and the costs are caused directly or indirectly by the outbreak of COVID-19.	Not Acceptable. Bidder to comply as per tender terms
361	Volume-1 GCC & SCC	Volume-I	GCC	GCC 8.6.0.0. Limitation of Liability	Kindly replace the clause with the following: Overall liability shall be limited to the 100% of the Contract value. Contractor s]hall in no event be liable, whether pursuant to any indemnity or in contract, tort (including negligence and statutory duty) or otherwise for loss of profit or revenue, loss of production, interruption of operations or loss of use, cost of capital, loss of interest, loss of information and/or data, for claims arising from Employer/Consultant/Customer's contracts with third parties, loss of power, cost of purchased or replacement power, or for any indirect or consequential damage.	Bidder to comply as per tender terms.

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362	Volume-1 GCC & SCC	Volume-I	SCC	Additional Clause- Deemed Acceptance	Please add the following as a seperate clause in the SCC; If Contractor notifies the Owner/Customer/Purchaser that the Works or a part of the Works are ready for acceptance, the Customer shall declare the acceptance of the Works or relevant part in writing within two weeks of the notified date. Upon expiry of the two week period the Works or relevant part of the Works shall be deemed accepted, unless the Customer has stated and substantiated in writing legitimate grounds on which it refuses acceptance. The acceptance shall be effective as of the date of Contractor's notification. In any event, the works shall deemed to be accepted if put in the commercial operation by the Purchaser. In case commissioning is delayed by more than 90 days from the scheduled date as notified by the Contractor to the Owner, due to reasons not attributable to Contractor/Supplier, then it will be considered as deemed commissioned. Consequently, the defect liability period shall start and the final payment due to Contractor (if any) shall become due to the Contractor.	Bidder to comply as per tender terms.
363	Volume-1 GCC & SCC	Volume-I	SCC	Additional Clause	Please add the following clause to the contract: The Owner/Customer/Purchaser acknowledges that Works on Site may generate and/or uncover hazardous waste which is subject to specific legal or regulatory requirements under applicable laws "hazardous materials" or "hazardous waste". If Contractor discovers hazardous materials (including asbestos), environmentally hazardous substances, geological or geothermal conditions, archaeological findings or any other local environmental conditions which have an adverse effect on the Works, the Customer shall be liable for any required remediation and shall also reimburse Contractor for any reasonable additional costs and expenses. Contractor shall also be entitled to a proportionate extension of time to provide the Works. The Customer shall, at its expense, provide containers complying with all legal and regulatory requirements and shall handle, store and dispose of hazardous waste in accordance with the applicable laws. Contractor shall not be obliged to provide the Works on Site in unhealthy or dangerous surroundings. All the necessary safety and precautionary measures shall be taken by the Customer, at no cost to Contractor, before the Works on Site commence and shall be maintained by the Customer during Contrcator's performance of the Works on Site.	Bidder to comply as per tender terms.
364	Volume-1 GCC & SCC	Volume-I	SCC	Additional Clause- Suspension of Works	Please add the following as a seperate clause in the SCC: Contractor may suspend performance of its obligations under the Contract if (i) the Owner/Purchaser is in delay with any payment or in providing any payment security required under this Contract for more than 30 days, (ii) the Purchaser/owner fails to perform those of its obligations necessary for Contractor to provide the Works; or (iii) the Purchaser otherwise materially breaches the Contract. Further in the event of suspension, the Purchaser shall become immediately liable to pay Contractor for all parts of the Works already provided. The Purchaser shall further reimburse Contractor all reasonable additional costs and expenses incurred as a result of such suspension (e.g. payments to subcontractors, cost of waiting time, demobilization and remobilization, etc.). Any contractual dates shall be extended for a reasonable period to overcome the effects of the suspension.	Bidder to comply as per tender terms.

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365	Volume-1 GCC & SCC	Volume-I	SCC	Additional Clause- Effective Date of Contract	Kindly add the following as a additional clause: Effective date of Contract shall start when all of the following activites has occured: a)Signing of Contract Agreement and advance payment from Owner, b)Owner has handed over the clear site without any hindrance,	Bidder to comply as per tender terms.
366	Volume-1 GCC & SCC	Volume-I	SCC	Taxes and Duties	As this is Works contract, we need to quote flat 18% GST for all items in the price schedule. Please confirm.	GST as applicable to be indicated in the price schedule.
367	Volume-1 GCC & SCC	Volume-I	SCC	SCC 73 AMC Contract	We understand that AMC works are not applicable for this project. Please confirm.	PWCAMC is applicable bidder to comply as per tender terms.
368	Volume-1 GCC & SCC	Volume-I	SCC	ANNEXURE-IV TO SPECIAL CONDITIONS OF CONTRACT 1.0 TERMS OF PAYMENT(I)	Please confirm , in how many days the payment shall be released by the Purchaser after invoicing by Seller.	Refer GCC 6.4.8.1 (page 234/2608).
369	Volume-1 GCC & SCC	Volume-I	GCC	GCC 4.4.0.0 and 7.0.7.0 Price Adjustment For Slippage in Completion/ Termination	Bidder request to only levy Liquidated damages being the sole remedy for any delay/slippages in completion.	Bidder to comply as per tender terms.
370	Volume-1 GCC & SCC	Volume-I	ITB	ATTACHMENT- VIII SELF-CERTIFICATION & DECLARATION BY CEO/CFO/COMPANY SECRETARY SELF-CERTIFICATION	We understand that this Schedules can be signed by the Power of Attorney Holders authorised by the CEO/CFO/CS of the Bidder's Company. Please confirm.	Bidder understanding is correct.
371	Volume-1 GCC & SCC	Volume-I	ITB	44. PROJECT SPECIFIC ACCOUNT For the benefit of the Project, it is desired that the Contractor shall maintain Project Specific Bank Accounts, with a bank approved by the Owner to ensure that finances released by the Owner if any, line of credit received from the lenders to meet working capital requirements and all revenues & other receipts arising from the Contract and under any agreements are deposited into such Account(s). Withdrawals and appropriations during the Contract Period, at any relevant time, from such Account(s) shall be made only for the purpose of Project/Project Facilities and Services.	Please delete this provision. Since Working capital of this project and the cash flows would be either self-funded or funded via internal cash of the company, this account is be required.	Bidder understanding is not correct. Bidder to comply as per tender terms.
372	Volume-1 GCC & SCC	Volume-I	SCC	80. PRICE VARIATION (Escalation / De-escalation)	We request you to provide the provision for Price variations (As per IEEMA formula) for all the items as applicable for this project.	Bidder to comply as per tender terms.
373	Volume-1 GCC & SCC	Volume-I	SCC	74 PRADHAN MANTRI SURKSHA BIMA YOJANA (PMSBY) The Contractor shall ensure that the workers engaged by him as well as workers engaged by the sub-contractor's are enrolled under "Pradhan Mantri Surksha Bima Yojana (PMSBY) & Contractor shall at his own expense cover all the workmen engaged under him under Pradhan Mantri Surksha Bima Yujana(PMSBY) and Pradhan Mantri Surksha Bima Yojana (PMSBY) schemes. The Contractor shall periodically submit the documentary evidence towards enrolment to the Owner/ Engineer-in-Charge.	We understand that all Insurances including Marine and EAR are in the scope of Owner. Bidder/Contractor does not have to take any Insurances for its scope of works. Accordingly,We request you to delete this provision of SCC 56.	Bidder to comply as per tender terms.

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374	Volume-1 GCC & SCC	Volume-I	SCC	37.0 MARINE COVER AND ERECTION ALL RISK COVER INSURANCE Notwithstanding contained in GCC, the provision of Insurance is modified to the following extent: 37.1 OWNER is in the process of taking the Marine and erection all risk Insurance of the project for permanent materials and services. Any loss or damage to the materials or any of them during ocean transportation, Air transportation, port/ custom clearance, during inland and port handling, inland transportation, storage, erection, final test and commissioning, shall be to the account of CONTRACTOR, and the CONTRACTOR shall be exclusively responsible within the scope of supplies in respect of materials and within the scope of services in respect of works to make good any damage or loss to the materials and works by way of repairs and/or replacement, as the case may be, pending insurance claim, and no delay shall be made by the CONTRACTOR in repair/replacement pending such claim. OWNER shall raise the insurance claim in case of damage to the materials and/or works, and all supporting documents for such claims shall be handed over by the CONTRACTOR to the OWNER immediately. CONTRACTOR shall provide all assistance for such a claim. 37.2 Policy covers CPCL/JV as Principal owner/beneficiary and its contractors, sub- contractors as Co-insured. 37.3 The CONTRACTOR shall bear the entire cost of arranging all documents/ information, facilitating inspection/ discussions by the officials/surveyors deputed by the Insurer. The CONTRACTOR shall make all efforts to get settlement of claim at the earliest, and no time extension for completion of work will be given for delay on this account.	We understand that all Insurances including Marine and EAR are in the scope of Owner. Bidder/Contractor does not have to take any separate Insurances for its scope of works. Please confirm.	Bidder to comply as per tender terms.
375	Volume-1 GCC & SCC	Volume-I	SCC	ANNEXURE-IV TO SPECIAL CONDITIONS OF CONTRACT 1.0 TERMS OF PAYMENT 2.1 Payment for Supplies (i) 10% (Ten percent) of total supply value as per SP-1 of Price Part of the tender (excluding cost of Mandatory Spares) against Advance Bank Guarantee (ABG) of equivalent Value on placement of Purchase Orders or approval of design basis report under Category "A". The equipment shall be identified during engineering/approval of billing breakup with the successful Bidder. Payment shall be released on submission of (a) Performance Bank Guarantee equivalent to 3% of the total contract value which shall be kept valid upto the end of the Defect Liability Period plus claim period of 3 months and (b) Advance Bank Guarantee for equivalent value which shall be valid upto the Contractual Date of Completion plus claim period of 3 months. ABG shall be released after receipt of all materials at Site and issue of certificate of verification and good condition in respect thereof in accordance with Clause 3.0.6.4 of the General Conditions of Contract. The value of advance Bank Guarantee will be allowed to be reduced on the written request of the CONTRACTOR in not more than 04 (four) occasions during the execution of the Contract and on recommendation and certification of Engineer-in-Charge for receipt and acceptance of materials in good condition at Site and on adjustment of advance by Owner's Finance department. .	We understand that these Advance payments of 10 per cent are interest free advance payments. Please confirm.	Refer SCC clause 68.1.4 & 68.1.5 (page 485/2608).

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				For payment of 10% of Total Supply value against BG, same Exchange rate shall be considered, as considered for the Price evaluation of the bids. Any fluctuations in the currency shall be adjusted later on after obtaining proof of payment by contractor to supplier by considering the exchange rate of the date of payment as per submitted proof of payment.....		
376	Volume-1 GCC & SCC	Volume-I	SCC	38 BOCWA Cess	As the complete scope of substation works is under IOCL factory premises, we understand that BOCWA@1% shall not be applicable for Contractor.	Bidder to comply as per tender terms.
377	Volume-1 GCC & SCC	Volume-I	ITB	Attachment 7- FORMAT FOR FURNISHING AFFIDAVIT ON AUTHENTICITY OF DOCUMENTS SUBMITTED AGAINST BIDDER QUALIFICATION CRITERIA	We understand that this schedule is not applicable for the bidder. If applicable, please let us know. From which agency this attachment needs to be certified from.	Bidder to furnish and affidavit on authenticity of the documents submitted against BCQ on Rs 100 non judicial stamp paper paper duly notarized.
378	Volume-1 GCC & SCC	Volume-I	NIT	XV. Earnest Money Deposit EMD of ₹58,25,000/- (rupees fifty eight lakhs and twenty five thousand only)	Please confirm whether EMD in the form of Bank Guarantee is applicable for this bid.	Bidder understanding is correct.
379	Volume-1 GCC & SCC	Volume-I	NIT,BDS and SCC	BDS-12- ITB 19.1- To be submitted as mentioned in NIT NIT 19.0 BID SECURITY 19.1 Bidder shall submit Bid Security in the form of EMD as detailed in NIT. Bidder shall also furnish a Bid Security Declaration shall be furnished by the bidder in the format Attachment-II to ITB. ITB- ATTACHMENT- II INSTRUCTIONS TO BIDDERS FORMAT OF BID SECURITY DECLARATION (On Bidders letter Head) SCC Annexure- VIII APPENDIX-V FORM OF BANK GUARANTEE IN LIEU OF EARNEST MONEY DEPOSIT	Please confirm whether EMD in the form of Bank Guarantee is applicable for this bid or only EMD declaration is required to be submitted.	EMD is applicable and also Bid Security Declaration as per ITB Attachment - II.
380	Volume-1 GCC & SCC	Volume-I	ITB	ATTACHMENT-11 Letter from Statutory Auditor/CA- FINANCIAL DETAILS	Please confirm if the Bidder is a public listed company,then any Practising Chartered Account can certify this attachment- 11.	Bidder understanding is correct.
381	Volume-1 GCC & SCC	Volume-I	ITB	ATTACHMENT - XII LETTER FROM THE BIDDER DULY CERTIFIED BY STATUTORY AUDITOR/ PRACTICING CHARTERED ACCOUNTANT	Please confirm if the Bidder is a public listed company,then any Practising Chartered Account can certify this attachment- 12.	Bidder understanding is correct.
382	Volume-1 GCC & SCC	Volume-I	ITB	ATTACHMENT - XIII Certification by CEO/CFO- FINANCIAL DETAILS	We understand that this Schedules can be signed by the Power of Attorney Holders authorised by the CEO/CFO/CS of the Bidder's Company. Please confirm.	Bidder understanding is correct.

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383	Volume-1 GCC & SCC	Volume-I	GCC	GCC 8.1.4.0 - (i) If and prior to the date of Mechanical Completion/ Completion of the entire work(s) there is an increase in the rate of any of the following output taxes applicable to invoices raised on the Owner, namely, Central Sales Tax, VAT or Service Tax or Goods and Service Tax (GST) the Owner shall pay and bear the additional tax in respect of the work performed by the Contractor upto the relevant date. Similarly, if there is any reduction in any of the said taxes between the said dates, the Contractor shall pass on the benefit of such reduction to the Owner with a view that the Owner shall be invoiced for and pay the reduced tax(es). (ii) If after the date of the last price bid of the Contractor relevant to the Contract and prior to the Relevant Date, any new output tax is introduced in addition to the taxes then existing relevant to the execution of the works, on proof of payment by the Contractor, the Owner will reimburse the Contractor the amount of such new tax paid by the Contractor in respect of the work performed by the Contractor upto the relevant date. GCC 8.1.4.1 - If there is an increase in the rate of output tax (CST, VAT, Excise Duty, Service Tax and Goods and Service Tax (GST) etc) or any new output tax is introduced in addition to the existing taxes in lieu of existing taxes where the total financial implications on account of new output taxes is more and arises beyond the contractual completion period, Owner shall reimburse the same , if the increase in output taxes or new output taxes is entitled for tax credit to the Owner. In other cases, Contractor shall bear the increase in the rates of existing taxes or any new output tax.	Please confirm: Contractor shall be entitled to an extension of time or payment of cost for any change in codes and standards and change in law.	Bidder to comply as per tender terms.
	General Points					
384	Tender layout - cable routing layout between 230kV GIS & 66kV	Exhibit 1	-	Tender layout	We understand that 66kV cable is routed through pipe ducts/cable racks & trench both. Kinldy clarify the scope of pipe ducts.	Refer corrigendum-2, Sr. No. 4.
385	Tender layout - cable routing layout between 230kV GIS & 66kV	Exhibit 1	-	Tender layout	Please provide the length of the cable route.	The approximate route length between 230kV GIS and 66kV GIS is 2200Mtr. The route length indicated may vary during detail engineering stage and minor variation has to be accommodated by bidder. For scope of cable supporting system between 230kV GIS and 66kV GIS, refer corrigendum-2, Sr. No. 4.
386	Clause 3.12 of Section C2	Exhibit 1	-	Tender layout	Please provide a typical section for pipe/cable rack drawing and cable trench drawing	Bidder shall develop trench layout within battery limit and get it approved from Owner.
387	Cable size and number of runs	Exhibit 1	-	-	Please specify the cable size & number of runs for 66kV cables from - 1. GTR to 66kV GIS 2. STR to 66kV GIS (for both 22MVA & 31MVA) 3. DG TR to 66kV GIS 4. aux trafo to 66kV GIS	Minimum size of 66kV cable shall be 630 sq.mm. 1 to 4: Cable sizing shall be done by bidder based on route lengths and transformer ratings provided in tender document.
388	Scope	Scope of LSTK Contractor	-	-	Kinldy confirm the scope of 66kV GIS building	All civil & structural works of GIS buildings are in bidder scope along with other scope as mentioned in tender document.
389	tender SLD	-	-	-	Kinldy confirm the location of EMDG aux trafo.	Route length is already indicated in the tender document, Volume-II, Part 1 of 4, scope matrix electrical.

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390	-	-	-	-	As per tender SLD, outgoing feeder to s/s-16 is in GIS LSTK contractor' scope. Please specify the details of the feeders inlcuding cable size type, route length etc.	Supply, Laying, termination of 66kV Cables on both ends of CPP auxiliary transformers (2Nos), CPP DG transformers (2Nos), CPP GTGs/STGs generator transformers (7Nos), grid transformers (2Nos) to 66KV GIS Switchgear along with their outdoor LAs, isolators, cable sealing ends, cable termination kits are in bidder scope. Supply and installation of cable termination kits at 66kV GIS side for other 66KV outgoing refinery feeders are in bidder scope. For detailed cable tray routing layout, refer Volume-II, Part 2 of 4, Exhibit-10 to 12. Note: S/S-16 refers to CPP auxiliary transformers.
391	Volume-II-2	Cable pipe and racks	-	Cable tray works	We understand that for present GIS LSTK Contractor supply and erection of cable tray shall be in LSTK bidders scope. However, pipe/cable racks including tray supports , earthing & Illumination works works shall be done by others. We request to provide section wise cable pipe/cable rack arrangement	Refer corrigendum-2, S. No. 4.
392	Volume-II-2	Building size and dimensions	-	Building dimensions	The size of the proposed building for both 230KV & 66KV GIS hall and other builings dimensions is mentioned in the Volume-II-2 drawings . We understands that there is always possiblility of optimization. Please clarify	Bidder shall provide in his Bid document the proposed building layout accommodating various equipment in the contract. In case the building size has to be increased later after award of contract to accommodate various equipment meeting the requirements of tender specification, it shall be accommodated by the bidder with out any additional cost.
393	Volume-II-2	Exhibit 10	-	Battery limit	Kindly mark up the Battery limit for GIS LSTK scope .	Battery limits cover the scope defined in the tender specification.
394	Volume-II-2	End Termination its	-	End Termination its	We understands that supply of End termination kits t 220KV GIS and 66KV GIS ends are in LSTK bidders scope. We request to provide the cable details(Size, Core and Type) of respective feeders.	Supply, Laying, termination of 66kV Cables on both ends of CPP auxiliary transformers (2Nos), CPP DG transformers (2Nos), CPP GTGs/STGs generator transformers (7Nos), grid transformers (2Nos) to 66KV GIS Switchgear along with their outdoor LAs, isolators, cable sealing ends, cable termination kits are in bidder scope. Supply and installation of cable termination kits at 66kV GIS side for other 66KV outgoing refinery feeders are in bidder scope. For detailed cable tray routing layout, refer Volume-II, Part 2 of 4, Exhibit-10 to 12. Cable size shall be decided by bidder.
395	Volume-II-2	415V MCC & PMCC	-	Scope of supply of 415V PMCC and 6.6KV Boards along with 66/6.6KV Trafo	We understad that following items are not in LSTK bidders scope 1. 6.6KV HT Boards located at STG ELEC Building 2. 66/6.9KV 31.5 MVA transformer 3. cables from 6.6kv boards to 6.6KV /415V Transformer 4. 6.6/415V 2.5MVA tranasfrmer 5.415V PCC-1&2 located at STG Electrical Buildig 6. Boiler PMCClocated at UB MCC room-1 7. 415V EPMCC located at STG Electrical Building 8. HVAC MCC located at STG Electrical Building 9. STG MCC-1 located at STG Electrical Building 10. STG MCC-2 , STG MCC-3, STG COM EMCC 11. 110V SUB DCDB at STG Building, 220V SUB DCDB , 110V UPS SUB DB	1. Confirmed. 2. Confirmed. 3. Confirmed and except for transformers located at 230kV GIS, which are part of bidder. 4. Confirmed. 5. Confirmed. 6. Confirmed. 7. Confirmed. 8. Confirmed. 9. Confirmed. 10. Confirmed. 11. Confirmed for DBs located at STG building.

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396	Volume-II-2	415V MCC & PMCC	-	Scope of supply of 415V AT Utility boiler MCC -1 located at UB MCC Room-1	We understad that following items are not in LSTK bidders scope aand Clarify 1. Utility Boiler MCC -1 2. Utility Boiler MCC -1 3. 110V UPS SUB DB 4. Utility Boiler MCC-3 5. 110V UPS SUB DB 6. 110V SUB DCDB at UB MCC Room -2 7. Utility Boiler MCC-4 8. 220V SUB DCDB located at UB MCC room-1 9. 110v SUB DCDB locaed at UB MCC Room-1	1. Confirmed. 2. Confirmed. 3. Confirmed for other than GIS buildings. 4. Confirmed. 5. Confirmed for other than GIS buildings.. 6. Confirmed. 7. Confirmed. 8. Confirmed. 9. Confirmed.
	Civil Points					
397	Volume-II-1	Section C12: Civil and Structural Works	Technical Specification - Civil	Land	We understand hinderance/encumbrance free land for proposed Substations (220kV and 66kV) and outdoor cable route shall be made avaliable to bidder from the date of LOI. LAND acquistation shall not be in bidder scope. Kindly confirm	Hindrance free land will be made available by Owner. Land acquisition is not in bidder's scope.
398	Volume-II-1	Section C12: Civil and Structural Works	Technical Specification - Civil	Price variation	Due to volatile market we request M/s,CPCL to bring the civil works under price variation clause.	Bidder to comply to the tender requirement.
399	Volume-II-1	Section C12: Civil and Structural Works	Price schedule	Detail BOQ	We request M/s.CPCL to provide us the detail civil BOQ for the subject pacakge	Civil BOQ to be estimated by the bidder.
400	Volume-II-1	Section C12: Civil and Structural Works	Topography Survey	Contour Map	Request M/s.CPCL to provide us the contour map (with layout super imposed) of the proposed SS along with required FGL inorder to access the foundation depth and design.	Contour drawing is shared in corrigendum-2, Sr. No. 33. Finished ground level (FGL) is 3.8M above MSL (Mean Sea Level) throughout the refinery premises.
401	Volume-II-1	Section C12: Civil and Structural Works	Technical Specification - Civil	Storm water drainage	We understand hindrance free land shall be provided for Storm water drainage - Connecting the SWYRD drainage to the outfall points. Kindly confirm. Kindly do provide us the length of drainage to be considered for connecting to the out fall point.	Land acquisition is not in bidder's scope. Hindrance free land will be made available by Owner. Length of drainage shall be estimated by bidder based on tender document.
402	Volume-II-1	Section C12: Civil and Structural Works	Delivery Schedule	Civil Work delivery	We need 24 months to complete the civil works. Request M/s.CPCL to consider the delivery schedule accordingly	Deviation is not acceptable. bidder to comply to the tender specification.
403	Volume-II-1	Section C12: Civil and Structural Works	Soil investigation report	Soil investigation report No : 1526, page No : 22	In the table for pile foundations, two different values of pile capacities are mentioned in the table for same type of pile with same dia and depths. Please clarify. Kindly do clarify which Borehole log to be considerec for the proposed 220kV and 66kV SWYRDS	For 66kV GIS building design, bidder to consider CPP area bore hole data attached as per corrigendum-2, Sr. No. 34. And for 230kV Switchyard and GIS building design, bidder to consider BH-11 bore hole data attached as per corrigendum-2, Sr. No. 34. No compensation will be provided during execution stage.
404	Volume-II-1	Section C12: Civil and Structural Works	SPEC. NO. 12416A-EL-GIS-40101	SPEC. NO. 12416A-EL-GIS-40101, Section C12 : Civil and structural works . Cl 1.1 Scope of work	Please provide the GA drawings of 220kV GIS Building and 66kV GIS Building with section and elevation details.	For GIS building details, refer Volume-II, Part 2 of 4, Exhibit-3, Electrical Equipment layout for 66kV main distribution & 230kV GIS. Bidder shall provide in his Bid document the proposed building layout accommodating various equipment in the contract. In case the building size has to be increased later, after award of contract to accommodate various equipment meeting the requirements of tender specification, it shall be accommodated by the bidder without any additional cost.
405	Volume-II-1	Section C12: Civil and Structural Works	SPEC. NO. 12416A-EL-GIS-40101, Section C12	SPEC. NO. 12416A-EL-GIS-40101, Section C12 : Civil and structural works . Cl 1.2.2 Site Grading	Please share the site grading drawing to assess the depth of filling and depth of shallow foundations	Contour drawing is shared in corrigendum-2, Sr. No. 33. Finished ground level (FGL) is 3.8M above MSL (Mean Sea Level) throughout the refinery premises.

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406	Volume-II-1	Section C12: Civil and Structural Works	Layouts	Optimization	Kindly clarify whether building size optimization with respect to manufacturer equipment size can be proposed. Kindly clarify	Bidder shall provide in his Bid document the proposed building layout accommodating various equipment in the contract. In case the building size has to be increased later after award of contract to accommodate various equipment meeting the requirements of tender specification, it shall be accommodated by the bidder with out any additional cost.
407	Volume-II-1	Section C12: Civil and Structural Works	SPEC. NO. 12416A-EL-GIS-40101	Section C12, Cl 1.2.3	As per the clause, ground floor shall be cable vault and GIS will be in first floor. We presume that this is applicable only for 66kV and 220kV GIS will be in ground floor. Pl confirm	Confirmed.
408	Volume-II-1	Section C12: Civil and Structural Works	Layout	66kV SWYRD layout	Kindly share the 66kV SWYRD layout	For GIS building details, refer Volume-II, Part 2 of 4, Exhibit-3, Electrical Equipment layout for 66kV main distribution & 230kV GIS. Bidder shall provide in his Bid document the proposed building layout accommodating various equipment in the contract. In case the building size has to be increased later, after award of contract to accommodate various equipment meeting the requirements of tender specification, it shall be accommodated by the bidder without any additional cost.
409	Volume-II-1	Section C12: Civil and Structural Works	SPEC. NO. 12416A-EL-GIS-40101	Section C12, Cl 1.11	Please confirm whether we can propose Rigid roads in place of flexible roads since the road length is not much	Bidder to follow tender requirement.
410	Volume-II-1	Section C12: Civil and Structural Works	Civil work	Transformer foundation	We assume that transformer foundation will be with rail walls and common footing. Kindly confirm Soak pit around the transformer will be filled with gravel and the pit size will be designed to contain 33% of the oil capacity. Common burnt oil tank shall be designed for 120% of the highest oil capacity transformer. Please confirm	Bidder shall provide rail walls with common footing for grid transformers. Confirmed for Soak and Common oil Pits.
411	Volume-II-1	Section C12: Civil and Structural Works	Civil work	Approved makes	We request you to provide us the details of makes of construction materials like cement, R/F steel , structural steel, tiles, pipes, paints etc…	If the Makes are not listed for specific equipment in the vendor list, then bidder can submit the sub vendor list and get the approval from the Owner/consultant during detail engineering.
412	Volume-II-1	Section C12: Civil and Structural Works	Civil work	Cement	We request your confirmation for usage of PPC grade cement	Type of cement shall be as per the tender specification / soil investigation report attached with corrigendum-2, Sr. No. 34 whichever is stringent.
413	Volume-II-1	Section C12: Civil and Structural Works	Civil work	General	We request for the details on the minimum weight of R/F steel and cement bags supplied to the site to be sent for testing (Kindly provide M/s.CPCL FQP for understanding the requirement)	FQP shall be submitted to owner for review and approval during detail engineering stage.
414	Volume-II-1	Section C12: Civil and Structural Works	Civil work	Grade of concrete and steel	We request M/s.CPCL to clarify the grade of concrete and steel to be considered for the civil works with minimum cement content.	Type of cement, concrete and steel shall be as per the tender specification / soil investigation report attached with corrigendum-2, Sr. No. 34 whichever is stringent.
415	Volume-II-1	Section C12: Civil and Structural Works	Civil work	Compound wall	We assume that compound wall requirement is not envisaged in the proposed SWYRD. Kindly confirm	Confirmed.
416	Volume-II-1	Section C12: Civil and Structural Works	Site	Approach Road	We assume that proper motorabale approach is available for both the proposed SWYRD. Kindly confirm.	Approach roads will be made available outside the GIS battery limits by owner. Inside this package battery limits, it is by bidder. The approach roads within the plant premises has to be verified by the bidder before transporting the equipment.
417	Volume-II-1	Section C12: Civil and Structural Works	Site	Land devlopment	We assume that no land development work is envisaged in both the proposed SWYRDs. Kindly confirm. We assume that land will be handedover with respect to the required FGL by M/s.CPCL. Kindly confirm	Confirmed.
418	Volume-II-1	Section C12: Civil and Structural Works	Site	Underground services	We assume that no underground services like cables, water supply pipe line, telephone cables etc.. are not in the proposed SWYRD. Kindly confirm	Graded site will be handed over. In existing area like cables, water supply pipe line, telephone cables etc. are likely to be available.
419	Volume-II-1	Section C12: Civil and Structural Works	Site	Dismantling works	We assume that no any dismantling works are envisaged in the proposed SWYRD. Kindly confirm	Confirmed.

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420	Volume-II-1	Section C12: Civil and Structural Works	Storm water drinage	Drinage along the roads	We would like to propose storm water driange in one side of the roads. Kindly confirm	Storm water drainage has to be considered on both sides of the roads.
421	Volume-II-1	Section C12: Civil and Structural Works	Tender documents	Soil Investigation	We assume that soil report provided in the tender documents are applicable for both the SWYRD's. Kindly confirm	For 66kV GIS building design, bidder to consider CPP area bore hole data attached as per corrigendum-2, Sr. No. 34. And for 230kV Switchyard and GIS building design, bidder to consider BH-11 bore hole data attached as per corrigendum-2, Sr. No. 34. No compensation will be provided during execution stage.
422	Volume-II-1	Section C12: Civil and Structural Works	Site	Tree cutting	We assume that no tree cuttings are envisaged in the proposed SWYRD. Encumbrance free land will be handed over to the successful bidder. Kindly confirm	Confirmed.
423	Volume-II-1	Section C12: Civil and Structural Works	Technical Specification - Civil	General - Construction water and Power	We understand we will get the construction power and water at one point in the proposed substations location. Kindly confirm	For 66kV GIS Building construction power and water will be provided near to 66kV GIS building. For 230kV GIS building construction water will be provided near to building. However, for construction power bidder shall arrange dedicated diesel generator.
424	Volume-II-1	Section C12: Civil and Structural Works	Technical Specification - Civil	Testing laboratory	We request you for the details on the approved construction material testing laboratory.	Bidder to provide the list of testing laboratories during detail engineering for owner's approval.
425	Volume-II-1	Section C12: Civil and Structural Works	Technical Specification - Civil	Site office, Labour camps, stores etc	We request M/s.CPCL to permit for having site office / stores / skilled labour camps within M/s.CPCL proposed sites for smooth coordination works.	Refer SCC, Volume-I. Clause no. 69.3.1, Page 488 of 2608.
426	Volume-II-1	Section C12: Civil and Structural Works	Technical Specification - Civil	Hindrances in the proposed site	Trees / bushes / scrap materials/ collapsed boundary wall /cable drums/ stores etc – These are the items which will cause hindrance during execution, Kindly confirm that the site will be handed over encumbrance free by clearing all the items as specified.	Confirmed.
427	Volume-II-1	Section C12: Civil and Structural Works	Site	Gate Pass and Entry Permission	We assume that necessary gate pass and permission will be provided during the construction time for all the labours, vehicles, equipments, tools and tackles as and when required without any delay. Kindly confirm	Confirmed.
428	Volume-II-1	Section C12: Civil and Structural Works	Technical Specification - Civil	Site - General - Disposal of excess soil and concrete waste	Request M/s.CPCL to provide us the location for disposal of excess soil and concrete waste. Kindly mention the distance from the proposed site to disposal yard.	It is the responsibility of bidder for disposal of excess soil and concrete waste inline with the local regulatory and approval.
	CRP & SAS					
429	Volume-II-2	Section C6: Control, Relay and Metering Panels	4.1	230 kV & 66 kV Line protection - (d) Auto re-closing scheme relays with single phase & three phase re-closing, dead-line charging and live-line re-closing	PI confirm if Auto reclose is required in 66 kV	Comply to the tender requirement.
430	Volume-II-1	Section C6: Control, Relay and Metering Panels	4.2	Bus Bar Protection - Numerical type, distributed redundant busbar protection scheme based on" low impedance" principle for selected bus arrangement shall be provided. It shall have check feature, discriminating zones, CT supervision and in-out switch.	If Low impedance bus bar protection has to be offered, the redundant Bus Bar protection for 59 number 66 kV Bays will have 4 Central Units and 118 Peripheral Units. This will be highly costly for a 66 kV system. PI confirm if High Impedance Bus Bar protection can be provided for 66 kV.	Comply to the tender requirement.
431	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	Metering & protection SLD - 66 kV	Separate BCU and Over current earth fault relay	Please confirm that BCU and Over current earthfault relay can be combined in one BCPU.	Comply to the tender requirement.

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432	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	Metering & protection SLD - 66 kV	For Transformer feeders in 66 kV, cable differential protection (87C) is mentioned	Please confirm that Transformer Differential protection is not required.	Transformer differential protection for 66kV outgoing feeders and incomer feeders except grid transformers is not required.
433	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	Metering & protection SLD - 66 kV	For Transformer feeders in 66 kV, cable differential protection (87C) is mentioned	Please confirm the cable length for 87C	Cables for 87C for refinery feeders shall be provided by others. For Substation-16 (2Nos. CPP auxiliary transformers, 2Nos. DG transformers, 2Nos. grid transformers), the cables supply and installation is in bidder scope.
434	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	Metering & protection SLD - 66 kV	For Transformer feeders in 66 kV, 50LBB (Local Breaker Back-up protection) is shown in a seprate box	Please confirm that if 50LBB can be provided as in-built function in Back-up Over current & Eath fault relay.	Comply to the tender requirement.
435	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	Metering & protection SLD - 66 kV	It is mentioned that "Metering & Protection shall be same as other Capacitor feeders".	But details of Capacitor feeder protection is not provided.	Capacitor feeder shall be provided with same protection as transformer feeders (SS-16) along with 59 (over voltage) and 60 (neutral displacement) protections shall be considered.
436	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	Metering & protection SLD - 66 kV	Outgoing Feeders of 66 kV	Please confirm the number of different types of feeders in 66 kV as protection requirments may varry	Two types of feeders are available. 1. Transformer feeder 2. Capacitor feeder

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437	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	Metering & protection SLD - 66 & 220 kV	Bus PT	Please confirm if separate CRP has to be provided for Bus PT or can Bus PT requirments be provided along with the CRP for Bus Coupler.	CRP for Bus PT can be part of CRP for Bus Coupler.
438	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	SAS Architecture for 66 kV & 220 kV GIS	2 numbers 16 port ethernet switches are shown for every 2 number of 66 kV bays	As each 66 kV feeder will have 1 BCU and 1 Main relay and 1 Back up O/C & E/F relay, please confirm if more than 2 feeders can be connected to each ethernet switch.	Comply to the tender requirement.
439	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	SAS Architecture for 66 kV & 220 kV GIS	2 numbers 16 port ethernet switches are shown for every 2 number of 66 kV bays	Please confirm if ethernet switch with more ports can be provided to accommodate more feeders in each switch.	Comply to the tender requirement.
440	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	SAS Architecture for 66 kV & 220 kV GIS	One protocol converter is shown for every MFM	Please confirm if MFMs can be looped and common protocol converter can be used for multiple loops.	Comply to the tender requirement.
441	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	SAS Architecture for 66 kV & 220 kV GIS	RSTP connection is asked with redundant star network for each IED.	Since star connection is asked which is already better than ring connection, can we provide on single star instead of redundant star.	Comply to the tender requirement.

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442	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	SAS Architecture for 66 kV & 220 kV GIS	Three different Gateways are shown - (a) for ECS (on IEC61850), (b) for PLCC (on IEC101/104) (c) for DCS (on OPC/TCP IP)	Please confirm if one redundant Gateway can be used as common for all the three purposes.	Comply to the tender requirement.
443	Volume-II-1	SPECIFICATION FOR GRID POWER - 230kV & 66kV DISTRIBUTION NETWORK - SPECIFICATION NO. 12416A-EL-GIS-40101 (VOLUME II PART-2 of 4)	SAS Architecture for 66 kV & 220 kV GIS	Gateway connectivity	We shall provide Data at the end of the Gateway port. However integration with other systems like ECS, DCS, SLDC etc is not in scope. Please confirm.	Providing data at the end of the Gateway port. Supply and installation of cables and integration with systems like ECS, DCS, SLDC etc. is included in the scope of bidder.
444	Volume-II-1	CONTROL PHILOSOPHY FOR CPP DOCUMENT NO.: TCE.12416A-EL-4005-CP-40055	GCP, SCAP, 66 kV ECP, 230 kV ECP, ECS, GT Control System, CPP DCS	-	Please confirm if GCP, SCAP, 66 kV ECP, 230 kV ECP, ECS, GT Control System, CPP DCS is included in scope.	66kV ECP, 230kV ECP and SAS for 230kV and 66kV GIS are only included in bidder scope. GCP, SCAP, ECS, GT Control System, CPP DCS will be part of other's scope.
445	Volume-II-1	CONTROL PHILOSOPHY FOR CPP DOCUMENT NO.: TCE.12416A-EL-4005-CP-40055	SAS for CPP	-	Please confirm if SAS for CPP is included in scope.	SAS for GIS package is in bidder scope. SAS for CPP will be by others. Refer corrigendum--2, Sr. No. 32 for revised SAS architecture details for 66kV & 230kV GIS..
446	Volume-II-1	Section C7: Substation Automation System (SAS)	5.0 System Hardware	5.1 - Substation Controllers, Operator Workstations (OWS) and Engineering Workstation (EWS)	We shall provide EWS, OWS (as required) and redundant RTU which will work as Data Concentrator cum Gateway. Separate Station Controllers are not envisaged. Please confirm.	Comply to the tender requirement.
447	Volume-II-1	Section C7: Substation Automation System (SAS)	6.0 Software Structure	Necessary firewall shall be provided at suitable points in software to protect the system	We shall provide one firewall for Gateway data connectivity to 3rd party systems. Please confirm.	Comply to the tender requirement.
448	Volume-II-2	Synchronization of Generators with TANTRANSCO	-	Common SCAP panel mentioned above will be supplied and installed by others (i.e. GTG & HRSG package supplier).	We understand thet the enire SCAP panel is not in GIS LSTK biders scope of supply, it will be supplied and commissionied by others	Confirmed but necessary integration required with GIS is in the scope of bidder.
449	Volume-II-2	Synchronization of Generators with TANTRANSCO	-	The interfacing signals required between GTG or STG Generator Control Panel (GCP) and SCAP panel	kindly clarify this is also not in scope of GIS LSTK Bidder	Confirmed.
450	Volume-II-2	Synchronization of Generators with TANTRANSCO	3	Supply and installation of interconnecting cables and cable carrying system to SCAP with GCPs, GIS breakers is as follows:	We undestand that the interconnecting cable between GIS and SCAP panel will be done by others and it is not in GIS LSTK Bidders scope	Confirmed.
451	Volume-II-2	DOC. NO. TCE.12416A-EL-4005-CP-40055	5	CONTROL PHILOSOPHY FOR CPP 5.0 CONTROL & MONITORING SCHEME – EHV SYSTEM (230kV)	We understand that control and monitoring scheme for 230KV GIS shall be in GIS LSTK bidders scope. Kindly clarify	Confirmed.
452	Volume-II-2	DOC. NO. TCE.12416A-EL-4005-CP-40055	-	CONTROL PHILOSOPHY FOR CPP 5.0 CONTROL & MONITORING SCHEME – EHV SYSTEM (230kV) **230kV ECP**	Kindly clarify whether supply of ECP Panel is in scope of GIS LSTK Biidder or not.	Confirmed that supply, installation and commissioning of 230kV and 66kV ECP Panels is in scope of bidder.

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453	Volume-II-2	DOC. NO. TCE.12416A-EL-4005-CP-40055	-	Operation philosophy of 230kV System All incomer and outgoing breakers are provided with sync closing facility in 230kV ECP to avoid blind closing of breakers. All 230kV breakers such as incomer and outgoing are possible to close in dead bus condition alone. 6.0 CONTROL & MONITORING SCHEME – EHV SYSTEM (66kV)	We understand that control and monitoring scheme for 66KV GIS shall be in GIS LSTK bidders scope. Kindly clarify	Confirmed.
454	Volume-II-2	DOC. NO. TCE.12416A-EL-4005-CP-40055	-	CONTROL PHILOSOPHY FOR CPP CONTROL & MONITORING SCHEME – 66kv SYSTEM 66kV ECP	Kindly clarify whether supply of ECP Panel for 66KV GIS is in scope of GIS LSTK Biidder or not.	Confirmed that supply, installation and commissioning of 230kV and 66kV ECP Panels is in scope of bidder.
455	Volume-II-2	DOC. NO. TCE.12416A-EL-4005-CP-40055	-	7.0 CONTROL & MONITORING SCHEME – HV SYSTEM (6.6kV)	We undestand that any control and monitoring system for 6.6KV is not in scope of GIS LSTK Bidders scope . Kindly clariy	Hardwired control and monitoring system for 6.6KV, 415V as per Volume-II, part 2 of 4, Exhibit-9 is in the scope of bidder.
	Fire Fighting Protection					
456	Volume-II-1	Transformer NIFPS & HVWS system	-	NIFPS & High velocity water system	As confirmed during pre bid meeting we understands that NIFPS and HVWS system is in client scope . We are not considering any Nitrogen Injection Fire Protection system.	Bidder understanding is correct.
457	Volume-II-1	cable size and type	Clause 3.12 of Section C2	66kV cables	Please specify the cable size & number of runs for 66kV cables from - 1. GTR to 66kV GIS 2. STR to 66kV GIS (for both 22MVA & 31MVA) 3. DG TR to 66kV GIS 4. aux trafo to 66kV GIS	Bidder can follow the minimum size of cable as 630sq.mm. Cable sizing is in the scope of the bidder.
458	Volume-II-2	Tender layout	-	Scope of 66KV GIS buildings	Kindly confirm the scope of 66kV GIS building	For detailed scope, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical and Section C3 Scope matrix Civil.
459	Volume-II-2	Tender layout	-	-	Kindly confirm the location of EMDG aux trafo.	For location of Emergency DG transformer, refer Volume-II, Part 2 of 4, Exhibit-11, plot plan.
460	Volume-II-2	SLD for 220KV & 66KV GIS	-	Feeder Details	As per tender SLD, outgoing feeder to s/s-16 is in GIS LSTK contractor' scope. Please specify the details of the feeders inlcuding cable size type, route length etc.	Supply, Laying, termination of 66kV Cables on both ends of CPP auxiliary transformers (2Nos), CPP DG transformers (2Nos), CPP GTGs/STGs generator transformers (7Nos), grid transformers (2Nos) to 66KV GIS Switchgear along with their outdoor LAs, isolators, cable sealing ends, cable termination kits are in bidder scope. Supply and installation of cable termination kits at 66kV GIS side for other 66KV outgoing refinery feeders are in bidder scope. For detailed cable tray routing layout, refer Volume-II, Part 2 of 4, Exhibit-10 to 12. Note: S/S-16 refers to CPP auxiliary transformers.
461	Volume-II-2	SLD for 220KV & 66KV GIS	-	415V LT Switchgear scope	As per technical specifications, 415V ACDB present in 66kV GIS building is to be fed from PCC. We understand that incomer supply to 415V ACDB shall be made available to contractor and our scope starts from ACDB panel.	Bidder understanding is not correct and scope includes incomer cables also, For detailed scope, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical.
462	Volume-II-2	Scope of GIS LSTK Bidder	-	220V DCDB scope	As per technical specifications, 220V DCDB present in 66kV GIS building is to be fed from Stg Elec Building. We understand that incomer supply to 220V DCDB shall be made available to contractor and our scope starts from DCDB panel.	Bidder understanding is not correct and scope includes incomer cables also, For detailed scope, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical.
463	Volume-II-2	Scope of GIS LSTK Bidder	-	110V DC & 220V DC suply scope	We understand that 220V DC is required for critical lighting and for control circuits , 110V DC supply is required. Kindly confirm.	Confirmed.
464	Volume-II-2	Scope of GIS LSTK Bidder	-	UPS system scope	As per technical specifications, 110V UPS sub DB present in 66kV GIS building is to be fed from UPS DB present in control room. We understand that incomer supply to 110V UPS sub DB shall be made available to contractor and our scope starts from 110V UPS sub DB panel.	Bidder understanding is not correct and scope includes incomer cables also, For detailed scope, refer Volume -II, part 1 of 4, Section C2 - Scope Matrix Electrical.
465	Volume-II-2	Scope of GIS LSTK Bidder	-	Battery charger and 110V DC system including DCDB scope	110V DC system including battery, battery charger and DCDB is under present scope of works. Please confirm.	Confirmed.

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466	Volume-II-2	Scope of GIS LSTK Bidder	-	Critical load details	As per specifications, all critical loads to be fed from 110V UPS ACDB. We understand that single phase AC supply required for panel heating & illumination in case of control & relay panel, RTCC panel, fire fighting panel etc shall be considered as non-critical. Kindly confirm.	Confirmed.
467	Volume-II-2	Scope of GIS LSTK Bidder	-	Earthmat quantities	Kinldy confirm if MS strip of appropriate size can be used for below ground earthmat & below ground risers.	Follow tender requirement.
468	Volume-II-2	Scope of GIS LSTK Bidder	-	Soil resistivity details	Please provide the soil resistivity for earthmat sizing calculation for the substation.	For soil investigation report, refer Volume -II, part 4 of 4.
469	Volume-II-2	Scope of GIS LSTK Bidder	-	Scope of 220KV & 66KV Building	Please clarify the scope fo 6.6kV system for 230kV GIS building.	Scope of 6.6kV system at 230kV GIS is for 230kV GIS auxiliary power supply as per Key SLD (Volume-II, Part 2 of 4, Exhibit-1).
	Site visit and observation points					
470	-	Site visits observation	-	Approach road to 230kv proposed land	We undrstand that CPCL is planning for 5 entry gates but location not finalized. In one of the location filling to approx 2-3 Mtrs required for making approach road (3-4 Mtrs) from Govt road to boundary wall. The current approach road is very narrow for material movement especially power transformer and GIS bays . kindly clarigy how to make movements of the vehicles	Suitable approach road will be provided during execution stage through refinery by owner.
471	-	Site visits observation	-	Construction water & electricity	We request CPCL to provide water and electricity for constructio work on noncharchable basis	Comply to the tender requirement
472	-	Site visits observation	-	Storage space – for construction material & supply materials	Pls confirm whether area is available for safe keeping of material at site and whether CPCL will provide land free of cost	Storage Space will be provided as per clause SCC clause No. 69.3 of Volume-I,
473	-	Site visits observation	-	Energy meter (Tariff) panel requirement at source end & space availability in that SS. Requirement of metering bay construction at source	We understand that Tafiff meter required for communication between source ad Remote station. GIS LSTK scope is limited only to supply tariff meter at CPCL end . Pls clarify	Bidder understanding is not correct. Supply of tariff meter at refinery end and TNEB feeding substation shall be part of bidder scope. Requirements of Transmission authorities shall be complied with without any additional costs.
474	-	Site visits observation	-	SAS signal requirement – for interfacing with SCAP system in CPP	We undestand that SCAP panel supply is in others scope ubut SAS system for both 230KV GIS and 66KV GIS Is in GIS LSTK bidders scope. Kindly clarify what all things to be considered in the SAS system for interconnnection with SACP panel	Bidder understanding is correct. For connection details between SCAP panel and SAS shall be referred in Exhibit.6 of Volume II.
475	-	Site visits observation	-	Signal transmiision at RLDC end	Pls provide details of existing panel at RLDC ad its location and what signals need to be transmiited to RLDC . Whether it is GIS LSTK Bidders scope	Bidder to supply, erect and commission the necessary RLDC communication equipment for both the substations (i.e. 230kV GIS refinery end and feeding substation remote end) in coordination with TNEB/TANTRANSCO as per their requirements.
476	-	Site visits observation	-	Construction of tower for Incoming lines from 230KV Grid	We understand that construction of Transmission towers is not in GIS LSTK bidders scope , it shall be done by CPCL or by some other agency Kindly clarify	Bidder understanding is correct.
477	-	Site visits observation	-	Spare items list	We have not found any details on the list of spares t be provided for 2230KV GIS, 66KV GIS or CRP SAS . Pls provide the list .	List of Mandatory spares can be referred from Volume-II, part 3 of 4, clause 6.1, ENGINEERING DESIGN BASIS ELECTRICAL (B416-999-16-50-EDB-1011).
478	-	Site visits observation	-	Cable Trench works	Pls provide details of cable trench works to be done which is under GIS LSTK Bidders scope.	Cable Trench routing is in bidder scope. Hence bidder can decide the cable trench routing and share the details for owner approval during detail engineering.
479	-	Site visits observation	-	Trench cover or concrete slab, Manholes requirement	Pls provide details what type of trench is to be constructed whether it is to be cover type or concrete slab type and also provide details of the manholes required.	For cable trench details refer Exhibit No. 13 of Volume II. However trench cover shall be concrete cover slab.
480	-	Site visits observation	-	pump house & FF material for switchyard or any source available from the existing pump	Pls clarify scope of Pump house and Fire Fighting scope. We understand that Fire fighting pump house is not in GIS LSTK Biddrs scope , it will be done by others.	Bidder understanding is correct.
481	-	Site visits observation	-	Capacity of EOT and Monorail & design of beam accordingly.	Span length , type of crane ad its requirement in both 230KV GIS and 66KV GIS hall is not clear Pls provide complete technical spec of type of crane required and span length details.	For crane details bidder to refer EOT crane data sheet.

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482	-	Site visits observation	-	False flooring / Epoxy paint / false ceiling requirement	Kindly clarify whether any room or GIS hall requires Epoxy paint or False flooring.pls provide detailed room wise requirement if any.	Bidder to provide cable cellar for 66kV GIS building. False flooring is not applicable for 66kV & 230kV GIS buildings. Epoxy paint shall be provided as per tender specification.
483	-	Site visits observation	-	Number of washroom requirement in the each building	Please provide details of the number of washroom required in each building	For GIS building details, refer Volume-II, Part 2 of 4, Exhibit-3, Electrical Equipment layout for 66kV main distribution & 230kV GIS.
484	Volume-II-1	Section C2: SCOPE MATRIX ELECTRICAL	3.36	Fire protection system for 230kV & 66kV GIS buildings	We understand that fire protection system for both 230kv GIS and 69KV GIS system along with for 100MVA Power Transformer is not in scope GIS LSTK Bidder. Kindly confirm	Bidder understanding is correct.
485	Volume-II-3	Section: 23 -CCTV	a. , (PG 244/1259)	Common Centralized video management system shall be provied for plant and surveillance	We understands the CCTV for the complete 2230KV & 69 KV GIS aalong with outdoor Transformer and 230KV Swicthyard area is not in GS LSTK Bidders scope.kindly confirm	Bidder understanding is correct.
486	Volume-II-3	4.16 AMBIENT AIR QUALITY MONITORING SYSTEM .	4.16 (pg-217/1259)	AMBIENT AIR QUALITY MONITORING SYSTEM .	We understand that ambient air quality monitoring system s not in scope of GIS LSTK Bidders scope . Kindly clarify	Bidder understanding is correct.
487	Volume-II-1(GCC)	GCC Document	-	Type test of Transformer	We will follow CAE guideslines for type test of transformer.	Acceptable.
488	Volume-II-1	Construction power	3.38 Scope Matrix Electrical	Construction Power subject to availability at site. In case provided by EPCM-4, same shall be on chargeable basis (charges indicated in commercial section Vol-I)	Pls provide the amount to be considered against construction power.	Construction power charges can be referred from Clause no. 69.2.4, Volume-I, SPECIAL CONDITIONS OF CONTRACTS.
489	Volume-II-1	EOT Crane	3.41Scope Matrix Electrical	EOT cranes and any other lifting devices (monorail) required for 230kV & 66kV GIS buildings	Pls provide the the ton of crane to be considered and also girder type (whether 5 ton or 7 ton to be considered)	1. 66kV GIS Building: 5 Ton EOT crane 2. 230kV GIS Building: 7.5 Ton EOT crane Girder type is already provided in datasheet
490	Volume-II-3	Approved make list of PLCC	Make list	Make list of items-EPABX SYSTEM	We find that only AGC Network and BPL system and projects are mentioned in approved make list. We will like to convey that we will provide bidder make EPABX and other items like DPC . Pls confirm	Details has to be provided by OEM and same shall be approved by Owner during detail engineering.
491	Volume-II-3	-	-	PLANT COMMUNICATION SYSTEM	We understand that Plant communication system is not in the scope of GIS LSTK Bidders.Pls confirm	Comply to the tender requirement.

ENGINEERING DESIGN BASIS
ELECTRICAL

JOB NO: **B416**

PROJECT: **9 MMTPA Cauvery Basin Refinery (CBR) Project at Nagapattinam, Tamilnadu, India**

CLIENT: **CHENNAI PETROLEUM CORPORATION LIMITED**

EIL SIGNATURE: parag 19/10/2021

CLIENT SIGNATURE: 25/10/21 25/10/21

Rev. No.	Date	Purpose	Prepared by	Reviewed by	Approved by
0	19/Oct/2021	Issued For Implementation	ROHIT KUMAR SINGH	RAMAN SOOD	PARAG GUPTA
A	27/May/2021	Issued For Comments	ROHIT KUMAR	RAMAN SOOD	PARAG GUPTA

Legend: ***Bold Italic*** text denotes change with respect to previous revision.

Table of Contents

1.0 SCOPE

This electrical design basis defines the design requirements agreed by owner/clients in addition to EIL standard design philosophy for electrical facilities no. 6-51-0099 Rev no. 7.
In case of any conflict between statutory requirements, this design basis and standard design philosophy, the most stringent requirement shall govern.

2.0 ABBREVIATIONS, CODES & STANDARDS / PUBLICATIONS

2.1 ABBREVIATIONS

Code	Description
AC	Alternating Current
ACB	Air Circuit Breaker
ACSR	Aluminium Conductor Steel Reinforced
AN	Air Natural
APFC	Automatic Power Factor Correction
ASB	Auxiliary Service Board
ATS	Auto Transfer Scheme
CB	Circuit Breaker
CBCT	Core Balance Current Transformer
CEA	Central Electricity Authority
CT	Current Transformer
DC	Direct Current
DCP	Data Concentrator Panel
DG	Diesel Generator
DGMS	Director General Mines Safety
DOL	Direct On Line
EHV	Extra High Voltage
ELCB	Earth Leakage Circuit Breaker
ELR	Earth Leakage Relay
EMPR	Electronic Motor Protection Relay
EPCC	Emergency Power Control Center
EPMCC	Emergency Power cum Motor Control Center
FBT	Fast Bus Transfer
FRLS	Flame Retardent Low Smoke
FS	Fire Survival
GI	Galvanised Iron
GIBD	Gas Insulated Bus Duct
GIS	Gas Insulated Switchgear
GTG	Gas Turbine Generator
HMI	Human Machine Interface
HV	High Voltage
IEC	International Electro-Technical Commission
IS	Indian Standard
LDB	Lighting Distribution Board
LV	Low Voltage
MCC	Motor Control Centre
MCCB	Moulded Case Circuit Breaker
MI	Mineral Insulated
MOV	Motor Operated Valve
MPCB	Motor Protection Circuit Breaker
MPR	Motor Protection Relay

Code	Description
MV	Medium Voltage
NA	Not Applicable
NGR	Neutral Grounding Resistor
NGT	Neutral Grounding Transformer
NIFPS	Nitrogen Injection Fire Protection System
OFAF	Oil Forced Air Forced
OLTC	On Load Tap Changer
ONAF	Oil Natural Air Forced
ONAN	Oil Natural Air Natural
PCC	Power Control Centre
PESO	Petroleum & Explosive Safety Organisation
PL	Power Limiting
PLC	Programmable Logic Control
PLCC	Power Line Carrier Communication
PMCC	Power Cum Motor Control Centre
PRP	Parallel Redundancy Protocol
PVC	Polyvinyl Chloride
RCC	Reinforce Cement Concrete
RSTP	Rapid Spanning Tree Protocol
SAS	Substation Automation System
SFU	Switch Fuse Unit
SPN	Single Phase & Neutral
SPV	Solar Photovoltaic
SR	Self Regulating
STG	Steam Turbine Generator
TP	Three Phase
TPN	Three Phase & Neutral
UPS	Uninterrupted Power Supply
VCB	Vacuum Circuit Breaker
VFD	Variable Frequency Drive
VT	Voltage Transformer
XLPE	Cross Link Poly Ethylene

2.2 CODES & STANDARDS / PUBLICATIONS

The main codes and standards, considered as minimum requirements, as applicable, are as follows -

S.No.	Description	Standards / Codes	Edition
1	IEEE recommended practice and requirements for harmonic control in electric power systems	IEEE-519	
2	Code of Practice for Electrical Wiring Installations	IS 732	
3	Outdoor type oil immersed distribution transformers up to and including 2 500 KVA,33kV - specification part 1 mineral oil immersed	IS-1180	
4	Code of practice for the fire safety of buildings - Electrical Installations.	IS-1646	

S.No.	Description	Standards / Codes	Edition
5	Code of practice for selection: installation and maintenance of automatic fire detection and alarm system.	IS-2189	
6	Code of practice for fire safety of industrial buildings - Electrical generating and distributing stations.	IS-3034	
7	Code of practice for Earthing.	IS-3043	
8	Code of practice for Interior Illumination: Part 1 General requirements and recommendations for welding interiors	IS-3646	
9	Insulation Coordination	IS/IEC-60071	
10	Code of practice for installation and maintenance of electrical equipment in mines	IS-4051	
11	Guide for safety procedures and practices in electrical work	IS-5216	
12	Classification of hazardous areas (other than mines) having flammable gases and vapours for electrical installations.	IS-5572	
13	Code of practice for Industrial Lighting.	IS-6665	
14	Guide for Control of undesirable static electricity.	IS-7689	
15	Guide for improvement of power factor - consumer's installations.	IS-7752	
16	Application guide for on load tap changers.	IS-8478	
17	Reference ambient temperature for electrical equipment	IS-9676	
18	Code of practice for selection, installation and maintenance of transformer.	IS-10028	
19	Code of practice for selection, installation and maintenance for switchgear and control gear.	IS-10118	
20	Voltage bands for electrical installations including preferred voltages and frequencies.	IS-12360	
21	Energy efficient induction motors-three phase squirrel cage	IS-12615	
22	Guide for short circuit calculations in three phase AC systems.	IS-13234	
23	Electrical apparatus for explosive gas atmospheres - General requirements.	IS/IEC 60079-0	
24	Equipment protection flameproof enclosures "d"	IS/IEC 60079-1	
25	Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"	IS/IEC 60079 : PART 2	

S.No.	Description	Standards / Codes	Edition
26	Electrical Apparatus for explosive gas atmospheres - Powder filling 'q'	IS/IEC 60079 : PART 5	
27	Electrical apparatus for explosive gas atmospheres - Oil immersion "o"	IS/IEC 60079 : PART 6	
28	Electrical apparatus for explosive gas atmospheres Increased safety type "e"	IS/IEC 60079 : PART 7	
29	Explosive Atmospheres Part 10 Classification of Areas Section 2 Combustible dust atmospheres	IS/IEC 60079 : PART10-2	
30	Explosive atmospheres: Part 11 equipment protection by intrinsic safety "i"	IS/IEC 60079 : PART 11	
31	Explosive Atmospheres: Electrical Installations Design, Selection and Erection	IS-16724/ IEC 60079 : PART 14	
32	Electrical apparatus for explosive gas atmosphere -Part-15 Construction, test and marking of type of protection "n" electrical apparatus	IS/IEC 60079 : PART 15	
33	Explosive atmospheres: Part 18 equipment protection by encapsulation "m"	IS/IEC 60079 : PART 18	
34	Material characteristics for gas and vapour classifications - section 1 - Test methods and data	IS/IEC 60079 : PART 20-1	
35	Explosive Atmospheres Part 30 Electrical Resistance Trace Heating Section 1 General and testing requirements	IS/IEC 60079 : PART 30	
36	Explosive atmospheres: Part 31 equipment dust ignition protection by enclosure "t"	IS/IEC 60079 : PART 31	
37	Code of practice for the protection of buildings and allied structures against lightning.	IS/IEC- 62305	
38	Recommended practices on static electricity	OISD-RP-110	
39	Classification of Area for electrical installation at Hydrocarbon Processing and handling facilities	OISD STD-113	
40	Inspection and safe practices during electrical installation	OISD-RP-147	
41	Design aspects for safety in electrical systems	OISD-RP-149	
42	Fire Protection System for Electrical Installations	OISD STD 173	
43	Lightning Protection	OISD-GDN-180	
44	National Electrical Code (NEC) - BIS Publication.	SP-30	
45	Power transformers	IS-2026	

3.0 GENERAL / DESIGN CONSIDERATIONS

S.No.	Project Philosophy
1	LV - Low Voltage. The voltage which does not normally exceed 250 V.
2	MV - Medium Voltage. The voltage which normally exceeds 250 V and does not exceed 650 V.
3	HV - High Voltage. The voltage which normally exceeds 650 V but does not exceed 33 kV.
4	EHV - Extra High Voltage. The voltage which exceeds 33 kV under normal condition.
5	"GI Canopy shall be provided for all outdoor equipment except transformers and Capacitor Banks."
6	Circuit breaker provided for PCC/ EPCC/ MCC/ ASB/ LDB/ ELDB and HVAC switchboard incomers and bus-coupler shall be 4 Pole type.

4.0 SPECIFIC DESIGN REQUIREMENTS

S.No.	Project Philosophy
1	The Electrical Switchgear/Switchboard for various voltages shall be suitable for below fault level - 66 KV : 40KA for 3sec , - 6.6 KV : 40KA for 3sec , - 0.415 KV : 65KA for 1sec
2	HV & MV switchgears shall be designed with 20% spare feeders philosophy (including DC system and UPS ACDB)
3	The re-acceleration scheme/logic shall be provided in all process unit motor feeders with facility to enable or disable the feature at site. (except for motor fed from AC and pressurization switchgears)
4	For all switchboard/switchgear breaker feeder control circuits, the tap-off circuit from main switchboard DC control bus to respective feeder numerical relay and tripping circuit shall be separately provided (independent of any other control supply tap-off for feeder).

5.0 OWNER / CLIENT SPECIFIC REQUIREMENTS

5.1 SITE CONDITIONS

S.No.	Description	Selected Option	Available Options
1	Equipment design temperature	45 DEG C	a)40 DEG C b)45 DEG C c)50 DEG C d)Any other
2	Relative humidity	80% at 45 DEG C	
3	Soil Resistivity	As per soil investigation report	
4	Minimum temperature. for battery sizing	10 DEG C	a)10 DEG C b)20 DEG C c)Any other
5	Minimum temperature For Electric heat tracing	As per process datasheet	

S.No.	Description	Selected Option	Available Options
6	Altitude above mean sea level	Less than 1000m above MSL	a)Less than 1000m above MSL b)Any Other
7	Maximum temp	45 DEG C	
8	Minimum temp	18 DEG C	
9	Pollution level for outdoor equipment	Very Heavy	a)Light b)Medium c)Heavy d)Very heavy

5.2 POWER SOURCE DETAILS

S.No.	Description	Selected Option	Available Options
1	Power System	Grid Supply with CPP	a)Grid Supply b)In house CPP c)Grid supply with CPP d)Existing electrical system
2	Grid Supply	Yes, Grid Supply in parallel with CPP	a)Yes b)No (Below Clause is not applicable)
2.1	Name of sub station	#	
2.2	Number of feeders	Later	
2.3	Length of feeder	Later	
2.4	Type /size of conductor/ cable size	# __ sqmm	
2.5	Voltage	230kV± 12.5% *	
2.6	Frequency	50 Hz ± 3 % *	
2.7	Maximum fault level		
2.7.1	3 Phase fault	* kA, sec.	
2.7.2	1 Phase fault	* kA, sec.	
2.7.3	X/R Ratio	*	
2.8	Minimum fault level	* kA, sec.	
2.9	Design fault level	* kA	
2.10	Basic Insulation Level	* kV	
2.11	System neutral Earthing	* SOLID GROUND	
2.12	Parallel operation of incomers	# Yes	a)YES b)NO
2.14	PLCC requirement	* Yes	a)YES b)NO
3	CPP and its configuration		
3.1	Type of Generator	STG/GTG	a)STG b)GTG
3.1.1	Number of Generators	4 Nos GTG & 3 Nos STG (Refer CPP design basis)	
3.1.2	Rating of Generator/Voltage/P.f	GTG- 11KV, 0.8 & STG-11KV, 0.8 (Refer CPP design basis)	
3.1.3	Requirement of Generator Circuit Breaker	No #	a)YES b)NO
3.2	Parallel operation with grid	Yes	a)YES b)NO

S.No.	Description	Selected Option	Available Options
3.3	Black Start DG Envisaged	Yes, (Refer CPP Design Basis)#	a)YES b)NO
3.4	Electricity duty metering	No *	a)YES b)NO
4	Existing System	NA	
4.1	Name of Substation		
4.2	Voltage rating		
4.3	Maximum fault level		
4.4	Design fault level		
4.5	System neutral earthing		
4.6	NGR rating (if applicable)		
5	Emergency generator	# Centralised	a)Centralised b)Distributed
5.1	Generator Voltage	# 6.6KV	a)6.6KV b)415V c)Any Other
5.2	Parallel operation with other sources	Momentary Paralleling	a)Momentary Paralleling b)Continuously Paralleling
5.3	Auto Starting	Yes	a)YES b)NO
5.4	Type of Emergency Generator	Diesel	a)Diesel b)Gas
6	Solar Power System		
6.1	Solar PV System	Not provided	a)Provided b)Not provided
6.2	Buildings on which solar power system to be mounted	NA	
6.3	Technology	NA	a)Silicon Crystalline Mono b)Silicon Crystalline Poly c)Silicon Crystalline (Mono/Poly)
6.4	Battery	NA	a)Provided b)Not Provided
6.5	Connectivity	NA	
6.6	Monitoring System	NA	a)Data logger based connection to SAS b)Internet web based with HMI

Note:-

* Data to be furnished/Confirmed by Client.
# To be decided during detail engineering.

5.3 POWER SUPPLY DISTRIBUTION SYSTEM

5.3.1 VOLTAGE AND FREQUENCY VARIATION

S.No.	Description	Selected Option	Available Options
1	AC System		

S.No.	Description	Selected Option	Available Options
1.1	Voltage	230KV ± 12.5% & 66kV/6.6kV/415V ± 10%	a) 11kV/6.6kV/415V ± 10% b) 33kV/6.6kV/415V ± 10% c) 66kV/6.6kV/415V ± 10% d) 66kV/11kV/415V ± 10% e) Other
1.2	Frequency	50 Hz ± 3%	a)50 Hz ± 3% b)60 Hz ± 3%
2	DC System		
2.1	Electrical protection and Control system	110V ± 10%	a)220V ± 10% b)110V ± 10%
2.2	DC critical Lighting system	220V ± 10%	a)220V ± 10% b)110V ± 10%
2.3	Instrumentation Power Supplies	Refer Instrumentation Design Basis	

Note:
Refer section 5.6.10 of this document for design voltage/frequency variation for motors.

5.3.2 UTILISATION VOLTAGE

S.No.	Description	Selected Option	Available Options
1	Primary EHV/HV distribution voltage	66kV	a)33kV b)66kV c)11kV d)Any other
2	Secondary HV distribution voltage	6.6kV	a)11kV b)6.6kV c)3.3kV d)Any Other
3	Primary EHV/HV distribution system neutral Earthing	Solidly Earthed	a)Solidly Earthed b)NGR c)Unearthed
4	Secondary HV distribution system Neutral Earthing	NGR	
5	HV motor voltage for DOL	6.6kV (For motors rating > 160kW)	
6	MV motor voltage	415 V AC (except VFD motor not having bypass)(For motors rating 0.18<=kW<=160)	
7	AC Motors	240V AC (except MOVs) (For motors rating < 0.18kW)	
8	DC Motor	As per equipment supplier standard, Preferable 110V DC	
9	Motor operated valves	415V AC, TP	
10	Battery chargers incoming power supply	415V AC,TPN	
11	UPS System incoming power supply	415V AC,TPN	

S.No.	Description	Selected Option	Available Options
12	AC Lighting/Power Panels	415V AC,TPN	
13	Auxiliary Boards incoming power supply	415V AC,TPN	
14	Welding Receptacles	415V AC,TPN	
15	Electrical heaters	415V AC, TP	
16	Normal Lighting/Emergency Lighting	240V AC,SPN	
17	LAN UPS Output Voltage	240V AC,SPN	

Notes:-

Input power supply for VFD not having bypass up to 315kW shall be 415V AC and power supply for VFD above 315kW shall be 6.6kV rated voltage. However, power supply for VFDs with bypass up to 160kW shall be 415V and 6.6kV rated voltage above 160kW.

5.3.3 UTILISATION VOLTAGE FOR CRITICAL SUPPLIES

S.No.	Description	Selected Option	Available Options
1	Switchgear protection control power supply	110V DC	a)220V DC b)110V DC
2	Critical lighting power supply	220V DC	a)220V DC b)110V DC
3	Input power supply for Plant communication system	110V AC UPS (From dual redundant UPS)	a)240V AC SPN (With Dedicated battery back up) b)110V AC UPS
4	Input power supply Fire alarm system	240V AC SPN (With Dedicated battery back up)	a)240V AC SPN (With Dedicated battery back up) b)110V AC UPS
5	Power supply for electrical annunciation panel	NA	a)220V DC b)110V DC
6	Control supply for VFD/ Soft-Starter/ Thyristor Panel	110V AC UPS	a)110V DC b)220V DC c)110V AC UPS d)230V AC UPS
7	Normal Instrumentation power supply	Refer Instrumentation design basis	
8	Critical instrumentation power supply	Refer Instrumentation design basis	
9	Instrumentation Shut-down system power supply	Refer Instrumentation design basis	
10	DC system for lighting and switchgear control	Separate	a)Separate b)Common

NOTE-1 : SCAP shall be powered with 110V DC control supply

5.3.4 SYSTEM NEUTRAL EARTHING

S.No.	Description	Selected Option	Available Options
1	EHV System	Solid earthed	a)Solid earthed b)Resistance earthed

S.No.	Description	Selected Option	Available Options
2	HV System	Resistance earthed	a)Solid earthed b)Resistance earthed c)Unearthed
3	415V System	Solid earthed	a)Solid earthed b)Resistance earthed
4	GT/ST Generator with generator transformer	NGT	a)NGT b)NGR c)Solid earthed d)Unearthed
5	GT/ST Generator without generator transformer	NA	a)NGT b)NGR c)Solid earthed
6	Emergency Generator-HV System	NGR	a)NGT b)NGR c)Solid earthed
7	Emergency Generator-415V System	Solid earthed	a)Solid earthed b)Resistance earthed
8	NGR rating- HV System	600 A	
9	NGR rating- 415V System	NA	

5.3.5 OPERATING PHILOSOPHY

S.No.	Description	Selected Option	Remarks
1	Auto/Manual transfer at primary distribution voltage bus with momentary paralleling	NA	a)NA b)YES c)NO
2	Auto/Manual transfer at secondary distribution voltage bus with momentary paralleling	Yes	a)YES b)NO
2.1	Bus transfer scheme	Fast Bus Transfer	a)Fast b)Normal c)NA
3	Auto /Manual transfer at MV with momentary paralleling		
3.1	At PCC/EPC/EPMCC Level	YES, Fast Bus Transfer	a)YES b)NO c)OTHER
3.2	At MCC Level (In case ACB incomers and Bus couplers)	YES, Fast Bus Transfer	a)YES b)NO c)OTHER
3.3	At ASB/ LDB Level	No (Castel Key interlock)	a)YES b)NO c)OTHER
4	Continuous Parallel operation of Incomers		
4.1	Primary EHV/HV voltage	Yes	a)YES b)NO
4.2	Secondary HV voltage	No	a)YES b)NO
4.3	PCC/PMCC	No	a)YES b)NO
5	Power Factor Correction	Required	

S.No.	Description	Selected Option	Remarks
5.1	Power factor improvement capacitors- location	Main 66kV bus at CPP (as required) and 6.6kV buses in substation with APFC.	a)6.6kV bus b)415V c)Both 6.6kV & 415V d)Any other
5.2	Minimum P.F. to be maintained at Power Transformer Primary at respective sub-station	0.95 at substation power transformer primary & 0.9 at grid transformer primary	a)0.95 b)0.90
5.3	Monitoring at Power Transformer Primary at respective sub-station	Yes	a)YES b)NO
6	Load shedding	Yes	a)YES b)NO
6.1	Voltage level for Load Shedding	415V PCC incomers and above voltages (6.6kV & 66kV)	a) 66kV b) 33kV c) 11kV d) 6.6kV e) 0.415kV - PCC/PMCC incomer f) Any Other

5.4 CONTROL-PROTECTION - METERING

5.4.1 CONTROL PHILOSOPHY

S.No.	Description	Selected Option	Available Options
1	Location of Relays for Generator	Separate Relay and Control Panel	
2	Location of Relays for Outdoor Switchyard	NA	
3	Location of Protection relays for EHV/HV switchgear		
3.1	Primary voltage EHV/HV switch gear	Separate relay & Control panel for both 66kV & 230kV GIS	a)On switchgear b)Separate relay and control panel
3.2	Secondary Voltage HV switchgear	On switchgear	a)On switchgear b)Separate relay and control panel
4	EHV/HV Switchgear control		
4.1	Generator	Control Relay Panel / SCAP & ECS	a)Control Relay Panel b)SCAP c)ECS
4.2	Outdoor Switchyard	Control Relay Panel & from ECS (for breaker)	a)Control Relay Panel b)SCAP c)ECS (for breaker)
4.3	Primary voltage EHV/HV switch gear	Control Relay Panel for both 66kV & 230kV GIS	a)On switchgear b)SCAP (for breaker) c)Separate relay and control panel
4.4	Secondary Voltage HV switchgear	On switchgear	a)On switchgear b)Separate relay and control panel c)ECS

S.No.	Description	Selected Option	Available Options
5	Numerical Protection/Monitoring system for		
5.1	Generators	Yes	a)YES b)NO
5.2	EHV system	Yes	a)YES b)NO
5.3	HV Switchboard	Yes	a)YES b)NO
5.4	PMCC/PCC	Yes	a)YES b)NO
5.5	MCC (for incomer and bus coupler having ACB)	Yes	a)YES b)NO
6	Control and logic through numerical relays	Yes	a)YES b)NO
7	Hardwired synchronization control panel-SCAP	Yes, Only for generators and generating Bus	a)YES b)NO
7.1	Synchronizing trolley required	Yes	a)YES b)NO
7.2	Type of Panel	Mosaic	a)Mosaic b)Simplex
7.3	Extent of Coverage on SCAP	For Synchronising Breakers only	
8	Type of annunciation panel	SCAP for generating switchboard & HMI for all other substation/ switchboards	a)HMI b)Part of SCAP
9	Load shedding panel	Part of ECS	a)Part of ECS b)Separate PLC c)Hardwired
10	Method of motor starting		
10.1	HV Motors	Direct on line (Note-1)	a)Direct on line (Note-1) b)Auto transformer c)Voltage Controlled Soft starter d)V/F Soft starter e)Dedicated transformer 2 MW and above
10.2	MV Motors	Direct on line	a)Direct on line b)V/F Soft starter c)Voltage Controlled Soft starter
11	Starting MVA limitation conditions for Motors		
11.1	HV Motors	To be decided during detailed engg.	
11.2	MV Motors	To be decided during detailed engg.	

Notes:

1. V/F controlled soft starter shall be considered for starting large HV motors if essential/unavoidable as per system design requirement/equipment design limitation based

on power system study.
2. Provision of laptop connectivity to the data concentrator / SAS system shall be provided in unmanned substation.
3. 230KV GIS/switchyard monitoring and status signals shall be replicated in SCAP panel at CPP substation/CR through separate FO interface.

5.4.2 POWER ISOLATION FOR TRANSFORMERS LOCATED REMOTELY AWAY FROM EHV/HV SUBSTATION

S.No.	Description	Selected Option	Available Options
1	Push button in transformer bay for tripping remote breaker	Yes (Push Button shall trip the local isolator breaker)	a)YES b)NO
2	Local Primary isolating breaker	Yes	a)YES b)NO
3	Protection relay required	Yes	a)YES b)NO

5.4.3 RELAY PROTECTION SYSTEM

5.4.3.1 PROTECTION DEVICES FOR POWER DISTRIBUTION SYSTEM

Protection devices for power distribution system shall be as indicated below -
(Figure inside bracket refers to note below)
(YES - Applicable)

S.No.	Relay Description	Relay No.	HV Transformer Feeder - Sec. Winding Volt=>3.3kv	HV Transformer Feeder - Sec. Winding Volt<=0.433kv	HV Motor Feeder	Outgoing Breaker Feeder - HV Plant Feeder	Outgoing Breaker Feeder - MV PCC/PMCC	Incomer - EHV/HV	Incomer - MV PCC/PMCC
1	IDMTL over-current relay	51	YES	YES	-	YES	YES	YES (1)	YES
2	IDMTL earth-fault relay	51N	YES(4)	YES	-	YES	YES	YES (1)	YES
3	51G backup earth-fault relay (Earthed neutral)	51G(11)	YES(23)	YES(23)	-	-	-	-	-
4	Motor protection relay with (50, 50N,46, 49, 50L/R,86,95)	99	-	-	YES(3)	-	YES(3)	-	-
5	Instantaneous restricted earth-fault relay (Earthed side)	64R(11)	-	-	-	-	-	YES(24)	YES(24)
6	Instantaneous over-current relay	50	YES	YES	-	-	-	-	-
7	Instantaneous earth-fault relay	50N	YES(2)	YES	-	-	-	-	-

S.No.	Relay Description	Relay No.	HV Transformer Feeder - Sec. Winding Volt=>3.3kv	HV Transformer Feeder - Sec. Winding Volt<=0.433kv	HV Motor Feeder	Outgoing Breaker Feeder - HV Plant Feeder	Outgoing Breaker Feeder - MV PCC/PMCC	Incomer - EHV/HV	Incomer - MV PCC/PMCC
8	Differential protection relay	87	YES(5)(16)	YES(16)	YES(6)(16)	YES(7)(16)	-	YES(16)	-
9	High speed tripping relay	86(20)	YES	YES	YES(21)	YES	YES(21)	YES	YES
10	Trip circuit supervision relay	95(20)	YES	YES	YES	YES	YES	YES	YES
11	Transformer auxiliary relay	63	YES	YES	-	-	-	-	-
12	Under-voltage relay with timer	27/2	-	-	YES(14)	-	YES (14)(FOR BREAKER CONTROLLED MOTOR FEEDERS)	YES(9)	YES(9)
13	Check synchronisation relay	25	-	-	-	-	-	YES(10)	YES(10)

5.4.3.2 POWER GENERATION AND EXTERNAL POWER SUPPLY

Minimum protection relays for Synchronous generator (GTG/STG/HV DG), generator transformer Grid power supply incomer and Synchronous motors shall be as follows:
(YES - Applicable)

S.No.	Relay Description	NEMA Code	Generator	Generator Transformer	EHV Incomer	EHV Transformer	Syn. Motor
1	Distance protection	21	YES		YES		
2	Synchronous check	25	YES(27)	YES	YES		
3	Under voltage with timer	27	YES		YES		YES

S.No.	Relay Description	NEMA Code	Generator	Generator Transformer	EHV Incomer	EHV Transformer	Syn. Motor
4	Reverse power	32	YES				YES
5	Low power flow	37	YES				
6	Loss of excitation	40	YES				YES
7	Negative sequence	46	YES				YES
8	Over current	50				YES	YES
9	Earth fault relay	50N				YES	YES
10	Over current	51			YES	YES	
11	Voltage restrained	51V	YES	YES			
12	Earth Fault back up	51G	YES	YES		YES	
13	Over current E/F	51N		YES	YES	YES	
14	Over voltage with timer	59	YES		YES		YES
15	VT failure	60	YES				YES
16	Auxiliary relay for transformer	63TX		YES		YES	
17	Transformer Restricted Earth Fault	64R	YES(26)	YES		YES	
18	Stator back up earth fault	64G	YES				
19	Generator Rotor Earth fault	64R	YES				YES
20	Directional O/C	67			YES		
21	Directional E/F	67N			YES		
22	Under frequency and df/dt	81	YES		YES		YES
23	Tripping relay	86	YES	YES	YES	YES	YES
24	Gen differential	87G	YES				
25	Gen and Transformer differential	87GT		YES			
26	Transformer differential	87T		YES		YES	

S.No.	Relay Description	NEMA Code	Generator	Generator Transformer	EHV Incomer	EHV Transformer	Syn. Motor
27	Feeder differential	87F				YES	
28	Bus bar differential and check	87B/ 87CH		YES			
29	Trip circuit supervision	95	YES	YES	YES	YES	
30	Dead bus charging relay	98	YES(27)	YES	YES		
31	Over fluxing	99	YES	YES(28)			
32	Out of step	78	YES				YES
33	Thermal overload relay	49G	YES				
34	Local breaker backup protection	50LBB	YES		YES	YES	

5.4.3.3 RELAY PROTECTION PHILOSOPHY

S.No.	Project Philosophy
1	In case of HV/EHV switchboards with continuous parallel operation of incomers, following additional relays shall be provided: a. One set of 87B (Bus differential) and 95 B (Bus wire supervision) for each bus section. b. 67 and 67N (Directional IDMTL over current and earth fault) relays for the incomers.
2	Instantaneous earth fault (50N) shall be provided only for transformer with delta primary.
3	For breaker fed motor feeders. Relay 50 shall not be provided for contactor controlled feeders.
4	Directional IDMTL earth fault (67N) shall be provided for transformer with star primary.
5	For transformers rated 5 MVA and above.
6	For motors rated 1500 kW and above, excluding VFD fed motors.
7	For critical/long feeders and plant feeders connected to main power generation and distribution bus. A plant feeder implies outgoing feeders from one switchboard to another switchboard of same voltage level.
8	Trip circuit supervision relay 95 shall be provided as part of the numerical relay for HV/ MV feeders wherever numerical relays are provided.
9	Wherever auto-transfer feature is provided
10	For switchgears where continuous or momentary paralleling of Incomers is envisaged, check synchronising relay shall be provided.
11	51G and 64R relays for input transformer of VFD system shall be decided by VFD Manufacturer.
12	The bus tie feeders in HV switchboards shall be provided with 51, 51N, 86 and 95 relays.

S.No.	Project Philosophy
13	HV capacitor bank feeders shall be provided with 51, 51N, 59 (over voltage), 60 (Neutral displacement), 86 and 95 relays.
14	The following feeders shall be provided with timers for delayed tripping on bus under voltage while the under voltage relay shall be common for the bus a. HV and MV capacitor feeders b. HV and MV breaker controlled motor feeders c. Contactor controlled motor feeders with DC control supply. Numerical relays where ever provided for motor and capacitor feeders shall use in built under voltage relay and timer for delayed tripping on bus under voltage.
15	One no. DC supply supervision relay (80) shall be provided for each incoming DC supply to the switchboard.
16	One set of bus differential relays (87B) and bus wire supervision relay (95 B) for each bus section shall be provided for HV switchboards.
17	In case of numerical relays, all relays shall be comprehensive units including all protection, metering and control having communication protocol of IEC 61850.
18	Under voltage and over voltage function along with associated timer shall be part of the numerical relays.
19	FBT/ Auto changeover logic between Incomers and bus coupler shall be built in the numerical relay.
20	Trip circuit supervision relay (95) shall be part of numerical relay. However, tripping relays (86) shall be a separate electromechanical relay with one of its output wired to numerical relay for LED indication.
21	2 Nos. of 86 relays shall be considered for HV and MV breaker fed motors for ease of differentiating between process & electric trip. Additionally, one of the outputs of both process and electrical tripping relays shall be wired to numerical relay for LED indication. Process trip relay shall be self reset type with hand reset flag.
22	Breaker control switch shall be hardwired type.
23	Stand by earth fault relay 51G shall be provided.
24	Restricted earth fault relay 64R shall be provided for transformer rating >= 2.5 MVA in the incomer of switchboard fed from transformers.
25	Relay 51V voltage controlled over current relay shall be provided on specific requirement considering the rating of the outgoing feeders with respect to the Incomer rating. Generally this relay shall be provided wherever CT primary current of outgoing feeders is exceeding 40% of the CT primary current of the Incomer.
26	415V DG set shall be provided with protection but not limited to 51V,51G,40,46,86,95,80,64R etc for generator rated above 500KVA and Generator rated less than 500KVA shall have 51V,51G,40,46,86,95,80 unless otherwise agreed with the owner.
27	For directly connected generator.
28	For large transformer as per manufacturer's standard.
29	Relay 87 and 64R shall be numerical relay and shall not be part of main comprehensive numerical relay. CT for 87 and 64R can be clubbed, as two core of single CT.
30	Stabilizing resistor shall be provided in residual earth fault connection for all motors and transformers even in case of numerical relay to avoid spurious tripping during start up.

S.No.	Project Philosophy
31	Feeder differential relay shall be connected with optical fibre cable for communication between two relays.
32	The Upstream source breaker shall be tripped on actuation of any of the relay functions 64R/87T/87L/63TX.

Notes:

A. Feeder differential numerical relays for plant feeders along with associated single mode FO cable end termination accessories (i.e. Pigtails, Splicer, end connectors, patch cords, LIU etc.) for both source and destination substations to be provided by source substation EPCM consultant. The feeder differential relay and accessories shall be free issued by source substation EPCM consultant to destination substation EPCM consultant.

5.4.4 METERING

5.4.4.1 METERING DEVICES IN EHV, HV AND MV SWITCHBOARDS

The metering devices in EHV, HV and MV switchboards shall be as below:
Type of metering : Analogue/As part of the Numerical relay

(Figure inside bracket refers to note below) (YES - Applicable)

S.No.	Feeder Type	A	V	Hz	PF	MW	MWH	HM	MVAR	MVAH	MVA
1	Grid Incomers	YES	YES	YES	YES	YES(2)	YES	-	YES(2)	YES(2)	YES(1,2)
2	Grid Bus Tie	YES									
3	Grid Transformer	YES				YES	YES				
4	Grid Bus P.T.		YES								
5	EHV/HV Incomer	YES	YES	YES	YES	YES	YES	-	YES	YES	YES
6	EHV/HV Bus Tie	YES	-	-	-	-	-	-	-	-	-
7	EHV/HV Transformer	YES	-	-	-	YES	YES	-	-	-	-
8	EHV/HV Bus P.T.	-	YES	-	-	-	-	-	-	-	-

S.No.	Feeder Type	A	V	Hz	PF	MW	MWH	HM	MVAR	MVAH	MVA
9	EHV/HV Plant Feeder	YES	-	-	-	-	YES	-	-	-	-
10	EHV/HV Motor	YES	-	-	-	-	YES(kWh)	YES	-	-	-
11	EHV/HV Capacitor	YES	YES	-	-	-	-	-	YES	-	-
12	PCC/PMCC Incomer	YES	YES	-	YES	-	YES(kWH)	-	-	-	-
13	PCC/PMCC Bus Tie	YES	-	-	-	-	-	-	-	-	-
14	PCC Bus P.T.	-	YES	-	-	-	-	-	-	-	-
15	ACB Outgoing (Non motor)	YES	-	-	-	-	YES(kWh)	-	-	-	-
16	MV Motor (>55kW)	YES	-	-	-	-	-	YES	-	-	-
17	MCC/ASB Incomer	YES	YES	-	-	-	-	-	-	-	-
18	MCCB/SFU O/G(250A)	YES	-	-	-	-	YES(kWh)	-	-	-	-
19	LDB Incomer	YES	YES	-	-	-	YES(kWh)	-	-	-	-
20	DG Set-MV	YES	YES	YES	YES	YES(kW)	YES(kWh)	YES	-	-	-

Notes:
1. MVA meter in EHV external power supply Incomers shall include maximum demand indication also.
2. Separate MW, MVAR, MVA and MVAH meters shall be provided for EHV external power supply Incomers only.
3. Seperate 3 nos. voltmeter and 3 nos. ammeter shall be provided for EHV external power supply incomers.
4. All metering shall be provided through numerical relay in case respective switchboard is having numerical relay.
5. Field ammeters are to be provided for all motors above 5.5 kW.
6. Wherever MWH meters are specified in the table, the meter shall be a multifunction meter suitable for data connectivity with HMI/SAS system.
7. Separate analogue meters shall be provided for below mentioned feeders, besides metering facility available in numerical relay
7.1 Incomers & Bus couple/bus tie of EHV, HV & MV Boards : "V & A"
7.2 EHV, HV, MV breaker feeders & all MV motor feeders above 5.5KW - "A"
7.3 EHV, HV & MV-PCC incomer feeders - "Digital multifunction meter".

5.4.4.2 METERING FOR GENERATOR AND GENERATOR TRANSFORMER

S.No.	Meter	HV Generator	Generator transformer
1	Ammeter (3 nos.)	YES	YES
2	Voltmeter (3 nos.)	YES	YES
3	MW meter	YES	YES
4	MVAR meter	YES	
5	MVA meter	YES	
6	MWH meter	YES	YES
7	MVARH meter	YES	
8	Power factor	YES	YES
9	Frequency meter	YES	

5.5 SUBSTATION DESIGN

5.5.1 SUBSTATION AUTOMATION SYSTEM

S.No.	Description	Selected Option	Available Options
1	Substation Automation System (SAS)	Required	
2	Communication protocol for relay network	IEC 61850	a)IEC 61850 b)open protocol
3	System architecture	IEC 61850 RSTP	a)IEC 61850 RSTP b)IEC 61850 PRP c)Redundant architecture for other open protocols
4	Data concentrator for SAS	Required (Common for HV and MV system)	a)Required b)Not Required
5	Communication with other devices		
5.1	Communication with ECS	Yes	
5.1.1	Protocol for communication with ECS	IEC 61850	a)IEC 61850 b)Modbus
5.2	Communication with DCS	Part of data concentrator	a)Part of data concentrator b)Part of ECS RTU c)No d)Part of ethernet switch
5.2.1	Communication with DCS-HV Switchboard	Part of data concentrator	a)Part of data concentrator b)Part of ECS RTU c)No d)Part of ethernet switch
5.2.2	Communication with DCS-PCC/PMCC	Part of data concentrator	a)Part of data concentrator b)Part of ECS RTU c)No d)Part of ethernet switch

S.No.	Description	Selected Option	Available Options
5.2.3	Communication with DCS-Conventional MCC	NA	a)Part of data concentrator b)Part of ECS RTU c)No d)Part of ethernet switch
5.2.4	Communication with DCS-Intelligent MCC	Part of data concentrator (communicable motor protection relays in MCC)	a)Part of data concentrator b)Part of ECS RTU c)No d)Part of ethernet switch
5.2.5	Protocol for communication with DCS	Modbus TCP/IP (Redundant connection)	
5.3	Communication with VFD & UPS	Part of data concentrator	a)Part of data concentrator b)Part of ECS RTU c)No d)Part of ethernet switch
5.3.1	Protocol for communication with VFD & UPS	Modbus TCP/IP / Modbus RTU	
6	HMI for SAS	Operator Cum Engineering Workstation	a)not required b)operator cum engineering workstation c)1 operator & 1 engineering workstation
7	Laptop	Common for HV & MV for each substation	a)not required b)common for HV & MV for each substation c)seperate for HV & MV for each substation
8	Local storage of data	Part of SAS HMI & data concentrator	a)not required (part of ECS) b)part of HMI c)part of data concentrator
9	Relay parameterization	SAS HMI	a)SAS HMI b)ECS HMI

Notes:

1. The display and data storage of communicable motor protection relay provided in MCC shall be limited to SAS system in respective substation (i.e shall not be communicated to ECS system).
2. The Communicable motor protection relay provided for MV motors below 55KW shall be suitable for communication on Modbus TCP/IP protocol with data concentrator.

5.5.2 EHV OUTDOOR SWITCHYARD

S.No.	Description	Selected Option	Available Options
1	Type	Single Bus	
2	Type of bus	String bus	a)String bus b)Tubular bus

S.No.	Description	Selected Option	Available Options
3	Structure for outdoor	Galvanised	a)Galvanised b)Painted c)Not applicable
4	Bus material	ACSR	a)ACSR b)Aluminium

5.5.3 SUBSTATION FEATURES

S.No.	Description	EHV	HV	MV	MCC/Elec. Room
1	Elevated with trays in cable cellar	YES	YES	YES	NO
2	Raised with internal trenches	NO	NO	NO	YES
3	All top cable entry with trays below ceiling	NO	NO	NO	NO
4	Pressurisation against ingress of dust	NO	YES (NOTE-5)	YES(NOTE-5)	NO
5	Roof slab for				
5.1	Generator Transformer/ Tie transformer	NO	NO	NA	NA
5.2	Power transformer	YES	YES	NA	NA
5.3	Distribution transformer	NA	YES	YES	NA
6	Air conditioning with false ceiling of switchgear hall	YES (Note-3)	NO	NO	NO
7	EOT Crane in EHV GIS area	YES (Note-2)	NA	NA	NA
8	Lift for substation having 2 Switchgear room floors	YES	YES	YES	NA
9	Electrical maintenance room	YES	YES	NO	NA
10	Electrical store room	YES	YES	NO	NO
11	Separate room for Instrumentation RIO panels	NO	NO	NO	NA
12	Exhaust fans/Ventilation fans for Switchgear room	NO	NO	NO	YES

Note :

1. Column HV is defined as Sub-station having full fledged EHV/ HV switchboard.
2. EOT Crane is not envisaged for isolator breaker panels located inside substation building. Monorail shall be considered for GIS isolator.
3. Air conditioning shall be provided in 230KV and 66KV GIS halls, However False ceiling

shall not be envisaged for GIS hall where EHV GIS panels are located.
4. Air conditioning shall be provided in rooms housing RIO / UPS / VFD/ Soft-starter / battery Chargers / FA panels / data concentrator panels /SAS system / ECS panels & Operator/Technicians room etc in Substation.
5. All EHV & HV Substations shall be provided with operator cum technician room and rest room facilities.
6. All the loading bays of substations shall be provided with extended monorail for provision lifting equipment through manual chain hoist, with a clear height of atleast 5 metres.

5.5.4 SPECIFIC EQUIPMENT LOCATIONS

S.No.	Description	Selected Option	Available Options
1	Batteries in substation and control Rooms	Separate room	
2	Battery charger in substation	Air conditioned room	a)Air conditioned room b)Non air conditioned room
3	Battery charger in control room	NA	a)Air conditioned room b)Non air conditioned room
4	Variable speed drive panels	Air-conditioned room in substation	a)Air-conditioned room in substation b)SRR
5	Thyristor controlled panels	Air-conditioned room in substation	a)Air-conditioned room in substation b)SRR
6	UPS System	Air conditioned room in control room	
7	Lead-Acid and Nickel-Cadmium	Separate room	a)Separate room b)Common room
8	Location of VRLA battery	Air conditioned room	
9	Annunciation panel	NA, SAS HMI shall be located in Operator room in substation	
10	Lighting Transformers	Switchgear room	a)Switchgear room b)Separate transformer room
11	Neutralisation pit with drain from flooded battery room	Required	a) Required b) Not required

Notes:-

1. Battery room shall be preferably located in corner side at switchgear floor / cable cellar floor of the substation building.
2. Electrical equipment installed in battery room such as exhaust fan, lighting, receptacles shall be of flameproof construction and certified for gas group II-C classified locations. Heat detectors installed in battery room shall be of intrinsically safe type with zener barrier.

5.6 EQUIPMENT DESIGN

5.6.1 EHV DESIGN

5.6.1.1 EHV OUTDOOR SWITCHYARD

S.No.	Description	Selected Option	Available Options
1	Bus bar system	Single Bus	a) Single Bus b) Double Bus c) Main and Transfer Bus
2	Circuit breaker type	NA	
3	Isolator type	Centre rotating	a)Pantograph b)Semi Pantograph c)Centre rotating d)Centre break

5.6.1.2 EHV SWITCHBOARD

S.No.	Description	Selected Option	Available Options
1	Type of Switchgear	Gas Insulated	
2	Busbar	Double	a)Single b)Double
3	Circuit Breaker Type	SF6	
4	Local Control Cabinet	As per vendor standard design for 66KV & Separate free standing for 230KV GIS	a)Mounted on GIS b)Separate free standing c)As per vendor drawing

The section 5.6.1.2 is applicable for both 230KV and 66KV GIS

5.6.2 HV SWITCHBOARD

S.No.	Description	Selected Option	Available Options
1	Execution	Drawout	a)Drawout b)Fixed
2	Type of switchgear	Air Insulated	a)Air insulated b)Gas insulated
3	Bus bar	Single bus	a)Single bus b)Double bus
4	Circuit breaker type	VCB	a)SF6 b)VCB
5	Motor Control	Breaker	a)Breaker b)Vacuum contactor
6	Marshalling Cabinet	Part of HV Switchboard	a)Part of HV Switchboard b)Separate c)Not Applicable
7	Internal Arc Classification		
7.1	Short Circuit Current (kA)	40	a)40 b)25 c)Any Other
7.2	Duration (Second)	0.1	a) 0.1 b) 0.2 c) 0.5 d) 1.0 e) Other
8	No. of bus-coupler	One (& Two bus-couplers incase of three bus switchboard)	a)One b)Two c)Other
9	Thermography window	Yes	a)No b)Yes

S.No.	Description	Selected Option	Available Options
10	Online temperature monitoring system	No	a)No b)Yes

Notes:-

1. All HV motor feeders shall be provided with CBCT for sensitive earth fault protection in numerical relay.
2. HV motors feeders shall be provided with Directly connected type ammeter in anti-condensation heating circuit to motor.
3. Minimum rating of any HV switchgear busbar and incomer/bus-coupler shall be 1250A.

5.6.3 CURRENT TRANSFORMER (CT)/POTENTIAL TRANSFORMER (PT)

S.No.	Description	Selected Option	Available Options
1	CT Secondary		
1.1	General Protection	1A	
1.2	Special protection(87,64R ,51G etc)	1A	
1.3	Metering	1A for conventional and remote metering	
2	VT Secondary	110V AC	

5.6.4 TRANSFORMERS (POWER/DISTRIBUTION)

S.No.	Transformer	Voltage Ratio	Vector Group	Tap Changer	Cooling
1	Grid power transformer	230/66KV	YNyn0	OLTC	ONAN/ONAF
2	Generator transformer	11/69KV	YNd 11	Off-circuit	ONAN
3	Tie Transformer	NA	NA	NA	NA
4	Generator auxiliary transformer	NA	NA	NA	NA
5	Intermediate power transformer	66/6.9KV	Dyn 1	OLTC	ONAN/ONAF
6	Dedicated (e.g. for VFD)	As Reqd.	As Reqd.	Off-circuit	ONAN or AN
7	Distribution transformer (<= 2500 KVA)	6.6/0.433KV	Dyn 11	Off-circuit	ONAN

Note:
1) Provision of Oil Soak Pit & Oil Collection Pit for transformers shall be as follows:
a) Oil quantity <= 2000L: Not Required
b) 2000L < Oil Quantity <= 9000L: Soak Pit
c) Oil Quantity > 9000L: Soak Pit + Collection Pit

2)Fire fighting system for transformers having oil quantity greater than 2000 Litres shall be Nitrogen Injection Fire Protection System (NIFPS).

3) The detailed indicated for Grid transformer and generator transformer may undergo change during detail engg.

4) The Minimum rating of distribution transformer shall be 2MVA (except for emergency distribution transformers for emergency PCC/PMCC).

5.6.5 MV SWITCHBOARD

S.No.	Description	Selected Option	Available Options
1	PCC / PMCC		
1.1	Breaker panels	Drawout Single front	
1.2	Contactor feeders	Drawout Double front	a)Drawout Single Front b)Drawout Double front c)Fixed Single front
2	MCC	Drawout Double front	a)Drawout Single Front b)Drawout Double front c)Fixed Single front
3	ASB	Drawout Double front	a)Drawout Single Front b)Drawout Double front c)Fixed Single front
4	LDB	Drawout Double front	a)Drawout Single Front b)Drawout Double front c)Fixed Single front
5	Motors		
5.1	PMCC	Above 55 kW Up to 160 kW	
5.2	MCC	Up to 55 kW	
6	Switchboard for small package (AC system, Pressurisation system ,Bagging plant etc)		
6.1	Type	Compartmentalised Fixed type	a)Compartmentalised Fixed type b)Drawout type
6.2	Configuration	Two incomers without Bus coupler (Note-6)	a)Single incomers b)Two incomers without Bus coupler c)Two incomers with Bus coupler
7	Marshalling Cabinet	Part of MV Switchboard	a)Part of MV Switchboard b)Separate c)Not Applicable
8	Internal Arc Classification		
8.1	Short Circuit Current (kA)	65 kA	a)65 kA b)50 kA c)35 kA d)25 kA e)Any other
8.2	Duration (Second)	0.1	a)0.1 b)0.2 c)0.5 d)Any other

S.No.	Description	Selected Option	Available Options
9	Bus-bar material	Aluminium	a)Aluminium b)Copper c)Any other
10	Closed door operation required	No	a)Yes b)No
11	Type of cooling for switchboard (Note-2)	Natural	a)Natural b)Forced
12	Incomer & bus-coupler for MCC & ASB	ACB	a)ACB b)Heavy duty switch
13	Incomer & bus-coupler for LDB	MCCB	a)MCCB b)Heavy duty switch

Notes:

1. MCC and ASB rating shall be limited to 1250A.
2. Up to 4000A rating, forced cooling shall not be provided.
3. All MCC panels shall be drawout type only.
4. Every substation with PMCC shall have a dedicated ASB panel for welding receptacles and other non-critical power. ASB incomer shall be provided with ACB with numerical relay for immediate isolation of faults.
5. The Bagging plant MCC shall be provided with two incomers and bus-coupler configuration.

5.6.6 MEDIUM VOLTAGE MOTOR STARTER TYPE

S.No.	Description	Selected Option	Available Options
1	Contactor and switch fuse with overload relay	NA	
2	Contactor, switch fuse and overload relay with CBCT & ELR	NA	
3	Contactor and switch fuse with communicable motor protection relay	Upto 55KW	
4	Air circuit breaker with numerical motor protection relay	Above 55kW and up to 160kW	
5	Contactor and MPCB	NA	
6	Contactor, MCCB with CBCT & ELR	NA	
7	MCCB with contactor and communicable Motor Protection Relay	NA	
8	Contactor and MCCB with overload relay with CBCT & ELR	NA	
9	Contactor, MCCB with O/L Relay	NA	

Note:

1. Communicable motor protection relays shall be with earth fault & under voltage protection.

2. Communicable Motor Protection relay shall be able to communicate on Modbus TCP/IP.

5.6.7 MEDIUM VOLTAGE OUTGOING FEEDER TYPE

S.No.	Description	Selected Option	Available Options
1	MCCB and CBCT with ELR	NA	a)___A and up to ___A b)Not Applicable
2	Switch fuse	Up to 125A	
3	Switch fuse with Contactor and CBCT & ELR	above 125A and up to 400A	
4	MCCB with Contactor and CBCT & ELR	NA	a)___A and up to ___A b)Not Applicable
5	MCCB	NA	a)___A and up to ___A b)Not Applicable

5.6.8 MOTOR CONTROLS (AS PER PROCESS PACKAGE & OPERATING PHILOSOPHY)

S.No.	Description	Selected Option	Available Options
1	Auto/OFF/Manual switch	Control room	a)Near motor b)Switchgear c)Control room
2	Local/OFF/Remote switch	Near motor	a)Near motor b)Switchgear c)Control room
3	Process interlock (Note-1)	PLC	a)PLC b)Switchgear
4	Reacceleration equipment	Switchgear	a)PLC b)Switchgear

Notes:

1. To be made available at switchgear as per Instrumentation philosophy.

5.6.9 CONTROL SUPPLY VOLTAGE

S.No.	Description	Selected Option	Available Options
1	Breaker control	110V DC	a)220V DC b)110V DC
2	Breaker spring charging	110V DC	a)240V AC b)220V DC c)110V DC d)230V AC UPS
3	Contactor feeder	110V DC	a)240V AC b)220V DC c)110V DC d)230V AC UPS
4	Control supply for earth fault relay in contactor feeder	110V DC	a)240V AC b)220V DC c)110V DC d)230V AC UPS

S.No.	Description	Selected Option	Available Options
5	Control supply for contactor motor starter and contactor feeder	110V DC control supply shall be provided	a)Control Transformer common for each bus b)Tapping P-N of Respective Feeder c)Control transformer in individual DOL starter d)NA
6	MCCB/ MPCB shunt trip voltage	NA	a)220V DC b)110V DC c)240V AC

5.6.10 MOTORS

S.No.	Motors	High voltage	415 volts
1	Enclosure		
1.1	Indoor	IP55	IP55
1.2	Outdoor	IP55	IP55
2	Insulation class	F (Temp. Rise limited to B)	F (Temp. Rise limited to B)
3	Anti-condensation heater	Yes	22 kW and Above
4	Additional canopy (outdoor motors)	Yes	Yes
5	Design voltage variation	±10%	±10%
6	Design frequency variation	±3%	±3%
7	Combined voltage / frequency variation (Design)	±10 % Any combination of above	±10 % Any combination of above
8	Energy efficient IE motors	NA	IE-3

5.6.11 UPS SYSTEM

S.No.	Description	Selected Option	Available Options
1	Redundancy	100%	a)50% b)100%
2	Type of redundancy	Dual redundant (2 sets of single UPS with bypass & each with 100% battery backup)	a)Parallel redundant b)Hot standby c)Dual redundant
3	Back-up time	As per process requirement (minimum 30 mins)	a)30 minutes b)60 minutes c)120 minutes
5	Separate fault diagnostic unit (Note 1)	No	a)YES b)NO
6	Battery type	Ni-Cd	a)Ni-Cd b)Lead acid c)VRLA

S.No.	Description	Selected Option	Available Options
7	Battery configuration	2 x 100% configuration (100% for each set UPS with bypass)	a)(2 x 50% configuration) b)(2 x 100% configuration) c)(1 x 100% configuration)
8	UPS Output Supply	Single Phase	a)Single Phase b)Triple Phase
9	UPS Output Voltage	110V AC (Final voltage shall be as per Instrumentation Design Basis)	
10	ACDB outgoing feeder type	Switch fuse unit	a) Switch fuse unit b) MCCB c) MCB

Notes-

1. UPS Status/fault annunciations shall be wired to DCS in control room and HMI/SAS system in Electrical operator cum technician room in substation.
2. UPS for LAN system, CFAP of FA system, sub-station automation system (SAS) HMI and tank rim-seal fire protection system shall be non-redundant with bypass type with VRLA battery.
3. ACDB outgoing feeders feeding field instruments shall be provided with isolation transformers (with floating/ grounded neutral on secondary side) based on instrumentation requirement.
4. Downstream cables of UPS i.e. From UPS to ACDB and from ACDB to downstream loads, shall be copper cables.
5. Incoming supply to UPS shall be from SFUs and not from Contactor feeder.
6. Non-redundant UPS loads shall be supplied from a separate PDB cabinet which shall be fed from two ACDBs of dual redundant UPS, Intelligent static transfer switches (Semiconductor switch) with two input and one output shall be used at inlet of PDB.

5.6.12 COMMUNICATION SYSTEM

S.No.	Description	Selected Option	Available Options
1	Plant Communication System	Yes (note-1)	a)YES b)NO
2	Telephone System	Yes	a)YES b)NO c)Separate
3	Telephone system and plant Communication system	Separate	a)Separate b)Integrated
4	Interface of Communication system		
4.1	With fire alarm system	Yes	a)YES b)NO
4.2	With telephone system	Yes	a)YES b)NO
5	FLP Telephone for process units	Yes	a)YES b)NO
6	Telephone cable type (Outdoor)	Non Jelly filled	a)Non Jelly filled b)Jelly filled

1. 110V AC UPS supply shall be given to Plant communication exchange from UPS in SRR/CR.

5.6.13 FIRE DETECTION AND ALARM SYSTEM

S.No.	Description	Selected Option	Available Options
1	Type	Analogue addressable	a)Conventional b)Analogue addressable
2	Name of buildings to be provided with Detectors	Control room, sub-station, SRR, Administration building/office, other buildings as required.	
3	Detection System	Break Glass, Multi sensor detection, heat detector, Linear beam detector (if required)	
4	Type of manual call point	Without call back facility	a)With call back facility b)Without call back facility
5	Qty of Siren and location	During detail engineering	
6	Power supply for Siren	415V AC	a) 415V AC b) 110V AC UPS c) 240VAC
7	Siren range	5 Km(Diametrically)	a)5 Km(Diametrically) b)8 Km(Diametrically)
8	Response indicator for rooms and concealed area for Addressable Fire alarm system	Yes	a)YES b)NO c)Not Applicable
9	Detector type for battery room	Intrinsically safe-IIC	a)Flameproof b)Intrinsically safe-IIC

Notes :

1. LED Edge Lit glass type exit sign with direction and Run indication shall be provided for safe area buildings.
2.

5.6.14 DC SYSTEM

S.No.	Description	Selected Option	Available Options
1	Battery type		
1.1	Switchgear Protection Control and critical lighting	Ni-Cd	a)Lead acid b)Ni-Cd c)VRLA
1.2	Instrumentation System	NA	a)Lead acid b)Ni-Cd c)VRLA
1.3	Diesel Engine Starting	Lead Acid	
1.4	DC Motors	Lead Acid	a)Lead acid b)Ni-Cd c)VRLA
1.5	Fire alarm system	VRLA	
1.6	Telephone system	VRLA	
1.7	End Cell Voltage		
1.7.1	Lead Acid Battery	1.85 VOLT	

S.No.	Description	Selected Option	Available Options
1.7.2	VRLA Battery	1.75 VOLT	
1.7.3	Ni-Cd Battery	1.16 VOLT	
2	Battery backup time		
2.1	Switchgear Protection and Control	120 minutes	a)30 minutes b)60 minutes c)120 minutes
2.2	DC Critical lighting	120 minutes	a)30 minutes b)60 minutes c)120 minutes
2.3	Instrumentation	NA	a)30 minutes b)60 minutes c)120 minutes
2.4	Diesel Engine Starting	10 starts (FW pumps) & 6 starts (others)	
2.5	DC Motors	As per equipment manufacturer's recommendation	
3	Battery Configuration	2X50%	a)2X50% b)1X100%
4	DCDB outgoing feeder type	Switch fuse unit	a)Switch fuse unit b)MCCB c)MCB

5.6.15 VARIABLE FREQUENCY DRIVE

S.No.	Description	Selected Option	Available Options
1	By pass feature required	Yes(Note-1)	a)YES b)NO
2	VFD rated output voltage(in case bypass is not provided)		
2.1	MV Inverter	i) Motor kW rating upto 315kW at 415V ii) Motor kW rating above 315kW & up to 700kW at voltage up to 690V	
2.2	HV Inverter	Motor rating more than 700kW	

Notes:
1. Bypass for VFD shall be provided as a standard practice unless not recommended from Process or driven equipment operation point of view.
2. The IOCL's Reliability task force recommendation (section 8) shall be considered in selection of VFD. The same is attached as annexure to Electrical design basis.

5.6.16 CABLE SIZES

The power and control cables shall have the following minimum cross sectional areas

S.No.	Description	Selected Option	Available Options

S.No.	Description	Selected Option	Available Options
1	Medium voltage power cable	Refer Note-4 & 6	a)Above 16 sqmm (Aluminium) b)2.5 sqmm to 16 sqmm (Copper)
2	Control cables	2.5 sqmm (Copper) (Note-5)	
3	Lighting	2.5 sqmm (Copper)	
4	Communication system	0.9 mm dia. (Copper)	
5	Telephone System	0.5 mm dia. (Copper)	
6	Fire alarm system	1.5 sqmm (Copper)	

Notes:

1. For lighting inside the building, minimum 1.5 sqmm copper conductor, PVC/XLPE insulated wire shall be used in conduit system (for circuit and point wiring), with proper colour coding.
2. Cable sizes are indicative only and these shall be finalised as per the recommendations of the equipment manufacturer.
3. Special cable type and size shall be decided on specific requirement.
4. All power cables 2.5 sqmm to 16 sqmm shall be with copper conductor and above 16 sqmm shall be aluminium conductor.
5. Control cable shall be twisted pair, individual as well as overall screened/ shielded type. The conductor shall be stranded.
6. Medium voltage power cable for motors shall be minimum 4 sqmm (Copper).

5.6.17 BUS DUCT

S.No.	Description	Selected Option	Available Options
1	HV Bus Duct (Phase segregated type)	Conventional	a)Conventional b)Sandwich type c)Cast resin type
2	MV Bus Duct (Non-phase segregated type)	Conventional	a)Conventional b)Sandwich type c)Cast resin type

5.6.18 CAPACITOR BANK

S.No.	Description	Selected Option	Available Options
1	Voltage Level (kV)	6.6KV / 66KV	a)0.415KV b)6.6KV c)11KV d)Other
2	Location	Outdoor / Indoor (Note-1)	a)Outdoor b)Indoor
3	Type of series reactor	Oil filled / Dry type (Dry type for indoor)	a)Oil filled b)Dry Type
4	APFC Panel	Required, Indoor (Note-2)	a)Required (Indoor) b)Not Required c)Other

Notes:

1. The option of indoor type capacitor & indoor series reactor shall only be applicable for

6.6KV voltage.
2. APFC shall only be applicable for 6.6KV capacitor bank (not for 66KV).

5.7 CABLING SYSTEM

5.7.1 CABLE DETAILS

S.No.	Design Criteria	EHV	HV	415 volts
1	Loads located beyond 1 km	1C cable	1C / 3C cable	1C / 3C / 3.5C / 4C cable
2	Loads located 200-1000 m	1C cable	1C / 3C cable	1C / 3C / 3.5C / 4C cable
3	Loads located upto 200 m	1C cable	1C / 3C cable	1C / 3C / 3.5C / 4C cable
4	Loads beyond 1250A rating and located near the transformer	GIBD/ 1C cable	Bus duct /1C cable	Bus duct /1C /3.5C cable
5	Recommended limiting size of multi-core cable (sqmm)	NA	300	300
6	Short-circuit withstand time (seconds)	1.Incomer from transformer:1 2.Incomer from other switchboard:0.6 3.Plant feeder:0.6 4.Transformer feeder:0.2	1.Incomer from transformer:1 2.Incomer from other switchboard:0.6 3.Plant feeder:0.6 4.Motor/Transformer feeder:0.2 5.Capacitor feeder:0.4	Not Applicable
7	Insulation voltage grade	Earthed	Unearthed	Earthed
8	Type of cable insulation	XLPE	XLPE	XLPE
9	Fire survival (Resistant) cable for Fire proof MOV and NIFPS	NA	NA	Yes
10	Power Cable for Motors/MOV	NA	3 core	3 core
11	Cable Conductor	Copper	Copper/ Aluminium	Refer Cl. 5.6.16
12	Armouring	Un-armoured	Armoured	Armoured
13	Type of Moisture barrier	Corrugated Aluminium	NA	NA
14	Termination Type	Cold Shrink/ Hot Shrink/ Premoulded	Cold Shrink/ Hot Shrink	NA
15	Screen Bonding arrangement for single core cables	Single point or Cross bonding	NA	NA

*1C - 1 Core

1) All power cables for Electrical heat tracing shall be 4-Core of suitable size.

2) Fiber Optic cable wherever provided shall be armoured, single mode type and shall be laid inside Flame retardant HDPE duct/conduit.
3) Single point/cross bonding system can be provided for Single core EHV cables. Sheath voltage of the cables shall be limited to 65 V (as per IS 3043). For higher lengths cross bonding can be provided.

5.7.2 CABLE LUGS MATERIAL

S.No.	Description	Selected Option	Available Options
1	Copper conductor cable & copper bus bar/ terminals	Tinned Copper	a)Tinned Copper
2	Copper conductor cable & Aluminium bus bar/ terminals	Bi-metallic (Aluminium palm with Copper barrel)	a)Tinned Copper b)Bi-metallic (Aluminium palm with Copper barrel)
3	Aluminium conductor cable & Copper bus bar/ terminals	Bi-metallic (Aluminium barrel with Tinned Copper palm)	a)Bi-metallic (Aluminium barrel with Tinned Copper palm) b)Tinned Copper
4	Aluminium conductor cable & Aluminium bus bar/ terminals	Aluminium	a)Aluminium b)Tinned Copper

5.7.3 CABLE LAYING PHILOSOPHY

S.No.	Description	Selected Option	Remarks
1	Process area where pipe-rack/sleeper is available	Above ground cable tray	a)Above ground cable tray b)RCC Trench
2	Process area where pipe-racks/ sleeper is not available	RCC trench, sand filled without racks	a)Overhead cable tray b)RCC trench, sand filled without racks
3	Offsite paved area where pipe-rack / sleeper is available	Above Ground cable tray	a)Above Ground cable tray b)Overhead rack c)RCC trench d)Other
4	Offsite paved area where pipe-rack / sleeper is not available	RCC trench, sand filled without racks	a)Above ground cable tray b)Overhead rack c)RCC trench, sand filled without racks d)RCC trench,without sand filling with racks
5	Offside unpaved area where pipe-rack/ sleeper is available	Above Ground cable tray	a)Above Ground cable tray b)Overhead rack c)RCC trench d)Other
6	Offside unpaved area where pipe-rack/ sleeper is not available	Directly buried	a)RCC Trench b)Directly buried
7	Type of cable trays	Galvanized prefabricated (FRP trays in cooling towers)	a)Galvanized prefabricated b)Site fabricated and Painted c)FRP type
8	Road Crossings for underground cables	Cable culvert / ERC with PVC pipes	a)PVC Pipes b)Cable culvert
9	Road Crossings for Above ground cables	Overhead cable bridge / Culvert	a)Overhead cable bridge b)Culvert

S.No.	Description	Selected Option	Remarks
10	Walkway, handrail and ladder for overhead cable trays	Required	a)Required b)Not Required
11	Cable entry into Blast resistant CR/SRR	Through MCT	a)Through MCT b)Without MCT through trench c)Without MCT through sleeves below ground
12	Cable entry into Sub-station	Overhead through trays	a)Underground through trench b)Overhead through trays

Notes:-

1. Plant communication, fire alarm and telephone cables shall be laid in instrumentation overhead cable duct / instrumentation trenches as far possible. In case these are not available. Cable shall be laid in electrical routes along berm of the roads.

5.8 EARTHING SYSTEM

S.No.	Description	Selected Option	Available Options
1	Earth electrode	GI pipe	
2	Main earth loop material	GI strip	
3	Substation earth loop	GI strip	
4	EHV switchyard earth grid	MS Rod	

5.9 LIGHTING SYSTEM

5.9.1 SUPPLY SYSTEM

S.No.	Description	Selected Option	Available Options
1	Centralised with Lighting distribution board-LDB	Yes	a)YES b)NO
2	LDB at each substation	Yes	a)YES b)NO
3	Lighting transformer required	Yes	a)YES b)NO
4	100% Standby transformer for normal lighting system	Yes	a)YES b)NO
5	100% Standby transformer for emergency lighting system	Yes	a)YES b)NO
6	Lighting transformer voltage ratio	415V/415V	a)415V/415V b)415V/400V c)Other

Notes:-
1. Lighting transformers shall be provided with Rotary type tap changer with Tap changer regulation range ± 7.5% with each step of 2.5%.

5.9.2 CONTROL PHILOSOPHY

S.No.	Description	Selected Option	Available Options
1	Outdoor yard	Auto	a)Auto b)Manual c)Centralised d)Local
2	Street lighting	Auto	a)Auto b)Manual c)Centralised d)Local
3	Outdoor process area	Auto	a)Auto b)Manual c)Centralised d)Local
4	Process building	Local	a)Auto b)Manual c)Centralised d)Local
5	Auto control	Synchronous timer	a)Synchronous timer b)Photocell c)ECS
6	Lamp type for all types of lighting fixtures.	LED	
7	ELCB in outgoing of LDB/ ASB feeding Lighting/ Power Panels	No	a)YES b)NO
8	ON /OFF Push button at substation entry	Yes	a)YES b)NO
9	ELCB (30mA) in each circuit of LP/PP	Yes	a)YES b)NO

5.9.3 AC EMERGENCY LIGHTING

S.No.	Description	Selected Option	Available Options
1	Name of process plants	All process areas (as per operation requirement)	
2	Name of buildings	Substation, Control room, Fire Water Pump House, Admin Building, Lab., Workshop, Canteen, Warehouse (Office Area) etc. and other locations/ buildings as per OISD	
3	Power supply source	Diesel generator	

Notes:-

1. Minimum 25% of the overall process plants/buildings lighting shall be emergency lighting.

5.9.4 DC CRITICAL LIGHTING FOR ESCAPE

S.No.	Description	Selected Option	Available Options
1	Name of process units	As per specific project/OISD requirement	

S.No.	Description	Selected Option	Available Options
2	Name of building	Substation, control room, SRR, Administration building, FWPH, Fire Station, DG shed, First Aid Center and other locations as per OISD	
3	DC lighting for remote buildings	Lighting fixture with built in battery	

Notes:-

1. DC lighting shall be sufficient enough to satisfy OISD guidelines.

5.9.5 WIRING TYPE

S.No.	Description	Selected Option	Available Options
1	Process plant / Building / Shed	Armoured cable	
2	Large service building	Concealed conduit	
3	Buildings with false ceiling	Surface conduit above false ceiling except in switchgear room, concealed conduit below false ceiling	a) Surface conduit above false ceiling except in switchgear room, concealed conduit below false ceiling b) Cables c) Perforated cable tray
4	Substation (Switchgear Room)	METSEC channel	a)METSEC channel b)Concealed conduit
5	Substation (Cable Cellar)	Armoured cable	a)Surface Conduit b)Armoured cable c)METSEC channel d)Concealed conduit
6	Other buildings in safe area	Surface cable (armoured)	

5.9.6 SPECIFIC LIGHTING REQUIREMENTS

S.No.	Description	Selected Option	Available Options
1	Aviation warning lighting	Yes	a)YES b)NO
2	Security lighting for peripheral road boundary wall	Required	a)Required b)Not Required
3	Type of high mast flood light	30 meters Telescopic tubular with LED flood lights	a)30 meters Telescopic tubular b)Lattice structural mast
4	Overall general lighting	High Mast with street lighting	a)High Mast b)Street Lighting c)High mast with street lighting d)Photovoltaic solar hybrid street light e)Other

5.10 ELECTRIC HEAT TRACING SYSTEM

S.No.	Description	Selected Option	Available Options
1	Maximum sheath temperature of Tracer	Product classification approach for SR	a) Product classification approach for SR b) System approach for PL/ MI
2	Skin effect heat tracing	Not required	a)Required b)Not Required
3	Circuit Temperature Control	RTD	a)RTD b)Thermostat
4	Central Monitoring System	Yes	a)Yes b)No

5.11 ELECTRICAL EQUIPMENT FOR HAZARDOUS AREAS

The electrical equipment for hazardous areas both for flammable gas & vapour areas and for explosive dust areas shall be selected as per IS-16724, OISD-149 and Petroleum rules. The Gas/ Dust group and Temperature class shall be selected based on the hazardous area classification. The minimum requirement is summarised below (for flammable gas and vapour areas):

S.No.	Equipment	Zone-1	Zone-2
1	MV Motors	Ex-d/ Ex-de (Note-2.12)	Ex-n/ Ex-ec (Note2.9 & 2.10)
2	HV Motors	Ex-d / Ex-de/ Ex-p (Note-2.8 & 2.12)	Ex-n/Ex-ec/Ex-d/Exp (Note-2.9, 2.10 & 2.11)
3	Push Button Station	Ex-d	Ex-d
4	Motor Starters	Ex-d	Ex-d
5	Plug & Socket	Ex-d	Ex-d
6	Welding Receptacle	Ex-d	Ex-d
7	Lighting fitting	Ex-d	Ex-nR (Note-2.5)
8	Junction Boxes	Ex-d	Ex-n (Note-2.5)
9	Transformer Unit	Ex-d	Ex-d
10	Plug & Socket	Ex-d	Ex-d
11	Break Glass Unit (Fire Alarm System)	Ex-d	Ex-d
12	Lighting Panel/Power Panel	Ex-d	Ex-d
13	Transformers	Hermetically sealed with surface temperature not exceeding 200 DEG C	Hermetically sealed with surface temperature not exceeding 200 DEG C

For additional Hazardous Area requirements, refer notes below -

5.11.1 NOTES

S.No.	Notes
1	The electrical equipment for hazardous areas shall generally be suitable for gas group IIB and temp classification T3 as applicable to the selected type of explosion protection. In case of hydrogen or hydrocarbon mixtures having more than 30% hydrogen, the gas group to be considered shall be IIC.

S.No.	Notes
2	As additional safety features, the following requirements for electrical equipment shall be followed.
2.1	The electric motors for agitators/mixers, metering pumps and canned pumps handling flammable material shall be flameproof type irrespective of the area being classified as zone 2 or zone 1.
2.2	All electric motors for vertical sump pumps handling flammable material shall be flameproof type.
2.3	Irrespective of the area classification (whether zone 1 or zone 2), all lighting fixtures within the storage areas shall be flameproof type.
2.4	Irrespective of the area classification (whether zone 1 or zone 2), all motors and lighting fixtures within the pump house/pump station/ compressor house associated with offsite tank farm, within the loading/unloading gantries shall be of flameproof type.
2.5	The emergency/critical lighting fixtures and associated junction boxes in hazardous areas (whether zone-1 or zone-2) shall be flameproof type.
2.6	Even though fired heaters in process units are not considered for area classification, all electrical equipments associated with fired heaters in process units shall as a minimum be suitable for installation in Zone-2 area.
2.7	Building such as Compressor sheds inside the process area shall be designed to allow adequate ventilation to allow area classification as Zone-2. Lighting equipment, EOT crane etc. in the shed shall be flameproof type. All other electrical equipment shall be suitable for Zone-1 or Zone-2 area depending on extent of hazard.
2.8	The motors for hazardous area Zone-1 shall preferably be flameproof type. Pressurised motors may be provided in exceptional cases, when flame proof motors are not available.
2.9	Ex-n/ Ex-ec motors shall be used unless any other type is specified by process licensor, except for following cases: (i)HV motors in Zone-2 area for centrifugal compressors shall be flameproof/ pressurized type. (ii)Flameproof motors shall be used in zone-2 areas having frequent start stop requirements such as EOT cranes, elevators, MOV actuators, etc.
2.10	In Zone-2 areas, Ex-ec motors as per IS/IEC 60079-7 shall be acceptable subject to availability of PESO approval.
2.11	Ex-p motors shall be used for higher rated motors where Ex-n/ Ex-ec motors are not available.
2.12	In zone-1 areas, Ex-de motor i.e. Ex-d motor with Ex-e terminal box is acceptable provided the motor has been tested/ certified by CIMFR or equivalent testing agency and approved by PESO
3	Statutory Approval 1. Statutory Authority for Electrical Installation: State Electrical Inspectorate/CEA 2. Statutory authority for hazardous area: DGMS:For mining area PESO:For area other than mines
4	All the areas within the process unit battery limits shall be classified considering process licensors' recommendations also.
5	All portable equipments to be used in zone-1 & zone-2 shall be 'Ex-d' type.

5.12 ELECTRICAL CONTROL SYSTEM-ECS

S.No.	Description	Selected Option	Available Options
1	Extent of coverage		
1.1	No of substations	All	
1.2	Monitoring		

S.No.	Description	Selected Option	Available Options
1.2.1	EHV/HV switchboard	Yes	a)YES b)NO
1.2.2	415V switchboard (I/C, B/C & outgoing breaker feeders)	Yes	a)YES b)NO
1.2.3	Emergency DG set	Yes	a)YES b)NO
1.3	Control		
1.3.1	EHV/HV switchboard	Yes	a)YES b)NO
1.3.2	415V switchboard (I/C, B/C & outgoing breaker feeders)	No (OFF control of PCC/PMCC incomers shall be provided for load shedding)	a)YES b)NO
1.3.3	Emergency DG set	No	a)YES b)NO
2	Base ECS functionalities		
2.1	Breaker control in CPP & Switchyard	OFF control for motor feeders, ON/OFF for all other breakers	
2.2	Breaker control in other substations	OFF control for all feeders	
2.3	Area lighting	ON/OFF control	
2.4	Electrical plant data acquisition and display	Yes	a)YES b)NO
2.5	Routine log report generation and energy balance report	Yes	a)YES b)NO
2.6	Detection and reporting of alarms	Yes	a)YES b)NO
2.7	Sequence of event recording	Yes	a)YES b)NO
3	Advanced ECS functionalities		
3.1	Load shedding including maximum demand limit control	YES	a)YES b)NO
3.2	Synchronization	YES	a)YES b)NO
3.3	Capacitor feeder control for power factor improvement	NO for all APFC at 6.6KV (automatic control), YES for 66KV incase provided	a)YES b)NO
3.4	Active & Reactive power control	YES	a)YES b)NO
3.5	Frequency & load control of all generators except DG	YES	a)YES b)NO
3.6	Excitation control of synchronous motors	NO	a)YES b)NO
3.7	Grid transformer OLTC control	YES	a)YES b)NO
4	Communication with other systems	Refer communication requirements in SAS	

Notes:

1. EPCM-4 shall design, supply and install ECS RTU, interposing relay panel, marshalling panel required at RTU end and transducer panels as required for ECS system.
2. The cable supply and installation of overall data highway network for ECS shall be designed and laid by EPCM-4.
3. The cabling between substation equipment/switchboards (from respective marshalling panel) and ECS panels shall be designed and laid by EPCM-4.

6.0 SPARE PARTS

6.1 MANDATORY SPARES

Mandatory spares shall be procured along with the main equipment. Such spares for each equipment shall be as per the below table. These spares include only those spares, which are critical for equipment.

S.No.	Part Description	Description
1	Generator	One set of spare for each Generator
1.1	Generator relay	One set (each type & make)
1.2	DVR - all control card	One each type
1.3	Control fuses / MCB	10 Nos. of each rating & type
1.4	Exciter Diodes and fuses	1 set
1.5	Control and Selector switches	1 No. of each type and make
1.6	Aux. contactors	20% of each type and make OR 1 No.(min) of each type and make, whichever is more
2	Gas Insulated Switchboard (GIS)	
2.1	Portable gas filling equipment/SF6 gas cart	1No. for 230kV & 1No for 66kV GIS buildings
2.2	Handle for disconnector switch drive	2Nos for 230kV & 4Nos for 66kV GIS
2.3	Handle for earthing switch drive	2Nos for 230kV & 4Nos for 66kV GIS
2.4	Pre selection / Mechanical key	1 No.
2.5	Power cable termination kit along with plug and socket (R,Y,B Phases)	2Sets for each type of cable size
2.6	Tripping coil	20% spare quantity for each 66kV & 230kV GIS switchboards
2.7	Closing coil	20% spare quantity for each 66kV & 230kV GIS switchboards
2.8	Capacitive type voltage detectors	1set for 230kV & 1No for 66kV GIS building
2.9	Control fuses / MCB	10 Nos. of each rating & type
2.10	Density / Pressure Gauge	2 Nos of each type
2.11	Indicating lamps covers	Min 5Nos of different colors for every 5 feeders of similar group
2.12	Indicating lamps	Min 5Nos of different colors for every 5 feeders of similar group
2.12A	Auxiliary relays for LCC/drive mechanism etc	10% or minimum 2 Nos. of each type
2.13	Portable SF6 Gas Leakage Detector	1No. for each GIS building
2.14	Ethernet Switch	1 no. of each type
3	Power Transformer	One set of spare for each power transformer
3.1	Complete set of gaskets	1 set
3.2	Sealing / Gauge glass of Conservator	2 Nos of each rating & type.
3.3	Control fuses / MCB for MB cubicles	20% for each rating OR 1 No. (min.) of each rating, whichever is more
3.4	HV bushings	One set of each type and rating
4	Distribution Transformer	One set of spare for each transformer
4.1	Complete set of gaskets	1 set
4.2	Sealing / Gauge glass of Conservator	2 Nos. of each rating & type.

S.No.	Part Description	Description
4.3	Control fuses / MCB for MB cubicles	20% for each rating OR 1 No. (min.) of each rating, whichever is more
4.4	HV & MV bushings	One set of each type and rating
5	HV Air Insulated Switchboard (AIS)	One set of spare for each switchboard (Refer Note-7 & 10)
5.1	Closing coil	1 No. of each rating & type
5.2	Shunt trip coil	1 No. of each rating & type
5.3	Control fuses / MCB (all type & rating)	10 Nos. of each rating & type
5.4	Breaker Finger jaws	1 set for each rating and type
5.5	Indicating lamps covers	5 Nos. of each colour
5.6	Indicating lamps	20% or 3 Nos. (min.), whichever is more
5.7	Ethernet Switch	1 no. of each type (Refer Note-10)
6	415V MV Switchboard	One set of spare for each switchboard (refer Note-9 & 10)
6.1	Closing coil	1 No. of each rating & type
6.2	Shunt trip coil	1 No. of each rating & type
6.3	Control fuses / MCB	10 Nos. each rating & type
6.4	Indicating lamps covers	5 Nos. of each colour
6.5	Indicating lamps	20% or 3 Nos. (min.), whichever is more
6.6	Breaker finger jaws	1 set for each rating and type
6.7	Contactor contacts	1 set for each rating and type
6.8	Ethernet Switch	1 no. of each type (Refer Note-10)
7	Variable Frequency Drive (one set of spare for each VFD) and Soft Starter	Quantity is per VFD and Soft Starter
7.1	Transistors / IGBT / IGCT	1 No of each rating & type
7.2	Control cards	1 No of each type
7.3	Power supply cards	1 No of each rating & type
7.4	Power fuses	20% for each rating OR 1 no. (min.) of each rating, whichever is more
7.5	Control fuses / MCB	10 Nos. of each rating & type
7.6	Contactors	10% of each type OR 1 no. (min) of each type, whichever is more
7.7	Indicating lamps	20% OR 1 nos. (min.), whichever is more
7.8	Indicating lamps covers	2 nos of each colour
7.9	Blocker Diode	2 nos. of each rating & type
7.10	Control power supply module	1 No of each rating & type
7.11	Power module	3 No of each rating & type
8	Substation Automation System (SAS) / HMI / Data Concentrator	One set of spare for each SAS / HMI / Data Concentrator
8.1	All cards such as input & output cards, power supply cards, processor cards etc.	1 No. of each type
8.2	Ethernet switches	1 No. of each type
8.3	Control fuses / MCB	10 Nos. of each rating & type
9	Relays for GIS/ Switchboard / Relay control Panel	One set of spare for each GIS/ Switchboard (Refer Note-8) /Relay control Panel
9.1	Protection Relays	1 No. of each type
9.2	Auxiliary Relays	10% or minimum 2 Nos. of each type
10	UPS System	One set of spare for each UPS system
9.3	Indicating Lamp Covers	Min 5Nos of different colors for every 5 feeders of similar group
9.4	Indicating Lamp	Min 5Nos of different colors for every 5 feeders of similar group
9.5	Control Fuses / MCB	10Nos. of each rating & type

S.No.	Part Description	Description
10.1	Power Thyristors / Transistors / IGBT / IGCT	1 No. of each rating & type
10.2	Control cards	1 No. of each type
10.3	Power supply cards	1 No. of each rating and type
10.4	Power fuses	20% for each rating OR 1 no. (min.) of each rating, whichever is more
10.5	Control fuses / MCB	10 Nos. of each rating & type
10.6	Indicating lamps	10% OR 3 nos. (min.), whichever is more
10.7	Indicating lamps covers	2 Nos. of each colour
10.8	Blocker Diode	2 Nos. of each rating & type
11	DC System	One set of spare for each DC System
11.1	Power Thyristors / Transistors / IGBT / IGCT	1 No. of each rating & type
11.2	Control cards	1 No. of each type
11.3	Power supply cards	1 No. of each rating and type
11.4	Power fuses	20% for each rating OR 1 no. (min.) of each rating, whichever is more
11.5	Control fuses / MCB	10 Nos. of each rating & type
11.6	Indicating lamps	10% OR 3 nos. (min.), whichever is more
11.7	Indicating lamps covers	2 Nos. of each colour
11.8	Blocker Diode	2 Nos. of each rating & type
12	Synchronous motors	One set of spare for each rating & type
12.1	Power fuses	20% for each rating OR 1 no. (min.) of each rating, whichever is more
12.2	Control fuses / MCB	10 Nos. of each rating & type
12.3	Bearing (DE & NDE)	1 set
12.4	Control cards	1 No. of each type
12.5	Terminal studs/bushing assembly	1 set each
12.6	Exciter Diodes and fuses	1 set
13	HV induction motors	One set of spare for each rating & type
13.1	Bearing (DE & NDE)	1 set
13.2	Terminal studs/bushing assembly	1 set each
14	MV induction motors 37 kW & above	One set of spare for each rating & type
14.1	Bearing (DE & NDE)	1 set
14.2	Terminal studs/bushing assembly	1 set each
15	Fire alarm system	
15.1	All cards, which Shall also include, CPU, Power Supply, Display unit, Communication card and chassis.	10% subjected to minimum 1 no. of each type.
15.2	Power fuses	20% for each rating OR 1 no. (min.) of each rating, whichever is more
15.3	Control fuses / MCB	10 Nos. of each rating & type
15.4	Terminal blocks	20 Nos
15.5	Smoke/Multisensor/Heat Detectors	5% subjected to minimum 3 no. of each type, whichever is more
15.6	Glass for Break Glass Boxes/ Manual call point	5 % of each type OR 1 No. (min.) of each type, whichever is more
15.7	Ethernet Switch	1 No. of each type

S.No.	Part Description	Description
15.9	break glass type Manual call point indoor/outdoor	5% subjected to minimum 3 no. of each type,whichever is more
15.8	FA Hooter	20% subjected to minimum 2 no. of each type.
16	Paging system / Plant Communication System	
16.1	All cards	1 No of each type
16.2	Power fuses	20% for each rating OR 1 no. (min.) of each rating, whichever is more
16.3	Control fuses / MCB	10 Nos. each rating & type
16.4	Ethernet Switch	1 No. of each type
17	Thyristor control panel for heaters	
17.1	Rectifier control module (Control card fully assembled)	1 No. of each type
17.2	Power supply card	1 No. of each type
17.3	Control cards	1 No of each type
17.4	Power fuses	2 Nos. min. of each rating and type
17.5	Control fuses / MCB	10 Nos. each rating & type
17.6	Contactors	10% of each type OR one no (min) of each type, whichever is more
17.7	Indicating lamps	20% OR 1 nos. (min.), whichever is more
17.8	Indicating lamps covers	2 nos. of each colour
17.9	Blocker Diode	2 nos. of each rating & type
17.10	Power Module	1 No. of each rating and type
18	Electrical Control System (ECS)	
18.1	Interposing relays (As applicable)	5 Nos. of each type
18.2	Power supply & control cards	1 No. of each type
18.3	Transducers	20% of estimated quantity of each type and make OR 1 no (min) of each type and make, whichever is more
18.4	Function generator cum counter	1 No.
18.5	4-20mA signal injection set	1 No.
18.6	Isolation transformer	1 No.
18.7	Ethernet Switch	1 No. of each type
19	Electrical Heat Tracing System	
19.1	RTD/Thermostat	1 no. of each type
19.2	Control fuses/ MCB/ELCB	5 Nos. each rating & type
19.3	Indicating lamps	10% or 2 nos. (min.) whichever is more
19.4	Indicating lamps covers	5 nos. of each colour
19.5	Contactor contacts	1 set for each rating and type
20	APFC panels for Capacitor Bank	One set of spare for total APFC panels
20.1	Control cards	One no. of each type
20.2	Power supply cards	One No of each rating & type
20.3	Power fuses	20% for each rating or one no. (min.) of each rating, whichever is more
20.4	Control fuses/ MCB	10 Nos. of each rating & type
20.5	Auxiliary Contactors	10% of each type or 1 no. (min.) of each type, whichever is more
20.6	Numerical Relays	One no. of each type
20.7	Indicating lamp covers	2 nos. of each colour

S.No.	Part Description	Description
20.8	Indicating lamps	20% or 1 no. (min.), whichever is more
21	Motor operated valve	
21.1	Position transmitter	10% (1 no. min. if the same is provided in MOVs)
21.2	Power supply unit	10% (1 no. min.)
21.3	Logic Board	10% (1 no. min.)
21.4	Local control board assembly	10% (1 no. min.)
21.5	Switchgear assembly	10% (1 no. min.)
21.6	Complete motor assembly	1 no of each rating

NOTES:

1. The word 'TYPE' means the Make, Model no., Type, Range, Size/ Length, Rating, Material as applicable.
2. Wherever % age is identified, Contractor shall supply next rounded figure.
3. The terminology used under 'Part Description' is the commonly used name of the part and may vary from manufacturer to manufacturer.
4. Mandatory spares as indicated above do not cover commissioning spares.
5. Mandatory spares as indicated above do not cover two year O&M spares.
6. Mandatory spares shall be applicable for electrical items of motors / sub-packages as per mandatory spares philosophy specified elsewhere in the bid document.
7. For Isolation breaker panel (GIS or AIS) one set of "Tripping Coil (1 No.), Closing coil (1 No.) and Control fuse/MCB (10 Nos. of each rating and type)" shall be considered as mandatory spares for each Isolation breaker panel (GIS or AIS).
8. For Isolation breaker panel (GIS or AIS) one set of "Auxiliary relays (1 no. of each type)" shall be considered as mandatory spares for Relays for Isolation breaker panel (GIS or AIS).
9. MV Switchboard shall include fixed and drawout type of switchboards such as PCC, MCC, PMCC, EPCC, EPMCC, ASB, LDB, ELDB, package switchboards etc.
10. 1 no. Ethernet switch of each type shall be provided for all switchboards for each voltage level/type put together for each substation.

6.2 COMMISSIONING SPARES

Commissioning Spare Parts shall be procured along with the main equipment as per equipment manufacturer's recommendations. The list of such recommended spares shall be obtained along with the offer.

6.3 RECOMMENDED SPARE FOR NORMAL OPERATION & MAINTAINENCE

Quotation for two-years spares for normal operation and maintenance (over and above mandatory spares) along with unit price shall be obtained with the proposal for Client to order the same separately.

6.4 SPECIAL TOOLS AND TACKLES

Required Special Tools and Tackles shall be procured along with the main equipment as per equipment manufacturer's recommendations. The list of such recommended special tools/tackles shall be obtained along with the offer.

7.0 VENDOR DATA REQUIREMENT

Vendor Data Requirement as indicated in the respective equipment Material Requisitions shall be followed.