Bharat Heavy Electricals Limited

(A Govt. of India Undertaking)
Transmission Business Group
Materials Management, 5th Floor, Plot No.25,
Sector-16A, Noida, Uttar Pradesh, PIN No: 201301
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CORRIGENDUM - 01 TO NIT NO-72528

Dated 31.03.2023

Subject: Corrigendum-01 to Tender enquiry for Supply & Services of 400 kV GIS FOR NTPC Talcher PROJECT.

Project	: NTPC Talcher Project
Equipment / Item	: SUPPLY & SERVICES OF 400kV GIS.
Enquiry No/Date	: Enquiry No_61G2300308 Dated 10-03-2023
BHEL NIT NO	: 72528
Original Tender due date	**: 31.03.2023**

This Corrigendum is issued by BHEL-TBG against above mentioned NIT/ enquiry **for:**

1) Issuance of technical clarifications to pre-bid technical queries (enclosed).

2) extension of due date of tender submission/opening to 14-04-2023.

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 **2023_BHEL_23119_1.**

Thanking you

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

CLARIFICATIONS TO TECHNICAL PRE-BID QUERIES

Annexure-I

SN	Document / Clause No	Description as per Bid Document	Bidder's Query	BHEL Reply
1	Section-1: 1.1, Pg. 3	The 400 KV GIS shall have three single phase constructions, one and half breaker arrangement (I-Type) having the following bays:	In GIS, there is no difference in layout arrangement for 1.5 CB scheme whether it is I-type or D-type. Please confirm.	Noted; Bidder to offer as per OEM Type Tested design.
2	Section-1: 1.2, Pg. 5	8) Any change in bay pitch (distance between bays): In a case where shifting of GIS bays shall be called by BHEL (during contract stage) due to layout requirement/ cost optimization/ revision/ change in civil architectural requirement or due to expansion joint requirement in the GIS building, Bidder to incorporate the same with full compliance of technical requirement.	Request for CAD layout drawing with column and beams marked to make precise offer without any assumptions.	Enclosed
3	Section-1: 1.3	In addition to this, packing of GIS & its accessories shall be suitable for long term storage without any deterioration in quality and performance (min. 2 years).	Packing of GIS & its accessories shall be suitable for 6 months storage subject to Buyer following Seller's storage instructions.	Bidder to follow TS
4	Section-1: 1.3, Pg. 7	6. Site Installation, Testing and commissioning HV test kit shall be brought at site multiple times as per site requirements, for reasons not attributable to BHEL/ NTPC. GIS bays may be commissioned at different point of time depending on the site conditions and as per L2 schedule for the project, and hence deployment of the resources at multiple times at site by bidder in line with actual requirement is envisaged and payment for the same shall be made to bidder, for the reasons not attributable to bidder.	GIS bays shall be installed in one shot and testing and commissioning of the same shall be done after installation. Charging of lines, trafos can be at different point of time once GIS bays are on-line. Request to clarify the "multiple times" as we have only two GT bays in this project.	Bidder to follow TS (Refer Price Schedule Sl. No G1 to G6).
5	Section-1 (1.8, Pg. 15), Section-2 (1.06.01, Pg. 4 of 40)	c. In case the Bidder has conducted such specified type test(s) according to the relevant standard and/ or specification not earlier than Ten (10) years prior to 06-June-2022, he may submit the type test reports to the Customer for waiver of conductance of such type test(s).	As per latest CEA guidelines (enclosed), type test reports not older than 15 years are acceptable. Please confirm.	In line with TS, Type Test Report validity period shall be as per latest CEA guidelines.
6	Section-1 (1.11, Pg. 18)	Training at manufacturers works and at Site	To & Fro, local transport, Boarding and lodging charges for trainees shall be excluded from GIS supplier's scope of supply. It shall remain in BHEL's scope. Request to confirm.	Bidder to follow TS
7	Section-1 (1.13, Pg. 19)	Drawings enclosed for reference: 400kV GIS Switchyard Single Line Diagram 400kV GIS Switchyard Layout Drawings	Request for CAD layout or clear pdf layouts as given layout drawings are not legible.	Enclosed
8	Section-1 (Annexure-A, A15 & A16)	Mandatory maintenance & monitoring equipment	As the quantity of SF6 gas & structure material would vary from one GIS design to the other, we request you to amend the quantity/ unit of such items as 1 Lot & let the manufacturer estimate the same & quote accordingly.	Bidder to quote as per Tender BOQ.
9	Section-1 (Annexure-A, C1 to C5 & D1 to D4)	Mandatory maintenance & monitoring equipment	We request you to confirm make & model of each of these items listed in Bid Price Schedule	Bidder to offer equipments meeting the technical requirements mentioned in the TS; Also, the offered equipments shall be suitable for maintenance/ monitoring of the supplied GIS system.
10	Section-1 (Annexure-A, D1), Section-2 (Annexure-E)	1.0 Dew point meter	SF6 gas analyzer (item no. C3) can be used to measure dew point of SF6 gas. Hence no need to have dew point meter separately. Please clarify.	Bidder to quote as per Tender BOQ.

SN	Document / Clause No	Description as per Bid Document	Bidder's Query	BHEL Reply
11	SLD	Notes : CSD for the tie bay & additional GIS CT cores ..... additional requirements of NTPC & shall be supplied subject to commercial settlement..	Quantity of CSD shall be as per BOQ and CTs, CT cores shall be as per Annexure-3 of Section-2.	Noted. any change in qty of CSD & no. of CT cores shall be adjusted based on unit rates quoted for the respective items; However, CT secondary parameters shall be as per Annexure-3 of Section-2.
12	Section-2 (2.01.01, Pg. 7 of 40)	The modular design shall be capable of extension on either side without any major dismantling.	We understand that no extension provision is to be given as there is no indication of future bays in SLD or in layout drawings. Please confirm	Bidder to follow TS; Future Bays may be added in future by M/s NTPC.
13	Section-2 (2.15, Pg. 13 of 40)	The leads to the tank heaters shall be enclosed in a conduit.	Thermostats shall be provided only in LCC, operating mechanism cabinet. There are no tank heaters provided.	Noted; Bidder to offer as per OEM Type Tested design.
14	Section-2 (2.21, Pg. 13 of 40)	Commissioning Tests: One-minute power frequency withstand tests for the main circuits. As per IEC 62271-203 high voltage tests at site with lightning impulse and switching impulse voltages are also acceptable as alternative.	We perform only Power frequency withstand test for main circuit at site as per IEC. Lightning and switching impulse tests are type tests for which type test reports shall be submitted.	Noted; Bidder to follow TS.
15	Section-2 (2.21, Pg. 13 of 40)	(h) Calibration/checking of SF6 gas pressure / density switches.	Checking of Density switch functioning can be performed at site. Density switches can be calibrated at factory.	Noted.
16	Section-2 (3.03.02, Pg. 17 of 40)	Circuit breakers shall be provided with two (2) independent trip coils, suitable for trip circuit supervision. The trip circuit supervision relay would also be provided.	Trip circuit supervision relay shall be part of relay panel. In Local control cubicle of GIS, no relays shall be provided.	Trip circuit supervision relays are not to be provided in GIS LCC.
17	Section-2 (5.02.02, Pg. 23 of 40)	b) Each current transformer shall be equipped with a marshalling box with terminals for the secondary circuits, which are connected to the local control cubicle.	Terminal box shall be provided for CTs.	Noted
18	Section-2 (6.06.00, Pg. 28 of 40)	Current for pressure relief test – 63kArms	Not applicable to GIS Surge arresters as per IEC.	Requirement of pressure relief test shall be as per latest IEC guidelines.
19	General	SLD & layout	Request to provide legible pdf of single line diagram and pdf/CAD layout drawings. From the given SLD and BOQ, there is no PIR for any Circuit breaker. Please confirm.	i) Autocad drawing enclosed. Ii) All the CBs are without PIR; however bidder to quote unit rate for the CB with PIR as per Tender BOQ.

SN	Document / Clause No	Description as per Bid Document	Bidder's Query	BHEL Reply
		Annexure-II		
1	BOQ 1.14(ITEM NO 14)	LCC-Quantity-17 No's	We would like to inform you that for Bus VT wires can easily fit in Bay 414. So we will consider LCP 15 No's. Kindly accept the same.	Bidder to follow Tender BOQ.
2	BOQ 1.15(ITEM NO 15)	SF6 gas quantity-20 MT SF6 gas quantity required for compensation losses before placing into successful operation.	We would like to inform you that we will perform the SF6 gas leakage test after installation complete and we will supply sufficient gas to compensate the site testing activities, Every GIS manufacturer design require different quantity of SF6 Gas for the complete project, Hence we request you to kindly specify the SF6 Gas in One (1) LoT for each manufacturer's consideration. Please accept the same.	Bidder to quote as per Tender BOQ.
3	BOQ 1.16(ITEM NO 16)	Support Structure for GIS equipment.-65MT support structure for GIS equipment.	We would like to inform you that we will submit this details during detail engineering time. Every GIS manufacturer design require different quantity of Structure Material for the complete project, Hence we request you to kindly specify the Structure Material in One (1) LoT for each manufacturer's consideration. Please accept the same.	Bidder to quote as per Tender BOQ.
4	BOQ 1.17(ITEM NO 17)	Earthing Material for GIS including High Frequency Earthing.	We would like to inform you that it will be EPC scope. Please accept the same.	Bidder to follow TS (Refer Point No. 7 of Clause 1.3 of Section-1 of TS).
5	BOQ 2.05(ITEM NO 22)	Spare gas of 20% SF6 gas in 4 MT	We would like to inform you that we will supply of 20% SF6 from as per required gas of total quantity. Please accept the same.	Bidder to quote as per Tender BOQ.
6	BOQ 2.12(ITEM NO 29)	Windoscope/ Observinf Window for CB	We would like to inform you that for CB observing window is not required as per safety concern and we not having this type CB, We will provide without observing window CB. Please accept the same.	Noted; Bidder to offer as per OEM Type Tested design.
7	NIT NO_72528 E8 & E9 Page No: 36	Training in Site and Factory	We requesting you Factory and Site training will be conduct in front of both M/s BHEL and M/s NTPC, we cannot provide separate training. Please accept the same.	Noted and confirmed.
8	BOQ 3.07 & 3.09(ITEM NO 59 & 61)	Portable PDM system & Online PDM system.	We need your clarification for Partial Discharge Measurement kit, Whether we need to consider Portable type or online PDM system or both of them. Please clarify the same.	Bidder to follow Tender BOQ.

SN	Document / Clause No	Description as per Bid Document	Bidder's Query	BHEL Reply
9	BOQ 4.02(ITEM NO 63)	GIS spare CB with PIR	We would like to inform you that as per present scope CB with PIR is not using in any Bay, so this type CB is not required for this project. Incase of consideration of PIR requirement, the entire 400kV GIS model will be different. Hence kindly elimate the requirement of CB with PIR as spare item. Please accept the same.	Bidder to follow Tender BOQ.
10	BOQ 2.33(ITEM NO 50)	CT with enclosure	We would like to inform you that, we are using differeent CT ratios for different Bays. Please clarify which bay CT required in spare.	Bidder to follow BOQ mentioned in Annexure-A of Section-1 of TS (Refer Sl. No.A4: Spare Bay CT shall be same as Line Bay).
11	BOQ 3.01 & 3.02(ITEM NO 52 & 53)	SF6 gas Handling Plant.	We would like to inform you that our proposed SF6 gas handling plant will compile your requirement of Gas filling, Evacuation, Filtering, Drying, Storage and Recycling work. Please accept the same.	Bidder to follow Tender BOQ.
12	General	GIS Building Layout	We would like to inform you that as per received layout diagram GIS structure for GIB is getting foul, Please revise the beam location in civil diagram. We will propose GIS layout for your references.	Refer Note "**COLUMN SPACING OF GIS BUILDING SHALL BE AS PER THIS DRAWING. BIDDER TO OFFER GIS SYSTEM COMPATIBLE WITH THIS COLUMN SPACING & BUILDING DIMENSIONS.**" mentioned in Conceptual GIS Building layout drawing No. 4540-001-230-PVE-F-023B attached with TS. Bidder to quote accordingly.
13	General	Gas Monitoring System	We need calrification by you for SF6 gas monitor system, you need seperated online SF6 gas monitor system or Gas pressure sensing device(without transmitter). Please clarify the same.	Bidder to follow Tender BOQ.
14	GIS Technical Specifications Clause No.1.8	TYPE TESTING: In case the Bidder has conducted such specified type test(s) according to the relevant standard and / or specification not earlier than Ten (10) years prior to 06-June-2022, he may submit the type test reports to the Customer for waiver of conductance of such type test(s).	As per CEA latest guidelines for Type Test Report acceptance, CEA allowed the Type test Report validity for EHV GIS till next 15 Year from the issuance of Report. Kindly accept the validity duration till 15 Years inplace of 10 Years.	In line with TS, Type Test Report validity period shall be as per latest CEA guidelines.
15	BOQ ITEM NO 5.01	SERVICES- GIS : INSULATION CO-ORDINATION STUDIES FOR GIS SYSTEM	Insulation Co-Ordination Studies is under scope of bidder, however BHEL should confirm to release the study input details along with GIS layout approval to sucessful bidder. Otherwise, Manufacturer can not commence manufacturing activiy untill in insulation cordination study shall not be completed. Kindly confirm to provide the inputs as per above requested timeline.	Technical inputs shall be provided to successful bidder based on data provided by NTPC. Manufacturing shall be done by vendor in line with provisions for TS.

SN	Document / Clause No	Description as per Bid Document	Bidder's Query	BHEL Reply
		Annexure-III		
1	1341798/2023/TBG-TBG_ENGG 8. Modular Design	All steel structure members shall be hot-dip galvanized after fabrication. Unless otherwise specified, minimum mass of zinc coating for Galvanizing shall be 610 gm/square meter.	We would like to inform that structures are hot dip galvanized according to EN ISO 1461[2]. The coating thickness is at-least 85 µm. We shall offer structure suitable for highly corrosive, highly humid and more prone to fungi environment.	Bidder to follow minimum requirements mentioned in TS.
2	1341798/2023/TBG-TBG_ENGG 1.8 TYPE TESTING	The Bidder shall carry out the type tests as listed in this specification on the equipment to be supplied under this contract.	We understand that the offered product should be type tested as per IEC 62271-203 from the manufacturing works from where the product is being offered and the type testing shall have to be completed before delivery of GIS. Pls confirm. Further regarding validity of type test , we understand type test report will be accepted if it been performed before within 10 years from date of signing of contract.	Pl. follow TS. Also, in line with TS, Type Test Report validity period shall be as per latest CEA guidelines.
3	1341798/2023/TBG-TBG_ENGG 1.18 PACKING AND DISPATCH	4. The equipment may be stored outdoors for long periods before installation. The packing shall be completely suitable for outdoor storage in areas with heavy rains and high ambient temperature. Hence, packing of the equipment shall be suitable for long storage (minimum 2 years).	In case the material is to be stored for longer periods, we request BHEL to store the material in Indoor Store only and in line with OEM storage guidelines.	Noted.
4	1341798/2023/TBG-TBG_ENGG 1.9. d	Type test for VT and Surge Arrestor	For the surge arrestor and VT, type tests of the vendors shall be submitted for approval. We do not envisage to repeat the type test.	Bidder to follow TS.
5	1341798/2023/TBG-TBG_ENGG 1.3	Service continuity requirements of GIS	Access from front side to ciruit breaker is possible only in design of circuit breakers that are horizontally oriented. For vertical circuit breakers, the access to interrupters is from top (to remove/repair interrupter), hence we understand that the requirement for 400 kV GIS in this project is with horizontal circuit breakers only. Pls confirm.	Bidder to offer as per OEM Type Tested design.
6	1341798/2023/TBG-TBG_ENGG 2.17	Length of bus duct shall be estimated by the bidder based on drawings provided in the bid. Any change in bay pitch (distance between bays) as per civil requirement for foundation layout during detailed engineering stage shall be incorporated by bidder as per item of Expansion Joints and bellows of BOQ	Confirmed, however any change in length of busduct and bus bar shall be compensated as per unit rate defined in respective line item in Price Bid.	For Bus Ducts, Bidder to quote as per Tender BOQ.
7	1341798/2023/TBG-TBG_ENGG Noted 4	Bidder shall conduct insulation co-ordination & very fast transient overvoltage (VFTO) studies in line with IEC 60071 for establishing suitability of surge arrester rating, and any other technical requirement for successful operation of GIS. Prices for VFTO study shall be included in the price quoted for Insulation Co-ordination study.	We shall offer the Surge arresters as per the BOQ. In case of additional requirement of surge arrester is envisaged after conducting VFTO studies during execution, the same shall be at additional time and price implication.	Unit rates shall be operated in case of any addition/deletion of equipment. No time implication shall be allowed.
8	1341798/2023/TBG-TBG_ENGG SLD	Notes: 1) CT & VT core details given in single line diagram/TS are tentative and may change at contract stage. Changes to be incorporated by bidder without any cost and delivery implication to BHEL/ NTPC.	The offered GIS shall be as per CT/VT parameters mentioned in the tender document. In case of change in parameters, the same shall be compensated in price as required.	Any change in qty of no. of CT cores shall be adjusted based on unit rates quoted for the respective items; However, CT secondary parameters shall be as per Annexure-3 of Section-2.
9	1341798/2023/TBG-TBG_ENGG 8. Modular Design	The bus enclosure shall be sectionalized in a manner that maintenance work on any bus disconnector (when bus and bus disconnector are enclosed in a single enclosure) can be carried out by isolating and evacuating the small effected section and not the entire bus.	Noted, however, entire bus shall be taken out of service. Hope the same is acceptable.	Bidder to offer as per OEM Type Tested design.

SN	Document / Clause No	Description as per Bid Document	Bidder's Query	BHEL Reply
10	1341798/2023/TBG-TBG_ENGG Notes 10	All supporting structures including foundation bolts/ fixing bolts/ embedded plate/ chemical anchor bolts and hardware etc. required for fixing and erection of GIS and bus duct shall be in bidder scope.	The Support structure required for GIS, Bus ducts including Foundation Bolts, Embedded Items, Rails and/ or other items structural items specfic to GIS shall be as per OEM design, hence request you to consider accordingly in BOQ as lot item included in respective GIS Bay/GIB price.	Bidder to quote as per Tender BOQ.
11	BOQ-F2	Circuit breaker with PIR	Please note that the circuit breakers are without PIR. We understand that CSD is required in the breakers mentioned in the bay description and SLD. Request clarify on these clauses where PIR is mentioned.	All the CBs are without PIR; however bidder to quote unit rate for the CB with PIR as per Tender BOQ.
12	BOQ-E7	Final successful Testing of GIS including HV test and its accessories	Noted, however, we have considered supervision of erection, testing and commissioning in one mobilization only.	Bidder to follow TS
13	SLD Notes for Switch yard	GIS CT for metering purpose	We have considered CTs in line with the BOQ- Scope of supply documents	Bidder to follow TS
14	Sub Section -B-17 2.03.21	Adequate number of gas leak detectors shall be installed at various locations at the base of the GIS structure to detect presence of gas which may be harmful for human. The detector shall send alarm signal locally as well as at remote stations.	In line to the general practice and our offered design, Gas Density monitor shall be supplied in each of the gas compartment. In case of Gas leak, Gas Density monitor shall raise the alarm at defined pressures. Any kind of sepereate Gas leak detectors, local alarm and remote alarm is not considered in scope.	Bidder to follow TS
15	Sub Section -B-17 2.13.02	Gas pressure monitoring devices shall be fitted with test valves such that field testing of the monitoring device can be performed without draining the main gas system. Each gas section shall be fitted with a suitable valve for routine gas sampling.	We would like to inform that, functional check /comparative check/calibration/replacement of gas density switch can be done by isolating the device from the GIS system, without de-energizing the primary equipment and without reducing pressure in gas compartments.	Noted
16	Sub Section -B-17 2.15.00	The leads to the tank heaters shall be enclosed in a conduit.	Tank heaters is not applicable for GIS, and offered GIS is type tested in line with IEC.	Noted; Bidder to offer as per OEM Type Tested design.
17	Sub Section -B-17 2.21.00	Commissioning Tests On completion of the erection and installation, following commissioning tests shall be performed as per IEC 62271-203, CIGRE working Group 23.03, 1975-Electra No.42, 7-29:	We would like to inform that, Site routine test shall be performed as per IEC only.	Bidder to follow TS.
18	Sub Section -B-17 3.03.02	Circuit breakers shall be provided with two (2) independent trip coils, suitable for trip circuit supervision. The trip circuit supervision relay would also be provided.	We would like to inform that, Trip circuit supervision relay shall be part of relay panel. In Local control cubicle of GIS, no relays shall be provided.	Trip circuit supervision relays are not to be provided in GIS LCC.
19	Sub Section -B-17 4.04.00 (l)	Mechanical position indication shall be provided locally at each switch along with remote indication at each bay module control cabinet & in the power house control room.	We would like to inform that, As per manufacturer's product specific design mechanical position indication shall be provided with operating mechanism. LED position indication shall be provided in local control cubicle.	Noted
20	Sub Section -B-17 11.01.00	Contractor shall perform any additional test based on specialties of the items as per the field QP/ instructions of the equipment supplier or Employer without any extra cost to the Employer.	Site testing shall be done in line to IEC and as per OEM standards. Kindly accept.	Bidder to follow TS.
21	Sub Section -B-17 11.05.00 (f) 11.06.00 (e)	Capacitance and tan delta measurement at minimum 10kV	As per OEM recommendation, the subject tests is not applicable for GIS.	Bidder to follow TS.

SN	Document / Clause No	Description as per Bid Document	Bidder's Query	BHEL Reply
22	Sub Section -B-17 11.07.00 (e)	SURGE ARRESTER a) Grading leakage current. b) Resistance of ground connection. c) Resistive current drawn at rated voltage after energisation.	As per OEM recommendation, the subject tests shall not be performed at site.	Bidder to follow TS.
23	SAS	Merging Units / Bay control units / Switchgear control units	We have offered conventional LCC along with conventional CT & VT in GIS. Cables shall be considered from GIS to LCC as per conventional practice with tentative distance marked in Layout. MU/BCU/SCU or any associated cables are not considered in bidders scope.	Noted
24	Sub Section -B-17 2.15.00	HEATERS:	We wish to inform that offered drive in CB/DS/ES is having continuous heater design and does not required any kind of thermostat. Same is as per type tested design.	Noted; Bidder to offer as per OEM Type Tested design.
25	Sub Section -B-17	Type test	We understand that the offered product should be type tested as per IEC 62271-203 from the manufacturing works from where the product is being offered and the type testing shall have to be completed before delivery of GIS. Pls confirm. Further regarding validity of type test , we understand type test report will be accepted if it been performed before within 10 years from date of signing of contract.	In line with TS, Type Test Report validity shall be as per latest CEA guidelines.
26	Sub Section -B-17 3.20.3	BAY MARSHALLING BOX	Please note that the bay marshalling box is not in our scope, we have considered Local control cubicles for the control and wiring termination of GIS.	Noted
27	General	COLUMN SPACING OF GIS BUILDING SHALL BE AS PER THE DRAWING ON PAGE 59 of 182 of TS doc. BIDDER TO OFFER GIS SYSTEM COMPATIBLE WITH THIS COLUMN SPACING & BUILDING DIMENSIONS	We request to provide the AutoCAD drawing for the layout to examine the feasibility of installation.	Enclosed
28	General	Make and Model of the equipment	We request to provide the approved vendor list, make/model of the equipment to be supplied under this tender	Bidder to offer equipments meeting the technical requirements mentioned in the TS; Also, the offered equipments shall be suitable for maintenance/ monitoring of the supplied GIS system.

(MANAGER/TBG)
RANAJIT DEY

VIVEK KAPIL 23.3.23
AGM/TBGM

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

DRAWING No.

INDEX

REFERENCE DRAWING: 4540-999-POE-J-001 REV A - TENDER DRAWING.
400kV GIS SWYD SINGLE LINE DIAGRAM (STATION TRANSFORMER SCHEME)

COMPUTER DRG. PATH NAME :

REF. DRG. No.																							
SIGN. & DATE	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED
																						01	12.12.22	PC / RD / VK
INVENTORY No.	ZONE			ZONE			ZONE			ZONE			ZONE			ZONE			ZONE			ZONE		SLD REVISED TO INCORPORATE ADDITIONAL CT & CSD AS PER CUSTOMER COMMENTS.

CA NO.	
ADDITIONAL INFORMATION W.O.No.	
STATUS OF DRAWING	
DISTRIBUTION OF PRINTS	

ग्राहक/परियोजना का नाम NTPC TALCHER SUPER THERMAL POWER PROJECT PHASE-III (2x660 MW)
NAME OF CUSTOMER/PROJECT

BHEL भारत हेवी इलेक्ट्रिकल्स लिमिटेड
ट्रांसमिशन परियोजना विभाग
BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION

	नाम /NAME	हस्ता /SIGN.	दि/DATE
बनाया DRAWN	PC	-SGD-	15.10.22
जाँचा CHECKED	RD	-SGD-	15.10.22
स्वीकृत APPROVED	VK	-SGD-	15.10.22

विभाग DEPT. | कोड CODE | अनुपात / SCALE | कार्ड कोड CARD CODE

शीर्षक/TITLE
400kV GIS SWITCHYARD SINGLE LINE DIAGRAM

ड्राईंग सं./DRAWING NO.
NTPC DRG NO. 4540-001-230-PVE-P-001
BHEL DRG NO.

पुनर:/REV. 01

पृष्ठ सं./SHEET No. 01 | अगला पृष्ठ/NEXT SHEET 02

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

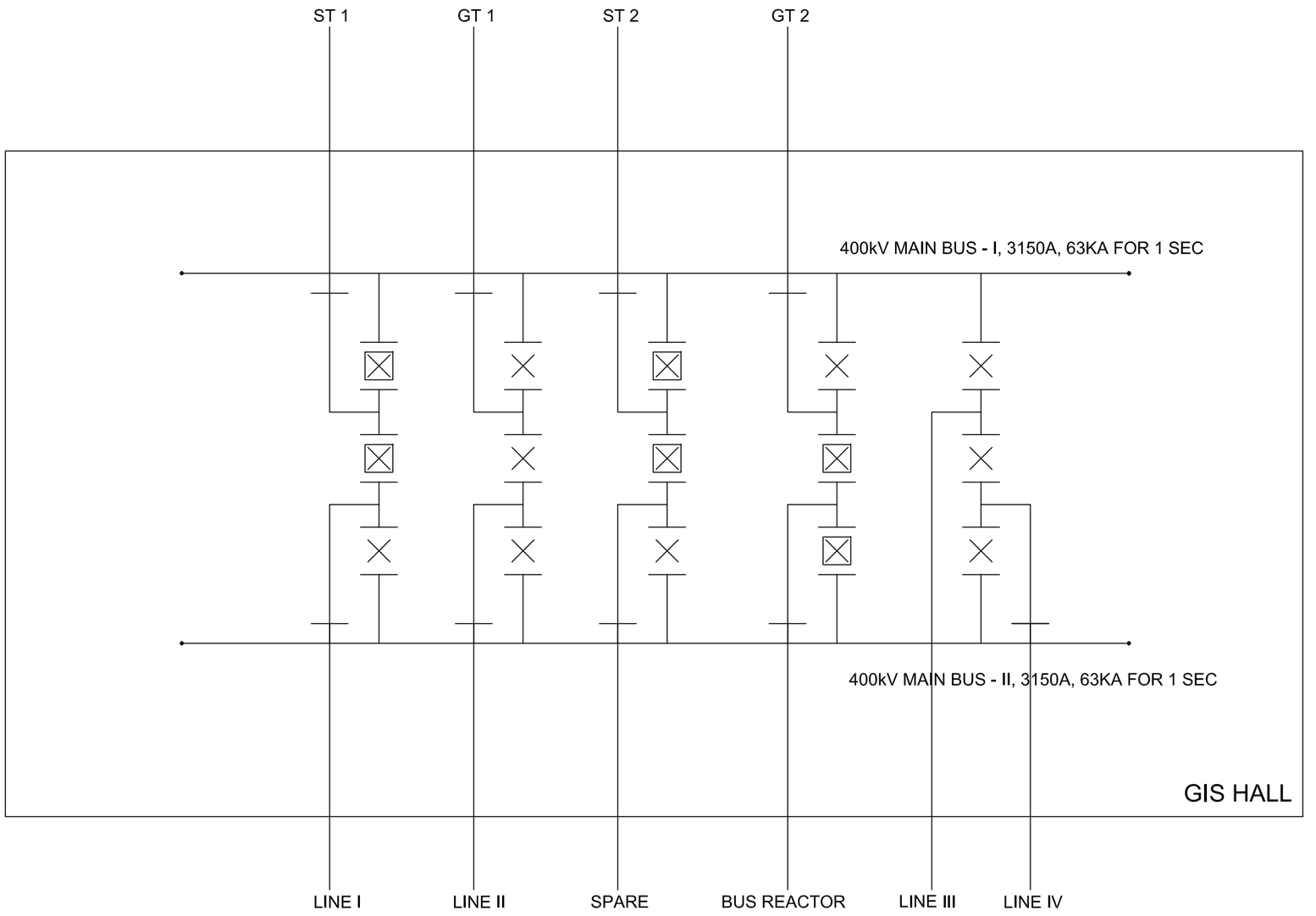
DRAWING No.

COMPUTER DRG. PATH NAME :

REF. DRG. No.

SIGN. & DATE

INVENTORY No.



BREAKER WITH CONTROLLED SWITCHING

BREAKER WITHOUT CONTROLLED SWITCHING

REV.	DATE	ALTERED / CHECKED / APPROVED	ZONE
01	12.12.22	ALTERED PC; CHECKED RD; APPROVED VK	SLD REVISED TO INCORPORATE ADDITIONAL CT & CSD AS PER CUSTOMER COMMENTS.

CA NO.

ADDITIONAL INFORMATION W.O.No.

STATUS OF DRAWING

DISTRIBUTION OF PRINTS

ग्राहक/परियोजना का नाम NAME OF CUSTOMER/PROJECT: NTPC TALCHER SUPER THERMAL POWER PROJECT PHASE-III (2x660 MW)

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
ट्रांसमिशन परियोजना विभाग
BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION

	नाम /NAME	हस्ता /SIGN.	दि/DATE
बनाया DRAWN	PC	-SGD-	15.10.22
जाँचा CHECKED	RD	-SGD-	15.10.22
स्वीकृत APPROVED	VK	-SGD-	15.10.22

विभाग DEPT. | कोड CODE | अनुपात / SCALE | कार्ड कोड CARD CODE

शीर्षक/TITLE: 400kV GIS SWITCHYARD SINGLE LINE DIAGRAM

ड्रॉईंग सं./DRAWING NO.
NTPC DRG NO. 4540-001-230-PVE-P-001
BHEL DRG NO.

पुनरा/REV. 01

पृष्ठ सं./SHEET No. 02 | अगला पृष्ठ/NEXT SHEET 03

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

DRAWING No.

COMPUTER DRG. PATH NAME :

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

=W1

ST 1 | GT 1 | ST 2 | GT 2

401 LA | 404 LA | 407 LA | 410 LA

401 CVT | 404 CVT | 407 CVT | 410 CVT

401 X | 404 X | 407 X | 410 X

400kV MAIN BUS - I

4BUSI LA | 4BUSI 89E1 | 4BUSI 89 | 4BUSI 89E2 | 4BUSI VT

401	404	407	410	413
CTM	CTM	CTM	CTM	
89TE	89TE	89TE	89TE	
89T	89T	89T	89T	
89A	89A	89A	89A	89A
89AE	89AE	89AE	89AE	89AE
CTA	CTA	CTA	CTA	CTA
-52*	-52	-52*	-52	-52
CTB	CTB	CTB	CTB	CTB
89BE	89BE	89BE	89BE	89BE
89B	89B	89B	89B	89B

402	405	408	411	414
89AE1	89AE1	89AE1	89AE1	89AE1
89A	89A	89A	89A	89A
89AE2	89AE2	89AE2	89AE2	89AE2
CTA1	CTA1	CTA1	CTA1	CTA1
-52*	-52	-52*	-52*	-52
CTA2	CTA2	CTA2	CTA2	CTA2
89BE2	89BE2	89BE2	89BE2	89BE2
89B	89B	89B	89B	89B
89BE1	89BE1	89BE1	89BE1	89BE1

403	406	409	412	415
89L	89L	89L	89BR	89L
89LE	89LE	89LE	89BRE	89LE
CTL	CTL	CTL	CTBR	CTL
-52	-52	-52	-52*	-52
CTA	CTA	CTA	CTA	CTA
89AE	89AE	89AE	89AE	89AE
89A	89A	89A	89A	89A
89B	89B	89B	89B	89B
89BE	89BE	89BE	89BE	89BE
CTB	CTB	CTB	CTB	CTB

403 X | 406 X | 409 X | 412 X | 413 X | 415 X

403 WT | 406 WT | 412 LA | 413 WT | 415 WT

403 CVT | 406 CVT | 413 CVT | 415 CVT

403 LA | 406 LA | 413 LA | 415 LA

4BUSII LA | 4BUSII VT | 4BUSII 89E2 | 4BUSII 89 | 4BUSII 89E1

400kV MAIN BUS - II

GIS HALL

LINE 1 | LINE 2 | SPARE | BUS REACTOR | LINE 3 | LINE 4

NOTES:
1. EARTHING SWITCHES WITH # ARE HIGH SPEED EARTHING SWITCHES.
2. CIRCUIT BREAKERS WITH * ARE BREAKERS HAVING CONTROLLED SWITCHING FACILITY.
3. GT STANDS FOR GENERATOR TRANSFORMER.
4. ST STANDS FOR STATION TRANSFORMER.

EQUIPMENT DESIGNATION FOR SLD

4	01	89	52	A/B/L/T/BR	E	X
VOLTAGE LEVEL = 400kV	BAY NO. - 01, 02, N	EQUIPMENT ID - (ISO)	EQUIPMENT ID - (CB)	A-EQPT CONNECTED TOWARDS BUS B-EQPT CONNECTED TOWARDS TIE L-EQPT CONNECTED TO LINE T/BR-EQPT CONNECTED TO TRANSFORMER/REACTOR SIDE	EARTH-SWITCH	SF-6 TO AIR BUSHING

REV.	DATE	ALTERED / CHECKED / APPROVED	ZONE
01	12.12.22	PC / RD / VK	SLD REVISED TO INCORPORATE ADDITIONAL CT & CSD AS PER CUSTOMER COMMENTS.

CA NO.

ADDITIONAL INFORMATION W.O.No.

STATUS OF DRAWING

DISTRIBUTION OF PRINTS

ग्राहक/परियोजना का नाम NAME OF CUSTOMER/PROJECT: NTPC TALCHER SUPER THERMAL POWER PROJECT PHASE-III (2x660 MW)

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
ट्रांसमिशन परियोजना विभाग
BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION

	नाम /NAME	हस्ता./SIGN.	दि/DATE
बनाया DRAWN	PC	-SGD-	15.10.22
जाँचा CHECKED	RD	-SGD-	15.10.22
स्वीकृत APPROVED	VK	-SGD-	15.10.22

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BHEL DRG NO.

पृष्ठ/REV. 01

पृष्ठ क्र./SHEET No. 03 | अगला पृष्ठ/NEXT SHEET 04

DRAWING No.

COMPUTER DRG. PATH NAME :

400kV OUTDOOR EQUIPMENT

S.NO.	DESCRIPTION	SYMBOL	BAY NO./LOCATION	UNIT	QUANTITY
1	3X1PH, 3X275 MVA, 420/SQRT(3)/21kV GENERATOR TRANSFORMER		404, 410	NOS.	2
2	144* MVA, 400/11.5/11.5 kV STATION TRANSFORMER		401, 407	NOS.	2
3	125 MVAr, 400kV SHUNT REACTOR - 3PH		412 BR	NOS.	1
4	336 kV LIGHTNING ARRESTER - 1PH		401 LA, 403 LA, 404 LA, 406 LA, 407 LA, 410 LA, 412LA, 413 LA, 415 LA	NOS.	27
5	400kV, 8800pF LINE CAPACITIVE VOLTAGE TRANSFORMER - 1PH.		403 CVT, 406 CVT, 413 CVT, 415 CVT	NOS.	12
6	400kV, 4400pF CAPACITIVE VOLTAGE TRANSFORMER FOR GT BAYS - 1PH		404 CVT, 410 CVT	NOS.	6
7	400kV, 3150A 0.5mH PEDESTAL MOUNTED WAVE TRAP - 1PH		403 WT, 406 WT, 413 WT, 415 WT	NOS.	8

400kV INDOOR GIS

S.NO.	DESCRIPTION	SYMBOL	BAY NO./LOCATION	UNIT	QUANTITY
1	400kV, 3150 A, 63kA FOR 1 SEC, CIRCUIT BREAKER WITH CONTROLLED SWITCHING - 3PH		401-52, 402-52, 407-52, 408-52, 411-52, 412-52	SETS	6
2	400kV, 3150 A, 63kA FOR 1 SEC, CIRCUIT BREAKER WITHOUT CONTROLLED SWITCHING - 3PH		403-52, 404-52, 405-52, 406-52, 409-52, 410-52, 413-52, 414-52, 415-52	SETS	9
3	400kV, 3150 A, 63kA FOR 1 SEC, DISCONNECTOR WITH ONE EARTH SWITCH - 3PH		401-89A, 401-89B, 401-89T, 403-89A, 403-89B, 404-89A, 404-89B, 404-89T, 406-89A, 406-89B, 407-89A, 407-89B, 407-89T, 409-89A, 409-89B, 410-89A, 410-89B, 410-89T, 412-89A, 412-89B, 412-89BR, 413-89A, 413-89B, 415-89A, 415-89B	SETS	25
4	400kV, 3150 A, 63kA FOR 1 SEC, DISCONNECTOR WITH TWO EARTH SWITCHES - 3PH		402-89A, 402-89B, 405-89A, 405-89B, 408-89A, 408-89B, 411-89A, 411-89B, 414-89A, 414-89B	SETS	10
5	400kV, 3150 A, 63kA FOR 1 SEC, DISCONNECTOR WITH ONE HIGH SPEED EARTH SWITCHES -3PH		403-89L, 406-89L, 409-89L, 413-89L, 415-89L	SETS	5
6	400kV, 3000A, 63kA FOR 1 SEC, CURRENT TRANSFORMER - 1PH		401-CTA, 401-CTB, 402-CTA1, 402-CTA2, 403-CTA, 403-CTB, 403-CTL, 404-CTA, 404-CTB, 405-CTA1, 405-CTA2, 406-CTA, 406-CTB, 406-CTL, 407-CTA, 407-CTB, 408-CTA1, 408-CTA2, 409-CTA, 409-CTB, 409-CTL, 410-CTA, 410-CTB, 411-CTA1, 411-CTA2, 412-CTA, 412-CTB, 413-CTA, 413-CTB, 413-CTL, 414-CTA1, 414-CTA2, 415-CTA, 415-CTB, 415-CTL	NOS.	105
7	400kV, 3000A, 63kA FOR 1 SEC, METERING CURRENT TRANSFORMER - 1PH		401-CTM, 404-CTM, 407-CTM, 410-CTM, 412-CTBR	NOS.	15
8	400kV BUS VOLTAGE TRANSFORMER - 1PH		4BUSI VT, 4BUSII VT	NOS.	6
9	400kV, 3150 A, 63kA FOR 1 SEC, DISCONNECTOR FOR BUS VT WITH TWO EARTH SWITCHES - 3PH		4BUSI 89, 4BUSII 89	SETS	2
10	BUS SURGE ARRESTER - 1PH		4BUSI LA, 4BUSII LA	NOS.	6
11	400kV SF6 TO AIR BUSHING - 1PH		401-X, 403-X, 404-X, 406-X, 407-X, 409-X 410-X, 412-X, 413-X, 415-X	NOS.	30

NOTES:
1. WAVETRAPS SHALL BE PROVIDED IN TWO PHASES.
2. RATING OF LA SHALL BE DECIDED BASED ON INSULATION COORDINATION AND TOV RESULTS.
3. ST RATING IS SUBJECT TO APPROVED SIZING CALCULATION
4. EARTHING SWITCHES MARKED WITH # ARE HIGH SPEED EARTHING SWITCHES.
4. CIRCUIT BREAKERS WITH * ARE BREAKERS HAVING CONTROLLED SWITCHING FACILITY.
5. GT STANDS FOR GENERATOR TRANSFORMER.
7. ST STANDS FOR STATION TRANSFORMER.
8. NOMENCLATURE MAY CHANGE AFTER FINALIZATION OF VENDOR.

MAIN SYSTEM PARAMETERS

1. NOMINAL VOLTAGE	-	400kV
2. HIGHEST SYSTEM VOLTAGE	-	420kV
3. RATED FREQUENCY	-	50 HZ
4. RATED SHORT TIME CURRENT	-	63kA FOR 1 SEC
5. POWER FREQUENCY WITHSTAND VOLTAGE	-	650 kVrms
6. LIGHTNING IMPULSE WITHSTAND VOLTAGE	-	± 1425 kVpeak
7. SWITCHING IMPULSE WITHSTAND VOLTAGE	-	± 1050 kVpeak
8. CREEPAGE	-	31mm/kV (13020 MM)

REV.	DATE	ALTERED / CHECKED / APPROVED	ZONE
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ड्रॉइंग सं./DRAWING NO.
NTPC DRG NO. 4540-001-230-PVE-P-001
BHEL DRG NO.

पुनरी./REV. 01

पृष्ठ सं./SHEET No. 04 | अगला पृष्ठ/NEXT SHEET 05

REF. DRG. No. | SIGN. & DATE | INVENTORY No.