भारत हेवी इलेक्ट्रिकल्स लिमिटेड
(भारत सरकार का उपक्रम)
BHARAT HEAVY ELECTRICALS LIMITED
(A Govt. of India Undertaking)

TCN - 05

Ref: PSER:SCT:KLN-M1870:TCN-05 Date: 14-03-2018

Sub	Tender Change Notice (TCN) - 05.	
Job	Design, Engineering, Manufacturing, Supply, Erection, Commissioning etc. of Hydrogen Generation Plant for 2X660 MW Maitree Super Thermal Power Project, Rampal, Bangladesh.	
Ref	1.0	Tender no PSER:SCT:KLN-M1870:18.
	2.0	BHEL's NIT, vide reference no PSER:SCT:KLN-M1870:6431, Dated 19-01-2018.
	3.0	BHEL's TCN-01, vide reference no PSER:SCT:KLN-M1870:TCN-01, Dated 07-02-2018.
	4.0	BHEL's TCN-02, vide reference no PSER:SCT:KLN-M1870:TCN-02, Dated 15-02-2018.
	5.0	BHEL's TCN-03, vide reference no PSER:SCT:KLN-M1870:TCN-03, Dated 27-02-2018.
	6.0	BHEL's TCN-04, vide reference no PSER:SCT:KLN-M1870:TCN-04, Dated 08-03-2018.
	7.0	Other References, if any.

With reference to above, following points/ documents, relevant to tender, may please be noted and complied with while submitting the offer.

1. Bidder's clarification is attached vide Annexure-A to TCN-05.
2. Amendment-1 to Volume-II, Technical Specification for Hydrogen Generation Plant is attached herewith.
3. Revised `No deviation certificate' is attached. Bidder to submit `No deviation certificate' as per attached format only.
4. All other terms & conditions shall remain unchanged.

Thanking you,

Yours faithfully,
for BHARAT HEAVY ELECTRICALS LTD

Sr. Engineer (SCT)

Encl: As above.

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)
POWER SECTOR EASTERN REGION, DJ-9/1, SALT LAKE CITY, KOLKATA - 700 091
फैक्स/Fax : (033) 23211960 फोन/Phone : बोर्ड/EPABX : (033) 23398000

ANNEXURE-A TO TCN-05

JOB: Design, Engineering, Manufacturing, Supply, Erection, Commissioning etc. of Hydrogen Generation Plant for 2X660 MW Maitree Super Thermal Power Project, Rampal, Bangladesh.

TENDER NO - PSER:SCT:KLN-M1870:18.

CLARIFICATION

Sl No	Reference clause of tender document		Existing Provision	Bidder's Query	BHEL's Clarification
			FILE-4.0-SCT-KLN-M1870-VOL-II-TS-(421-704)		
	Cl. No.	Page No.	B12 (PART 1: HYDROGEN GENERATION PLANT)		
1	B12.3.1	14 of 284	one (1) electrolysis unit complete with all accessories such as feed water tank, supply tank for electrolyte solution, electrolyte pump with motor, gas cooling aggregate, gas scrubber, gas leak detection system, etc. N2 purging system, connecting pipes, all necessary fittings, base frames, etc.	one tank common for both is applicable and considered	Bidder to follow technical apecification.
2	B12.3.1	14 of 284	one (1)heating equipment, electrically operated, for pressurizing the cell block before Start up of the plant, complete with all necessary accesso-ries.	Not required as per our standard and proven design.	As already mentioned in the specification that" the technical specification is prepared considering Unipolar/ bipolar design. So the equipment and mandatory spares as applicable for Uni-polar/ bipolar design as per manufacturer standard practice shall be supplied". In veiw of same bidder to follow technical apecification.
3	B12.3.1	14 of 284	one (1) make up water tank with by-pass line, drain, vent, level indicator and all necessary instrumentation, tank capacity shall allow 12 hours of hydrogen generator operation, in case of interruption of demi- water supply.	Not required as per our standard and proven design.	Bidder to follow technical apecification.
4	B12.3.1	14 of 284	one (1) nitrogen gas bottle station to provide sufficient bottles to ensure uninterrupted operation	common for both stream.	Bidder to follow technical apecification.
5	B12.3.2	14 of 284	The hydrogen compressors are to be flexible-mounted, each with explosion-proof drive motor, protective filters, intermediate chillers/coolers, drying, purification and pressure relief devices, connection pipes, fittings, etc.	dryer, purification are a common skid for entire plant.	Bidder to follow technical apecification.
6	B12.3.3	14 of 284	one (1) DCS/ PLC/ microprocessor based local control panel with mimic diagram, redundant controllers, indicators, alarm systems, terminal strips for transfer signals and all other electrical and pneumatic equipment for closed- and open-loop control function	mimic is not required, as we will provide EWS/OWS (PC based).	Bidder to follow technical apecification.
7	B12.3.3	15 of 284	all equipment, such as cables, transmitters, etc. up to and including the terminals at the H2-generation plant necessary for transmission of impor-tant remote indications, alarms, signals, etc. to the central control room.	CCR distance is not known, we will keep signal exchange provision (dry contact) in our panel only. Cable out side HGP Control room not in our Scope.	Bidder to follow technical apecification. Distance between H2 Plant and CCR is 1200Meter approx.
8	B12.3.3	15 of 284	Appropriate Hydrogen purity monitor and hydrogen leak detection system shall be provided and hooked up to the DCS for CCR monitoring. In addition one H2 dryer should be provided for each unit.		Bidder to follow technical apecification.
9	B12.3.3	15 of 284	In addition one H2 dryer should be provided for each unit.	Dryer is common.	Bidder to follow technical apecification.
10	B12.3.3	15 of 284	Complete equipment for chemical cleaning of the electrolysis with the requested chemical cleaning pump and drainage pump, storage tanks for chemicals, valves and internal piping and waste water pipeline up to the water treatment plant	not applicable.	Noted. However, if found applicable during detail engineering, all the applicable equipemnts along with instrument, piping and valve etc. shall be provided by the bidder without any cost implication to BHEL/customer.
11	B12.3.4	15 of 284	All necessary venting and draining equipment including connection pipes to the drain system and emptying equipment	drainage system shall be connected at one point in the hydrogen building.	Bidder to follow technical apecification.
12	B12.3.4	15 of 284	Normal and specialized fire-extinguishing equipment	fire extinguishers are not in our Scope.	Bidder to follow technical apecification.
13	B12.4.1	16 of 284	a) make up the normal hydrogen leakage for the steam turbine generator b) simultaneously, completely charge the empty high pressure storage bottles (numbers as per design) in not longer than 4 days. The number of storage bottles and piping shall be sized such that the generator system may be completely charged with gas from the storage bottles in not more than 9 hours, including purging.	BHEL to suggest this capacity, considering their leakage.	Bidder to note that plant capacity and number of cylinders already mentioned in technical specification. Hence, bidder to follow technical specification.
14	B12.4.2	17 of 284	Where suitable and applicable all pumps are to be fitted with dry-run protection, minimum-flow device, with shut-off valves on the suction and the discharge sides and with check valves on the discharge side. Suitable pipes are to be provided to drain stuffing-box leakage.	vacuum pump only is applicable. not with the same accessories as mentioned in this specification.	Bidder to follow technical apecification.
15	B12.4.3	17 of 284	accidents in the event of leakage. The feed water tank and the storage tank for the electrolyte solution can be made of stainless steel, glass fiber rein-forced plastic (GRP), polyethylene (PE) or polypropylene (PP).	HD PVC, and HDXLPE is offered.	Bidder to follow technical apecification.
16	B12.4.4	18 of 284	The power supply equipment, i.e. rectifiers with transformers is to be constructed to have no adverse effect on supply switchgear. Transformer & rectifier should be in air-conditioned room. See also requirements stated under Clause 4.6 of this Section. Hydrogen production shall be automatical-ly controlled to meet the demand.	Rectifier shall be placed in Ventilated Electrical room, not Air Conditioned room, due to high heat dissipation.	Bidder to follow technical apecification.
17	B12.4.4	18 of 284	An electrode cleaning system if necessary to obtain high operational reliability has to be provided. Wastes shall be discharged to the Waste Water Treatment Plant.	Not required in our design.	Noted. However, if found applicable all the equipemnts along with instrument, piping and valve etc. shall be provided by the bidder without any cost implication to BHEL/customer.
18	B12.4.5	18 of 284	fully automatic manner. Should a fault occur in any of the systems or should any parameter exceed the safe working limit, the plant shall shut down in a safe manner and an alarm signal shall be given on the local control panel as well as in the central control room. Local panels and for all local control board equipment shall also be covered by this section.	local panels / local control boards are not offered.	Bidder to follow the specification.
19	B12.4.5	19 of 284	The local control system shall be suitably interfaced to the DCS for remote operation and monitoring from CCR.	We proposed PLC based control system in the Hydrogen Plant control room. Remote monitoring or control is not envisioned in our offer. Nor, recommended as per standard operating of Hydrogen Plant.	PLC based control system is noted. For other part bidder to follow the specification.
20	B12.4.5	19 of 284	The volume indication, the audible and visible low and high alarms of the gasholder and the optical on/off indication and audible and visible alarms of the generation line shall be transmitted to the local control panel and to the	Audiable in the PC.	Bidder to follow the specification.
21	B12.4.5	19 of 284	DCS in the CCR. Hydrogen purity Analyzer (Meter) shall be provided by the Contractor. The high alarm of the gasholder shall stop the operation of the generation plant.	DCS connectivity is not envisioned, in our offer	Bidder to follow the specification.
22	B12.4.6	19 of 284	The sub-distribution board must contain two 100% in-feeds equipped with hand-operated circuit breakers with current transformers for metering purposes and for protection as purposes. The sub-distribution should be of plug-in type. A circuit breaker must be provided for the output to the transformer/ rectifier, matched to the actual current requirements and including all necessary protective devices.	Our designed Rectifier is different, than what is written in the specification. Its complete will all respect of operation.	Bidder to follow technical apecification.

ANNEXURE-A TO TCN-05

JOB: Design, Engineering, Manufacturing, Supply, Erection, Commissioning etc. of Hydrogen Generation Plant for 2X660 MW Maitree Super Thermal Power Project, Rampal, Bangladesh.

TENDER NO - PSER:SCT:KLN-M1870:18.

CLARIFICATION

Sl No	Reference clause of tender document		Existing Provision	Bidder's Query	BHEL's Clarification
23	B12.4.6	19 of 284	The transformers shall be designed with self air cooling. Cable connection boxes shall be provided at the primary and secondary side. The LV shall be earthed solidly and the breakers shall be coordinated with the upstream breakers.	The LV side can't be solidly earthed, as this will lead to localized current flow, loss of power, and damage to Electrolyser.	Bidder to follow technical apecification.
24	B12.4.6	19 of 284	The transformer/rectifier unit is to be installed in sheet metal cubicles with front and rear door with all the appropriate features a required. The rectifiers are to be provided as Thyristor-controlled devices. On the front of the transformer/rectifier cubicle, the Contractor shall provide all the necessary monitoring equipment, measuring instruments, switches, indicator lamps etc. Illumination intensity shall be 300 Lux.	Could not understand the illumination intensity, BHEL to clarify.	Bidder to follow technical apecification.
25	LV Motor Data Sheet	98 of 284	: Continuous duty LT motors up to 160 KW Output rating (At 45 deg.C ambient temperature), shall be Premium Efficiency class-IE3	small motor 0.56kW is not available in IE3.	Noted. However, if found applicable during detail engineering the same shall be provided by the bidder without any cost implication to BHEL/customer.
			SECTION – IC SPECIFIC TECHNICAL REQUIREMENTS (CONTROL & INSTRUMENTATION)		
26	4	108 of 284	Redundant PLC communication shall be provided for communication between PLC and DCS through serial link with OPC Compliant for monitoring /Control. For detail, please refer PLC Architecture Diagram.	Control from DCS will not be given, only monitoring permission will be given.	Bidder to follow technical apecification.
27	7	108 of 284	The 24 V DC systems shall consist of 2 sets of power supply with each set consisting of 1 x 100% battery charger, 1 x 100% batteries for 1 hour duty and 1 x 100% DC distribution board.	BHEL to confirm whether Redundant UPS, or Redundant Battery charger system, with Redundant or Single Battery bank, back up time 30 min or 60 min to be considered. Because the specification calls for both in two different section.	Both UPS and Charger are applicable. Further battery back-up shall be 1 hour.
28	8	108 of 284	Intelligent Battery health management system shall be provided for each set of 24VDC power supply system and UPS batteries (except mini-UPS). It shall be connected to DCS.	It will be Connected to PLC EWS, OWS.	Bidder to follow technical apecification.
29	12	109 of 284	Redundancy of instruments /sensors shall be provided, irrespective of instrumentation shown in the PID, by bidder as follows :- For important parameters which are concerning the safe operation of the generation units, triple redundancy shall be applied; for interlock and alarm signal, double redundancy shall be supplied.	No redundancy of instruments are required in our standard design and proven practice, we have sufficient check points to establish any failure and capture, to safe shut down of the plant.	Bidder to follow technical apecification.
30	21	109 of 284	All transmitters shall be smart type and shall have 4-20mA DC signal with superimposed digital communication (HART). Each Temperature element shall be complemented with temperature transmitters, compensating cable, JB/LIE/LIR & other erection hardware.	As per our standard and proven practice, we use RTDs directly connected to RTD Modules in the PLC and Not Temperature Transmitters.	Bidder to follow technical apecification.
			SECTION – IIA - GENERAL TECHNICAL REQUIREMENT (MECHANICAL)		
	4.0.2	115 of 284	CONSTRUCTION DETAILS OF EQUIPMENT		
31	4.0.3	116 of 284	Two nos. of rectifier (one for each electrolyser) to cater load of each of the electrolyser shall be provided. The rectifier equipment shall be complete in all respects with air-cooled rectifier transformer, thyristor convertor, electronic control and annunciation, filters choke etc. mounted in suitable panels.	Filter, choke not applicable in our standard and proven design.	Bidder to follow technical apecification.
32	4.0.4	116 of 284	Material of the pipes and pumps:- i) Hydrogen gas line:- SS316 ii) Oxygen gas line:- SS316, iii) Cooling Water line (DM water) :- SS 304 iv) DM water line :-SS 304. iv) KOH pump :- SS 304 (wetted parts)	MOC of all pipe lines. shall be as per our standard and proven practice, H2, O2, CW- CS/ MS, DM-SS304,	Bidder to follow technical apecification.
33	4.0.6	116 of 284	(ii) Capacity of each gas holder Shall be equal to capacity of one stream of Hydrogen Generation Plant. (iii) Material ASTM A36 or equivalent (v) To provide with two (2) Seal pots for each gas holders.	capacity & MOC shall be as per our design. 6 M3 is sufficient for this application. 1 Seal pot is sufficient for one gas holder.	Bidder to follow technical apecification.
34	4.0.9	117 of 284	(ix) All suitable auxiliaries (as applicable) such as built in relief valves, Pressure and temperature gauges after every compressor stages, mechanical lubricator, built in automatic unloader devices, Water cooled inter coolers as applicable after every compression stage, flow switches, pressure gauge in coolant line, sight flow indicators in coolant line, V belt drive with pulleys, a transfer switch to allow operation of standby compressor automatically, suction filters, scrubber to remove any traces of entrapped electrolyte, separator and filters, suitable protection device to prevent suction of water from gas holders as a back-up to low level switch provided on the gas holders for compressor TRIP, Mist Eliminators (if applicable). One number on-line % oxygen / trace oxygen analyzer at the suction shall be provided for continuously monitoring hydrogen purity before compressor and also to provide suitable alarm and automatic tripping of plant in case, hydrogen purity falls below the present level.	As per Compressor Manufacturer standard and proven practice.	Bidder to note that the as applicable is already specified in the referred clause hence bidder to follow technical specification.
35	4.0.13	117 of 284	Hydrogen Nitrogen Gas Cylinders and Cylinder Manifold:	The configuration needs to be discussed and understood.	Bidder to follow technical apecification.
			SECTION – IIC - GENERAL TECHNICAL REQUIREMENT (CONTROL AND INSTRUMENTATION)		
36	1.14	186 of 284	DEW POINT METER-Display : Combined enclosure with two three-digit seven segments LED display with decimal point after two digits. **LED height shall be 4 inches, clearly legible from a distance of atleast 10 meters.**	The 4" display is not available with any manufacturer, in Hydrogen application. Thus, not considered by us.	Bidder to follow the specification.
37			3.03.66.01 Hydrogen Gas Hygrometer		
38		190 of 284	17 Calibration — Required every 12 months, Calibrator shall be supplied by bidder.	calibrator, can't be supplied. These needs to be factory calibrated.	Bidder to follow technical apecification.
39		191 of 284	18 Calibration Gas — 5ppm O2 in N2, shall be provided by bidder for one year after commissioning of plant.	not possible, the gas expires.	Bidder to follow technical apecification.

BHEL	**AMENDMENT TO TECHNICAL SPECIFICATION FOR HYDROGEN GENERATION PLANT 2 X 660MW MAITREE SUPER THERMAL POWER PROJECT AT RAMPAL, BANGLADESH**	SPECIFICATION NO.: PE-TS-421-168-A001 AMENDMENT NO # 1 REV. NO. 00 DATE: 07/03/2018 Page **1** of **1**

The following modifications with respect to Technical Specification for **HYDROGEN GENERATION PLANT** BHEL's Technical specification no **PE-TS-421-168-A001** shall apply.

Bidder to note that existing clauses/ details as appearing in the specification stands deleted and clauses/details as mentioned in "Modified to or Read as" column shall be applicable and complied by the bidder as listed below in **SCHEDULE A**.

SCHEDULE-A

MODIFIED CLAUSES/ PAGE NUMBERS:

Sl no.	Vol. No.	Section/ Description	Clause no	Page no	Existing clause/details	Modified to or Read as
1.	IIB	SECTION– IA	2.1.51	6 of 704	Any item/ equipment manufactured in China shall not be acceptable for this project.	The referred clause stands deleted. For any items/ equipment, Indian and Chinese codes and standards are not acceptable. However, other International Design standards are acceptable. Latest version of all codes and standards to be followed.

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ANNEXURE-2

FORMAT FOR NO DEVIATION CERTIFICATE
(To be submitted in the bidder's letter head)

BHARAT HEAVY ELECTRICALS LIMITED,
Power Sector - Eastern Region,
Plot no 9/1, DJ Block, Sector – II, Salt Lake City,
Kolkata – 700 091

Sub	No Deviation Certificate.	
Job	Design, Engineering, Manufacturing, Supply, Erection, Commissioning etc. of Hydrogen Generation Plant for 2X660 MW Maitree Super Thermal Power Project, Rampal, Bangladesh.	
Ref	1.0	Tender no PSER:SCT:KLN-M1870:18.
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	6.0	BHEL's TCN-04, vide reference no PSER:SCT:KLN-M1870:TCN-04, Dated 08-03-2018.
	7.0	BHEL's TCN-05, vide reference no PSER:SCT:KLN-M1870:TCN-05, Dated 14-03-2018.
	8.0	All other pertinent issues till date.

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted/uploaded offer/documents in accordance with tender instructions with acceptance of the terms & conditions of the tender by us and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative of the bidder)