THE WEST BENGAL POWER DEVELOPMENT CORPORATION LIMITTED

(A Govt. of West Bengal Enterprise)

Bakreswar Thermal Power Project

P.O.Bk.T.P.P , Dist -Birbhum,Pin -731104

NIT No.: WBPDCL/Tend-Adv/CC/13-14/172/BkTPP Date: 08.01.2014

Sealed tenders in two parts, Part A (for technical specification bid) and Part B (for commercial price bid) in duplicate are invited by the General Manager, BkTPP with same material specification for the supply of following material at BkTPP.

1.	Description of Material	:	As per Annexure-I
2.	Earnest Money	:	Rs. 4,00,000/-
3.	Cost of Tender Paper	:	Rs. 1,000/-
4.	Sale of Tender Paper	:	08.01.2014 to 29.01.2014 up to 01:30 PM
5.	Pre-bid discussion	:	31.01.2014 at 03:00 PM
6.	Last Date of Submission of Sealed Tender Paper	:	20.02.2014 upto 02:30 PM
7.	Opening of Tender		
7a.	Part-A (for technical bid)	:	20.02.2014 at 02:45 PM
7b.	Part-B (for price bid)	:	Opening date will be intimated to the successful i.e technically accepted bidders later on.
8a.	Material Delivery Period	:	Twenty Four (24) weeks from the date of the order.
8b.	Installation & Commissioning Period	:	Two (02) months from arrival of material at BkTPP Store.

Qualifying Requirement:

(i) The bidder should be an original manufacturer of Similar Hydrogen Generator or authorized channel partner/Vendor of the same. Bidders should have manufacturing facility in India.

(ii) The Bidder should have supplied at least 10 schemes in India over past 5 years and shall submit necessary reference list along with the offer.

(iii) The bidder should have similar Installation in any Indian PSU Sector. Copy of supporting documents is to be provided.

Detailed terms & conditions are set forth in the Tender Paper (Non - Transferable) which can be obtained from the Sr. Manager(S&P), BkTPP on application. The cost of Tender Paper is to be deposited in the Account Section, BkTPP from 10.30 AM to 01.30 PM (except Saturday, Sunday and Holiday). Tender Paper will not be issued against DD / MO / Cheque and by post. If any change or extension of due date or any corrigendum, may please visit website. The WBPDCL reserves the right to accept or to reject any or all tender either in full or in part or to split up, if necessary without assigning any reasons whatsoever. For qualifying requirements and other details visit website www.wbpdcl.co.in

T. K. BOSE
SR.MGR(S & P)
BkTPP/WBPDCL

ANNEXURE-I

TECHNICAL SPECIFICATION
FOR
Replacement of Existing Hydrogen Generator and Power Supply (Rectifiers) at WBPDCL Hydrogen Gen. Plant:

Description of Hydrogen Generator:

Sl No.	Item Code	Item Description	Quantity	UOM
1	04S070028	H2 Generator Set, H2 purity 99.99%, Discharge Pressure 100psig (7.0kg/cm2), Discharge flow 11.2 Nm3/hr. with integral H2 purifier/drier assembly, power supply rectifier unit, Standard annunciation, protection and control panel, PC for SCADA with software for PLC environment friendly equipment. The equipments are to be designed and manufactured in accordance/compliance with specified Codes and Standards.	1.0	SET

GENERAL:

This specification is intended to cover dismantling of old Hydrogen Generator[size: L-110cm, W-94cm, H-171cm and it's Power Supply size: for Rectifier 76cmX76cmX151cm, for TB 76cmX15.5cmX91.5cm] and install new hydrogen generator in that space by design, engineering, manufacture, inspection, testing at manufacturer's works, supply/delivery duly packed (sea worthy packing for imported items) FOR Site Basis, including freight, storage and handling at site, erection and commissioning, trial run at site, PG test, and plant handing over to WBPDCL etc. inclusive of all prevailing taxes, duties and other levies of HYDROGEN GENERATOR as specified below:

i) The system must be compatible with the existing H2 Compressor (Hofer make) at suction pressure to be maintained at 6-7Kg/CM2 (g), and suction temperature 40°C maximum. Cooling water flow available for the generator Maximum 44 Ltr./Minute from clarified water with MS pipe line from overhead tank free flow with operating temperature range from 0.6°C to 47°C. The Generator module must be acquired the same space as old one with the existing piping connection unaltered.

ii) New H2 Generator should be identical with that of old one, so that it can be retrofitted with the existing pipe lines, H2 compressor in respect to suction pressure and other parameters.

iii) If any changes required in protection system, that must be retrofitted to the existing system.

iv) One (1) Number Hydrogen Generator with Power Supply (Rectifiers) complete with all accessories and PLC based control panel including start up, and commissioning spares as required by for replacement of existing Hydrogen Generator.

Technical Specification:

1) Alkaline Bipolar design Hydrogen Generator with following Accessories:

i. Alkaline Bipolar Electrolyser with each Electrolysis module minimum 5 NM3/Hr. rating.
ii. Separate KoH Reservoir/ Phase separators for Hydrogen and Oxygen.
iii. Deoxo Tank for removing Oxygen from the Hydrogen gas.

iv. PLC controlled In-built Hydrogen Dryer having changeover cycle of 6 Hours each.
v. Recirculation KoH Pumps to feed electrolyte to individual cells and to remove Heat from the Modules.
vi. PLC controlled DM Water make Pump during operation.
vii. Heat Exchangers and Condensers for cooling the KoH coming out of Modules.
viii. Hydrogen in Oxygen Sensor to control and monitor H2 purity and trip the Generator if Purity falls below set point.

2) The equipments are to be designed and manufactured in accordance/compliance with following Codes and Standards. These include, but are not limited to, the applicable sections of the following:

- Pressure Vessels: ASME, Section VII, Div 1
- Piping: ASME B31.1
- Flanges, Fittings/Valve Bodies: ANSI, ASME
- Structures: ANSI/AWS D1 (American Welding Society)
- Electrical Wiring: ANSI/NFPA 70/ USA National Electrical Code
- Electrical Installation: ANSI/NFPA 70, Art. 500 for Class 1, Division 2, Group B
- Electrical Motors: NEMA, MG-1 & UL
- Electrical Enclosures: NEMA 250
- Grounding: NEC, Article 500
- Transformers: NEMA ST20

3) Specification of Hydrogen Gas produced by proposed Hydrogen Generator:

- Hydrogen (H2) Gas Capacity : 11.0 NM3/Hr.
- Hydrogen Purity : 99.999%
- Hydrogen Gas Delivery Pressure : 8 to 10 Bar.
- Oxygen Purity : < 5 PPM
- Oxygen Gas Delivery Pressure : 8 to 10 Bar.
- Dew Point (Moisture Content) : < 60 Dec. C.

4) Availability of Space for installation of new Hydrogen Generator:

- The space available for installation of New Hydrogen Generator (in place of old H2 Generator) is as per below:
  Length: 2.00 Meters.
  Width: 1.00 Meters.
  Hence Hydrogen Generator proposed by the bidder must be installed in the above specified area of 2 Meters X 1 Meter only.
  Note: It is to be noted that there is no other space available as the other Hydrogen Generator is in service.

A) Mechanical scope/ Requirement:

- Alkaline Bipolar design Electrolyser of Capacity 11.0 NM3/Hr. Electrolyser have 2 electrolysis modules. Each module shall be more than 5.0 Nm3/hr capacities.
- Electrolyser shall be standalone unit (installed on skid) and all the accessories shall be installed on that skid only.
- Physical dimension of Electrolyser shall be such that it is installed in 2 Meter X 1 Meter area. There is no other space left out as there is running Hydrogen Generator in the same room.

- Phase separators for Hydrogen and Oxygen where KoH is initially filled for operation. DM water inlet/ make up point in one of the Phase separator for Make up of DM water which is consumed during normal operation.
- Nitrogen purging system. Hydrogen Being Explosive Gas Inert gas or Nitrogen Purging is to be done before start-up and after shutdown.
- Adequate Heat exchangers/ condensers to cool down the KoH coming out of Electrolysis Modules.
- Inbuilt Hydrogen Dryer dual tower type with Changeover facility after 6 hours.
- Equipment is to be designed such that it can operate continuously or intermittently as per requirement.

B) Electrical scope/ Requirement:

The scope of electrical works, equipment and services shall be as per following:

- WBPDCL will provide only one feeder from their existing MCC suitable for Power Supply. No other feeder is available.
- Bidder has to make their own arrangement if they require additional feeders for their equipments.
- Power supply (rectifiers) shall be standalone unit and must be installed in a separate room (non Hazardous area). The Power Supply can be installed on the existing Power Supply panel space on the Cable Trench.
- Bidder has to provide their own DC cables as per requirements.
- Motors present in hazardous area of the hydrogen generation plant shall be Constant speed Sq. cage type Electric motor suitable for group IIC of IS 2148 or equivalent international standards like Class I Div II of NEC/ zone 2 or classification IIC of IEC 60079.

C) Control and instrumentation scope/requirement:

a) All necessary instruments such as transmitters, temperature elements, sensors, switches, gauges, controller, analyzer, solenoid valve, etc should be provided for safe, efficient & reliable operation and maintenance of the H2 generation plant. All instrument devices should be intrinsically safe with explosion proof enclosure suitable for hazardous area described in NEC article 500, Class-1, division-2 or EN60079-14 or shall comply with the essential requirements of ATEX directives as approved by CCE, India and other statutory authorities. All fittings, cable glands, etc. shall be strictly as per NEC recommendation Article 500 to 503.

b) General requirement for PLC and HMI (SCADA) system:

- The control of Hydrogen generator should be cold redundant processor (CPU) based PLC system. PLC unit should be supplied with power supply and necessary analogue and binary Input and Output cards, communication cards for normal operation.
- The PLC system should be provided with UPS system (30 mints back-up) for safe operation and shutdown incase of power interruption.
- Hydrogen generator & Compressor can be start and stop from remote PC and logging of the equipments operation.
- SCADA shall display following parameters:

  - Module Percentage Loading.
  - Different Annunciations related to generator & Compressor.
  - Compressor parameters (1st.stage & 2nd Stage pressure, temperature, etc)
  - Production rate.

- Feed Water pump timing, purge status, Elapse time, etc.
- All parameters including all field inputs to be displayed in the SCADA. Complete HMI and DATA Monitoring, Trend, event log, Software alarm are to be incorporated in the SCADA Computer (In addition to touch screen).
- Even log configuration from alarm and trip value of all analog parameters and state change of binary inputs are to be configured properly.
- License Document in paper/CD/DVD for SCADA computer is required.

c) All the instrument and controls shall have to Device Net Control system. Signal from the hydrogen generator shall be transmitted to PLC control panel installed in the control room.

d) Touch screen of the new Generator from local basis and system should be such that the total operation can be done from a remotely placed less than 50Mtr. Both the touch screen and PC should so parameter details along with the annunciation.

e) Space should be such that the new one can be spaced in existing place.

f) Following instruments for proposed hydrogen generator are envisaged as minimum:

- Level transmitter for measuring KOH leveling phase separator.
- Pressure transmitter for measuring the pressure of hydrogen and Oxygen gases as well as Dryer pressures for normal operation and safe shutdown.
- Flow switch to measure the KOH flow entering the electrolysis Modules.
- Thermocouples to measure KOH temperature at inlet and outlet of Modules, De-Oxo temperature, etc.

g) Panel for PLC, annunciation and relay control shall be provided with necessary alarms display with hooter. This panel should be wall mounted and the size of the panel should match with the space already provided. Max panel size (Width X Height X Depth)=1000 X 1000 X 600 in mm.

h) Documents in soft form (DVD/CD) as well as 3 nos. hard copy.

i) Complete Spare list with part no, parameters and ordering code for spare procurement.

D) Civil scope:

All civil foundation of equipment if required will be done by bidder. Bidder has to do the complete grouting of their equipments.

E) Others Requirement:

I. Safety points:

a) Checking & shut down due to feed water quality.

b) Nitrogen purging during start-up of Generator.

c) Automatic shut-down of system when deviated from normal design parameter.

d) Hydrogen in Oxygen monitor to determine the Hydrogen content in the Oxygen produced.

e) DC Current monitoring to Generator.

f) Hydrogen leak detectors to be inter locked with the Generation.

g) Dew point of Hydrogen generated should show and shut down the Unit if limit value crosses.

II. COMMISSIONING SPARES:

All the necessary commissioning spares shall be supplied as a part of base offer. Bidder will submit the list of commissioning spares for hydrogen generation plant along with the Bid.

III. QUALITY ASSURANCE PLANS:

Bidder has to submit Quality Assurance Plan after successful award of Contract along with Drawings and documents for WBPDCL approval. Detailed QAP,

inspection, checklist etc, shall be approved by WBPDCL. All inspection & testing etc. shall be carried out as per the approved Quality plan.
Any changes/additional tests insisted upon by WBPDCL during detailed engineering shall be accepted by bidder without any commercial implication.

IV. SUB VENDOR:

Bidder to note the sub vendors shall be selected from the sub vendor list enclosed as annexure. Additionally proposed sub vendor over and above specified in the enclosed list shall be subjected to WBPDCL approval during detailed engineering without any commercial / delivery implication to WBPDCL. Decision of WBPDCL shall be binding on vendor in this regard.

V. PG TEST:

Bidder shall perform required tests in presence of WBPDCL to prove and guarantee the performance guarantee parameters as indicated in Technical Proposal of the bid to the satisfaction of WBPDCL. The exact modalities of verifying guarantee for the parameters indicated in the specification shall be finally as agreed with the WBPDCL during detailed engineering & mutually agreed.

The Bidder shall arrange all the monitoring gadgets / instruments / equipments required for performing guarantee parameters (returnable after PG test). Site facility as available or as extended by WBPDCL shall only be provided.

VI. INSTRUMENT AIR/SERVICE AIR:

Instrument air and service air shall not be provided by WBPDCL. If Instrument air or Service air is required then bidder has to make their own arrangement.

N.B.

1. **Mandatory Spares, Maintenance Manual, Drawing, Other relevant certificates are to be supplied by the Party along with the package.**
2. **Training is to be provided by the party.**
3. **Complete recommended spare parts list with part number, drawing and ordering code for spare procurement must be provided.**