



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY

NOTICE INVITING TENDER

Phone: +91 431 257 7421/7297

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Web : www.bhel.com

TWO PART BID

Tender to be submitted in two Parts

Enquiry
Number:

2631900065

Enquiry
Date:

20.11.2019

Due date for submission
of quotation:

13.12.2019

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer should reach physically on or before 14.00 Hrs(IST) on the Date of tender opening. Tenders received after 14.00Hrs (IST) will not be considered for evaluation.

Item	Description	Quantity	(Indigenous Vendors) Matl. Will be Delivered to
10	Online Continuous Effluent Monitoring System as per the technical specification & commercial conditions applicable(To be downloaded from web site www.bhel.com/tender/tender_home.php or https://eprocure.gov.in/epublish/app)	1 Set.	FOR, BHEL,Stores, High Pressure Boiler Plant, Tiruchirappalli - 620014

Important points to be taken care during submission of offer

- 1) Material shall be delivered to (By Indigenous vendors): As stated above.
- 2) Delivery required 3 Weeks from the date of purchase order.
- 3) Erection and commissioning activities shall be done by the supplier, at BHEL Trichy works.
- 4) Erection & Commissioning period required 3 Week from the date of intimation by BHEL to vendor for deputation of their Engineers for E&C.
- 5) EMD applicable for this Enquiry is INR 40,000/-
- 6) Compliance Forms. TRY/IND/07 to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
- 7) All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions (refer MM / CE / GENL / GENL / 001 EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site www.bhel.com/tender/tender_home.php or from the Government tender website <https://eprocure.gov.in/epublish/app> under Enquiry reference 2631900065.

Tenders should be submitted before 14.00Hrs (IST) on the due date
Tenders will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.

Yours faithfully,
For BHARAT HEAVY ELECTRICALS LIMITED

V. Karunakaran
DGM / Capital Equipment / MM

Online Continuous Effluent Monitoring System at 2.0 MLD STP in BHEL, Trichy

PRE QUALIFICATION CRITERIA:

The BIDDER has to meet the following requirements to get qualified for consideration of the technical offer.

S. No.	REQUIREMENTS
1	If the vendor is not an OEM for the equipment, then dealership certificate from the Original Equipment manufacturer shall be submitted along with the offer.
2	Vendor should have successfully Commissioned similar OCEMS system in the last three Years and the same shall be in operation at present. PO and Completion certificate/commissioning report from the customer shall be submitted.

Online Continuous Effluent Monitoring System at 2.0 MLD STP in BHEL, Trichy

SI No	Item Description	Qty
01	Supply, installation, commissioning of Online Continuous Effluent Monitoring System for 2.0 MLD Sewage Treatment Plant located in BHEL, Trichy Factory Complex – Complete System	1 Set
02	Annual Maintenance Contract for a period of four years after the completion of 1 year from the date of successful commissioning of the system. To be quoted per annum for 4 year period	4 Years

Detailed Technical Specifications for the Online Continuous Effluent Monitoring System (OCEMS)

Brief Scope:

Supply, Erection, Testing and Commissioning of a comprehensive Online Continuous Effluent Monitoring System which is capable of analysing & measuring pH, TDS, TSS, COD, BOD of the treated water and to connect the existing Electro Magnetic Flow Meters to the OCEMS and capture data measure the inflow of Sewage and Outflow of Treated water. The system shall continuously monitor and transmit data to the TNPCB server fulfilling the requirements as detailed below:

1. The System shall be installed in the 2.0 MLD Capacity Sewage Treatment Plant located in BHEL-Trichy Factory complex.
2. The system shall be in conformance with the guidelines issued by Central pollution control board time to time.
3. The vendors shall compulsorily visit the site location and asses the site before submitting their quotation
4. Measurement Method shall be Non sampling type (continuous), no external sample preparation shall be required for measurement, measurement method must be online or in line/ Open Tank in situ Type as per CPCB and PPCB

5. Basic Requirements of the OCEMS

- a. Should be capable of operating un-attended over prolonged period of time.
- b. Should produce analytically valid results with precision and repeatability
- c. The instrument/analyser should be robust and rugged, for optimal operation under extreme environmental conditions, while maintaining its calibrated status
- d. The analyser should have inbuilt features for automatic water matrix change adaption.
- e. The instrument / analyser should have on board library of calibration spectra for different industrial matrices with provision of accumulating further calibration matrices
- f. Should have data validation facility with features to transmit raw and validated data to central server.
- g. Should have Remote system access from central server provisioning log file access.
- h. Should have provision to send system alarm to central server in case any changes made in configuration or calibration.

- i. Should have provision to record all operation information in log file.
- j. Should have provision for independent analysis, validation, calibration & data transmission.
- k. Must have provision of a system memory (non-volatile) to record data for at-least one year of continuous operation.
- l. Should have provision of Plant level data viewing and retrieval with selection of Ethernet, wireless, Modbus & USB
- m. In case of TOC analyser, the empirical relationship between TOC to COD and TOC to BOD must be authenticated for all industrial applications and the correlation calculation (for factor) shall be provided.
- n. The correlation/interpretation factor for estimating COD and BOD using UV-Visible Absorption Technique shall be regularly authenticated/ validated and details should be transmitted online.
- o. That the Record of calibration and validation should be available on real time basis on central server from each analyser
- p. Record of online diagnostic features including sensor status should be available in database for user friendly maintenance.
- q. Expandable program to calculate parameter load daily, weekly or monthly basis for future evaluation with flow rate signal input.
- r. Must have low operation and maintenance requirements with low chemical consumption and recurring cost of consumables and spares.
- s. The OCEMS shall be of self - cleaning without any operator intervention
- t. The cleaning frequency shall be customisable
- u. The data can be available for storage for 5 years
- v. The enclosure at each fixed RTWQMS shall accommodate data logger, HMI, sensor cards, voltage regulator, transmitter unit etc. The enclosure shall provide protection from dust, humidity, precipitation, sunlight & environmental pollution. The material for the enclosure shall be customized for cable entry openings.
Enclosure Material Rating: IP-66

6. Equipment - Comprehensive water quality analyser with following specifications

Parameters to be analysed	pH, COD,BOD,TSS & TDS
Flow Measurement	To be captured from the EMFM installed in the plant with RS 485 Output
Power Supply	As per Manufacturer's Recommendation
Sampling Pressure	As per Manufacturer's Recommendation
Sample Temperature	0-80 Degree Celcius
Display	Colour TFT LCD, LED backlight Resistive touch screen. It should have touch screen display
Communication	RS 485 / RS 232 Output USB Port for Connectivity & download data
Analog Output	4 -20mA
Protection Class / Enclosure Type	IP 66, Stainless Steel with Epoxy Coating
pH Range Measurement principle	Electrode method
Measurement methodology for BOD/COD	UV Visual Light Spectrometry with Double Beam Technology with entire Spectrum
Measurement methodology for TDS/Conductivity	Electro Mechanical Sensor
Measurement range	
pH	0 to 14
COD	0 to 800 mg/l
BOD	0 to 400 mg/l
TSS	0 to 750 mg/l
TDS	0 to 500 mg/l
Cleaning	Automatic. Analyzer should have facility to start cleaning cycle automatically as per user defined time interval.
Calibration Requirement	Zero Calibration: Should have auto zero calibration facility. Analyzer should have facility to start auto zero calibration as per defined time Interval. Span Calibration: Should be perform as per laboratory measurement data.
Multiplexing Facility	Analyser should have built-in multiplexing facility to add various sample stream minimum up to six - which allow user to connect additional sample stream to meet future compliance requirement, 1f any without any cost.
Accuracy	
pH	+/- 0.1 pH
COD	+/- 5%
BOD	+/- 5%
TSS	+/- 5%
TDS	+/- 5%
Operation	Reagent / Chemical Free analysis
Interference	Independent of Pressure or Flow Variations
Measuring Cycle	Programmable, Continuous
Response time	5 Seconds
UV Light Source	Xenon Flash Lamp with life not less than 10 Years Warranty

7. Data Acquisition, Interpretation & Data Logging Requirements:

- a. The system should be capable of collecting data on real time basis without any human intervention.
- b. The data generation, data pick up, data transmission; data integration at server end should be automatic.
- c. **Necessary software shall be supplied for data acquisition, Interpretation & Data logging**
- d. In case of delay in collection of data due to any reason, the data transmission should be marked delayed data and reports of delayed data should be displayed on the portal
- e. At no point of time, manual data handling shall be permitted. Data validation should be permitted only through the administrator and data changes recorded with date and time stampings.
- f. Configurations of the systems once set up and verified, shall not be changed. In case any setting change is required it should be notified and recorded through the authorized representatives only
- g. The data submitted electronically shall be available to the data generator through internet, so that corrective action if any required due to submission of non-validated data can be initiated by the industry
- h. Change Request Management: window for requesting data changes due to actual field conditions shall be provided to the industry in line to SPCB for consideration.
- i. The site surrounding environmental conditions shall also be recorded along with other environmental parameters, as these have the potential to affect the system adversely and influence the data generated.
- j. The software should be capable of analyzing the data with statistical tools and shall have the following capabilities:
 - i. Statistical data analysis (customizable) for average, min., max., diurnal variation.
 - ii. Comparison of parameters of different locations in user selectable time formats i.e. in graphical and tabular formats compatible to MS Excel, MS Word, *.txt etc.,
 - iii. Capability of comparison of data with respect to standards/threshold values
 - iv. Auto report and, auto mail, SMS generation etc
 - v. Providing calibration database for further validation/correction of data
 - vi. Transmitting data to different locations as per EC, CTE/CTO, and other directives in force
 - vii. Channel configuration for range, units etc
 - viii. Providing data in export format on continuous basis through central/station computer system to other system
- k. Data transmission through different media like phone line, Broadband, leased lines (at least any two media supported).
- l. System should be connected to a backup power source with adequate capacity to avoid any power disruption for at least 2-3 hours.
- m. The software will give alarm, in case of the concentration of parameter exceeds the prescribed norms by 10% continuously.
- n. In case of system requiring pumping of samples, the instrument supplier/vendors has to ensure that dilution of sample is not possible and in case of any dilution, the system gives alarm
- o. The software should be capable to verify the data correctness which means at any given point of time the regulatory authorities/data generator should be able to visualize the current data of any location's specific parameter

- p. The software shall have facilities to capture the data as required by the customer with provision to customise the sampling frequency, reporting, exporting data to excel, storing data to local server
- q. Software shall interact with the field mounting units by means of suitable communication cable
- r. System software shall be compatible with any Laptop and PC using Windows XP / Vista/ Windows 7/ Windows 8 & later versions.
- s. System should operate in any laptop/ PC without requiring the installation of any additional hardware (interfacing card).
- t. System should be able to connect with any PC/ Laptop through LAN (Ethernet) port.
- u. System should operate without requiring any dongle key and/or software key number.
- v. System should pose no restriction on the number of installations of the system software.
- w. System software should be capable of being installed in any PC/ Laptop with copied CD from original CD (OEM).
- x. The data acquisition / logging system shall be extendable in future for additional parameters to be measured by the customer from any new equipment
- y. No online registration or download should be required for installation / operation of the system and/or software.
- z. The software shall be user friendly with facilities like
 - a. Data logging facility for desired interval of timings.
 - b. Retrieval & history mode operation / Report preparation facility.
 - c. Graphical mode.
 - d. Calculator mode with user defined formulae enabled.
 - e. Slot summary display.
 - f. Data output in Microsoft Excel format.

8. Essential Technical features

- a. All instruments must be operated according to the plug & measure principle.
- b. All instruments should be pre-calibrated.
- c. The instruments and analysers must be made of highly resistant material (titanium).
- d. All instruments must have auto-diagnosis procedures are used to ensure best possible operation.
- e. All spectrometer probes for organic analysis must operate using Spectrometry as measuring principal.
- f. pH & temperature measuring principle must be unique, non-porous / non-leaking combined reference electrode for technically consistent pH performance, long term stable and maintenance free in operation Sensor not require any cleaning with compressed air
- g. Sensor must have multi-wavelength scanning double beam spectrophotometer.
- h. On-board event detection and validation software on system enable objective of decision making and to have optimum process controls.
- i. COD, BOD & TOC must have independent program for calibration, analysis and validation. Parameter calculation for one to another parameter such as COD to BOD to TOC is not recommended due to accuracy issues.
- j. Optical sensors including spectrophotometric probes must be water-proof, rugged and have integral IP68 bendable cable to operate in harsh conditions without downtime.
- k. All Sensors must be reagent and consumable free.
- l. Systems should be international Certified Like – TUV Germany/ USEPA / MCERTS UK. etc.
- m. Vendor should have approval for Data connectivity to TNPCB
- n. Any approval if required shall be obtained from CPCB/TNPCB for the equipment / software by vendor himself

9. Accessories

- a. Power supply units if necessary for the equipment including UPS shall be provided by vendor
- b. All signal Cables, electrical cables, earthing cables and accessories if required
- c. Any other item that may be required for the successful commissioning of the equipment

10. Power Supply to the Equipment

- a. Incoming Power Supply will be provided by BHEL at one point in the 2.0 MLD STP
- b. Any other electrical accessories like starter, Switch fuse unit, MCB etc., required for the installation shall be supplied & installed by the vendor
- c. All the incoming electrical cables to the equipment and outgoing electrical, signal cables from the equipment shall be supplied by the vendor to suit the site requirements.
- d. Exclusive Earthing for the equipment shall be provided by the vendor

11. Data Validation & Calibration

- a. The vendor shall supply, install, commission and test the equipment for its desired performance meeting all the requirements
- b. The OCEMS performance will be validated using standard laboratory techniques. The results generated from the OCEMS system will be compared with the analytical reports of the composite samples tested at NABL accredited laboratory.
- c. Any calibration requirements based on the field results shall be done by the vendor at free of cost within the guarantee period

12. Guarantee & Maintenance

- a. The guarantee period for the equipment will be 12 months from the date of successful commissioning jointly signed by the Vendor and BHEL
- b. The authorized service partner/instrument manufacturer shall ensure that any problem in monitoring system/data acquisition and transfer system does not persist beyond 72 hours.
- c. Any service that requires deputing of service engineer to BHEL site shall be carried out at free of cost by the vendor during the guarantee period
- d. The Vendor/instrument manufacturers shall ensure availability of spare parts for at least 07 years after installation of the system
- e. Any spare part if required to be replaced within the guarantee period shall be supplied by the vendor at free of cost

13. General Conditions

- a. Power will be supplied at one point for the equipment
- b. Electrical Energy & Water required for installation & commissioning activities shall be provided by BHEL at one point at free of cost
- c. Available data on the test reports of the treated effluent will be shared with the vendor. However, the vendor shall take a sample and test it in any NABL accredited Laboratory before submission of their quote.
- d. Water requirement if any for the installation & commissioning shall be supplied by BHEL at free of cost
- e. Any earthwork excavation (including refilling) if required for laying of the cables shall be in the scope of the vendor
- f. Any conduits, pipes required for the work shall be in the scope of the vendor only

- g. Any equipment's / work not mentioned which is required for completion of said system as per guidelines of CPCB & PPCB is in the scope of supplier. 1st Revised CPCB Guidelines dated 10.07.2018 also form a part of these terms and conditions and the technical and other details have to be complied with by the suppliers.
- h. Details on SERVICE-AFTER-SALES set-up in India including the address of Agents/Service centres in South India must be furnished.
- i. The Technical offer should be supported by product Catalogues & Data sheets. Technical details of Bought-Out-Items with copies of Product catalogue should be made available to the maximum possible extent.
- j. Complete Training on Operation & Maintenance of the offered items should be given to BHEL Engineers at BHEL Trichy unit.
- k. Offered items should be commissioned at BHEL works.
- l. If there are any issues with the system at site within warranty period, vendor representative should visit site personally and solve the issues, free of cost, as and when required by BHEL.
- m. Any approval from CPCB/TNPCB if required for the connectivity etc., the same shall be done by the vendor.
- n. The equipment, software etc., shall meet CPCB/TNPCB norms.
- o. Any Civil foundation works if required will be executed by BHEL.

14. VENDOR SUPPLY VERIFICATION / ACCEPTANCE CRITERIA FOR ITEM

SI No	Criteria	Remarks
01	Supply Installation and Commissioning	An acceptance certificate shall be issued once all these activities are completed. The one-year warranty period shall commence from the date of successful acceptance of the system and same shall be referred for the subsequent Annual Maintenance Contracts for next four years.
02	Submission of initial calibration certificates	
03	Instruction manual must be submitted along with the system (hard copy & soft copy both required).	
04	Demonstration of the successful working of the system continuously for 2 working days with successful data capture, transfer, storage to various locations at BHEL-Trichy, CPCB/ TNPCB (Vendor Representative should be available for demonstration).	