

**Pre- Qualifying Requirement (PQR):**

1. The bidder shall offer the analyzers “i.e. SO<sub>2</sub>, NO<sub>x</sub>, CO, CO<sub>2</sub>, O<sub>3</sub>, PM10 & PM2.5 and Hg” which have been supplied, erected and commissioned in a coal based thermal power plant and this system should be working satisfactorily for a minimum period of one year as on BHEL bid opening date. The bidder shall submit copy of “PO placed/ Dispatch documents/Commissioning Report/End User certificate with details of end user concerned official for supply, satisfactory operation of the commissioned equipment” in support of above.
2. Offered CO<sub>2</sub> analyzer, which are not meeting PQR point no. 1, is also acceptable if measurement principle is same as CO analyzer. In such case, PQR of equivalent CO analyzer, as per point 1 above, would be acceptable against offered CO<sub>2</sub> analyzer.
3. For Bidders offering upgraded / latest models of analyzer in point 1,2 above, PQR of equivalent previous models is acceptable. For offered analyzers, OEM shall certify that offered model is upgraded version of earlier model meeting PQR in point 1,2 above. The bidder shall submit Reference List of Projects wherein offered analyzers are supplied & commissioned.
4. The bidder shall have experience for installation, execution & commissioning of CAAQMS in last 5 years. The bidder shall submit copy of “PO placed on bidder, Dispatch documents, Commissioning Report with details of end user concerned official”.
5. In case the bidder is sourcing analyzers from an OEM, Tender specific authorization letter is required from the manufacturer, clearly indicating contact details like Name, Email and address of manufacturer.
6. The bidder shall furnish an agreement with OEM for providing services and supply of spare parts for 5 years from the date of commissioning of items. In case OEM is bidding, he shall provide a certificate for providing services and supply of spare parts for 5 years from the date of commissioning of items.
7. The bidder shall furnish “OEM Technical literature/Manuals of offered Analyzers/ Accessories and all major items forming part of BOM”.
8. Bidder’s Registered address of India office and Name of representative for technical support for E&C and after sales service at project site.
9. The firm of Bidder should have in existence in past 3 years as on date of bid opening. Bidder Average Annual Turnover (Last 3 Years): 3 Crore. Supporting documents certified by CA to be provided.

## CONTINUOUS AMBIENT AIR QUALITY MONITORING SYSTEM

### 1.01.00 CAAQMS Stations – 06 Sets

Broad break up of items under CAAQMS is as below:

S. No.	Description	Quantity
1.	Sulphur dioxide (SO <sub>2</sub> ) Analyzer	06 Nos.
2.	Oxides of nitrogen (NO <sub>x</sub> ) Analyzer	06 Nos.
3.	Carbon monoxide (CO) Analyzer	06 Nos.
4.	Carbon dioxide (CO <sub>2</sub> ) Analyzer	06 Nos.
5.	Ozone (O <sub>3</sub> ) Analyzer	02 Nos.
6.	Suspended Particulate Monitors (PM10, PM2.5 Analysers)	12 No. (02 at each AAQMS)
7.	Sampling Inlet Heads (PM10, PM2.5 and TSP – 01 Set)	06 Set (18 Nos.)
8.	Mercury (Hg) Analyser	02 Nos.
9.	Meteorological Monitoring System	01 Set
10.	Multi Gas Calibrator & Zero Air Generator	06 Set
11.	Calibration Gas Cylinders for analysers (01 Set for each AAQMS)	06 Set
12.	Hydrogen Generator	06 Nos.
13.	Sample Handling System Including Compressed Air For Purging	06 Set
14.	Analyzer Shelter with 19" Rack Cabinet, Furniture (01 Cupboard, 01 Table & 02 Revolving Chairs), Air Conditioners (1.5T, 2 No. for each AAQMS)	06 Set
15.	UPS (3Ø Input, 1Ø Output, Min 6 KVA) with Batteries (1 Hour backup) for each shelter	06 Set
16.	Local DAS with Work Station(PC)	06 Set
17.	Central DAS with Work Station (PC), Laser Jet Printer & UPS	01 Set
18.	Exclusive Work Station for uploading data on CPCB/SPCB server	01 Set
19.	Electronic Display to display the parameters of the AAQMS from central station along with Platform and Mounting structure	01 No.
20.	Wireless (RF) Connectivity: RF connectivity for each "AAQMS Station LDAS to CDAS" & "CDAS to Electronic Display" for data communication.	1 Set
21.	Any additional item not covered above but required as per technical specifications for completeness of system.	-

**Note:** All above items are required to be supplied as per clause no. 1.01.01 to 1.14.00 of specifications. This is a turnkey contract. Any other item required to complete the scope of manufacturing, supply, erection & commissioning of AAQMS stations with local DAS, central DAS, display board, with RF based interconnectivity is in scope of bidder.

**1.01.01** AAQMS shall be provided to check upon the ambient air quality inside and around the power plant and capable of generating required periodic reports for submission to relevant Central & State regulatory agencies by Owner.

**1.01.02** Ambient air quality shall be monitored for concentration levels of selected gaseous pollutants at different locations within the power station boundary and adjoining areas as per the continuous ambient air quality monitoring guidelines of Central & State regulatory agencies like, MOEF, Central & State Pollution Control Boards (PCBs) prevailing during contract execution phase. AAQMS system including the analysers being supplied shall meet all applicable requirements/guidelines of relevant Central & State regulatory agencies like, MOEF, Central & State Pollution Control Boards (PCBs) etc. or of US EPA in the absence of the same.

**1.01.03** Offered analyser for SO<sub>2</sub>, NO<sub>x</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub> and O<sub>3</sub> should be USEPA approved. Proof of approvals and certificates with copy of the Test report (in English) from US EPA for SO<sub>2</sub>, NO<sub>x</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub> and O<sub>3</sub> Analysers will be furnished in support of above.

**1.01.04** For Mercury Analyser & CO<sub>2</sub> Analyser, certificates with copy of the Test report (in English) from OEM for Continuous Ambient Air Monitoring application is applicable. It is the sole responsibility of the Vendor to obtain the necessary approvals and certificates of the above compliance along with copy of the Test reports. Owner has no liability towards the same.

**1.01.05** AAQMS will include monitoring of the following pollutant gases/parameters. Method of measurements & standards will be as per CPCB and state pollution control boards (PCBs) norms.

- a) Sulphur dioxide (SO<sub>2</sub>)
- b) Oxides of nitrogen (NO<sub>x</sub>)
- c) Carbon monoxide (CO)
- d) Carbon Di-oxide (CO<sub>2</sub>)
- e) Suspended particulate matter (PM<sub>10</sub>)
- f) Suspended particulate matter (PM<sub>2.5</sub>)
- g) Ozone (O<sub>3</sub>) - at two locations only
- h) Mercury Analyser - at two locations only

**1.01.06** AAQMS for each plant location shall be a fixed type, self-contained 'Station'. Minimum one (1) no 'Station' shall be located at the UP-wind direction path. Minimum three (3) number 'Stations' shall be located at downwind direction and balance two (2) stations would be located based on factors like sensitive receptor, population etc. The exact location of the monitoring station(s) shall be decided in consultation with Owner and State Pollution Control Board (SPCB) during project implementation phase.

**1.01.07** Ambient air quality monitoring for each plant location will be suitable for continuous on-line monitoring of different pollutant gases. AAQMS will allow on line monitoring, on line logging of parameters values, on line archiving and on line report generation for environmental monitoring authorities (CPCB & SPCB) and plant management personnel. All required software & hardware will be provided by bidder.

**1.01.08** The Analysers / Monitors should be 19" Rack Mounted with the ON / OFF Switch and display of all-important status signals including Lamps, etc. should be preferably on the front panel.

Each AAQMS Station shall include the following including analysers, accessories, calibration facility, mounting racks/ cabinets and housing shelter, Data Acquisition System etc. but not limited to the same:

- a) Individual Gas analysers for the parameters specified
- b) Necessary sampling systems for the AAQMS analysers
- c) Multi gas calibration system, Zero air generators
- d) PC Based Data Acquisition System for AAQMS Station.
- e) Hydrogen Generator,
- f) Calibration gas cylinders
- g) Mounting cabinet/ rack for analysers and accessories
- h) Housing shelter for AAQMS equipment- environmentally conditioned, walk-in type shelter complete with lighting and convenience receptacles.
- i) UPS & lighting power supply complete with distribution facility
- j) Furniture (01 Cupboard, 01 work station table & 02 industrial grade chairs).
- k) Interfacing the AAQMS analysers signals to the AAQMS work stations either by serial communication link or hardwired signals including suitable cables with accessories at both ends and cable carrier etc.

**1.01.09** The system must function properly in the weather and atmospheric conditions as applicable at Udangudi project site, Tamil Nadu.

**1.01.10** The system will be supplied with all ancillaries and consumables necessary for trouble free operation for a period of 24 months after I&C at site. In case Shelf life of any consumable is shorter, and then supplies to be done in suitable phases. Bidder will give details of shelf-life, quantity of consumables required etc. to last operation for 24 months.

**1.01.11** Minimum requirements like input power, space, approach and any other associated facilities required for installation and commissioning of the AAQMS will be specified by the bidder in the offer. Installation and commissioning of the AAQMS will be done by the bidder at the site provided by TANGEDCO. Only one-point power supply would be provided at each AAQMS location by BHEL. Rest all work related to I& C of AAQMS as per specification would be in bidder's scope. Bidder will obtain statutory and other clearances for commissioning, operation & maintenance of the AAQMS.

**1.01.12** Bidder will furnish, along with the bid documents, the details of calibration system provided with each Analyzer / Monitor.

**1.01.13** AAQMS system will include the following:

- (a) AAQMS stations - 6 Nos;
- (b) Centralised AAQMS data acquisition system.



**1.01.14 SPECIFICATIONS OF CONTINUOUS MONITORING AMBIENT AIR ANALYSERS**

<b>Description</b>	<b>NO-NO<sub>2</sub> -NO<sub>x</sub> Analyser</b>	<b>SO<sub>2</sub> Analyser</b>	<b>CO Analyser</b>	<b>CO<sub>2</sub> Analyser</b>	<b>Ozone Analyser</b>	<b>Mercury Analyser</b>
<b>Principle</b>	Chemiluminescence	Fluorescence in UV absorbance	IR type with Gas Filter Correlation	IR type with Gas Filter Correlation	UV Photometric	Atomic Absorption /Atomic Fluorence
<b>Measurement</b>	NO, NO <sub>2</sub> , NO <sub>x</sub> in Ambient Air	Sulphur Dioxide In Ambient Air	CO	CO <sub>2</sub>	O <sub>3</sub>	Hg
<b>Display</b>	LCD	LCD	LCD	LCD	LCD	LCD
<b>Ranges</b>	0-1 PPM in Multi ranges (mini mum four selectable ranges) preferably as below: 0-100 PPB; 0-200 PPB, 0-500 PPB & 0-1000PPB	0-1 PPM in Multi ranges (mini mum four selectable ranges) preferably as below: 0-100 PPB; 0-200 PPB, 0-500 PPB & 0-1000PPB	0-100 PPM (minimum four selectable ranges)	0-1000 PPM	0-100 ppb to 0-10 ppm ,  User selectable, Dual ranges and auto ranging supported	0.5-2000 ng/m3, 5-10000 ng/m3
<b>Minimum Detectable Limit</b>	±1 PPB	±1 PPB	0.05 ppm	0.05 ppm	±0.006 ppm	--
<b>Zero Drift (24Hr. Basis)</b>	<0.4 ppb of Full Scale Per Day	< 1 ppb	<0.1 ppm/day	<0.1 ppm/day	<1.0 ppb/24 hours	--
<b>Span Drift (24 Hr. Basis)</b>	± 1% of Full Scale Per Day	± 1% per week	± 1% per week	± 1% per week	1% of reading per 7 days	--
<b>Response time at Lowest range</b>	10 to 40 Seconds for 0-100% reading.	10 to 80 Seconds for 0-100% reading	60 Seconds	60 Seconds	---	--
<b>Accuracy</b>	±0.4 ppb (for 500 ppb range)	± 1 %	±0.1 ppm	±0.1 ppm	±0.1 ppm	--

SPECIFICATION - CAAQMS

Linearity	±1% of Full Scale Reading	+1% of full scale reading	± 1% of Full Scale Reading	1% of full Scale	--
Operating Temperature	15-35 deg.C	20 - 30 deg.C	20 - 30 deg.C	20 - 30 deg.C	--
Signal Output	4-20 mA DC / RS 232 or RS 485 link.	4-20 mA DC / RS 232 or RS 485 link.	4-20 mA DC / RS 232 or RS 485 link.	4-20 mA DC / RS 232 or RS 485 link.	4-20 mA DC / RS 232 or RS 485 link.
Power Supply	240 V AC (UPS)	240 V AC (UPS)	240 V AC (UPS)	240 V AC (UPS)	240 V AC (UPS)
Mounting	Rack Mounted	Rack Mounted	Rack Mounted	Rack Mounted	Rack Mounted
Other parameter	--	--	--	--	Sampling Cycle: Continuous Measurement
Calibration	Built – in calibration Facility	Built – in calibration Facility	Built – in calibration Facility	Built – in calibration Facility	Built – in calibration Facility
Consumables and spares (Recommended requirements)	2 Years of continuous operation	2 Years of continuous operation	2 Years of continuous operation	2 Years of continuous operation	2 Years of continuous operation

### 1.01.15 Continuous ambient air measurement of TSP, PM10 & PM 2.5

The Continuous Ambient Particulate Monitor measures the mass concentration of suspended particulate matter (PM 10/PM2.5) by use of beta attenuation. In addition, the ambient radioactive influence of natural Radon (Rn-222) gas is measured as a refinement step toward better sensitivity at lower ambient particulate concentrations.

Principle: Beta attenuation by particulates sampled through the instrument and collected on movable filter tape. Before and after sampling, beta radiation will be measured by appropriate counter. An internal microprocessor will handle all sequences and automatically calculate the concentration of the particulate matter being measured. Each analyser will be freely configurable at site for either TSP, PM 10 & PM 2.5. These analysers will be provided with sampling heads suitable for continuous measuring of PM2.5 and PM10. Additional sampling arrangement for TSP will also be provided and it will be possible to easily connect it to the Analyser normally measuring PM2.5.

1	Principle	Beta attenuation
2	Measurement Range	0-2000 $\mu\text{g}/\text{m}^3$ (Micro Gram per cubic meter ) (Min. two selectable ranges)
3	Minimum Detectable Limit	2 $\mu\text{g}/\text{m}^3$
4	Accuracy	$\pm 5\%$
5	Sampling Inlet	1. PM10 Hood & 2. PM2.5/TSP-Manually Interchangeable hoods
6	Cycle	1 hr
7	Display	LCD
8	Resolution	$\pm 1 \mu\text{g}/\text{m}^3$
9	Data Storage	200 days, 1 hr sample
10	Power supply	230V, 50 Hz supply UPS
11	Air flow rate	0-20 SLM user selectable
12	Temp. range	30 deg to +60 deg C
13	Mounting	19" Rack

### 1.01.16 Multi-point calibration System

To cross check the built-in-calibration facility of the Analyzers/Monitors, a Multi-Gas Calibration System for each AAQMS station with fast response time will be offered by the Bidder which can be used as manual or remote multi-point generation of gas concentrations from one to several high concentration Span Gas Cylinders.

OEM of Multi-Gas Calibration System should be same as offered AAQMS Analyzers against this bid specification.

- a) Flow measurement accuracy:  $\pm 2\%$  of Set point or  $\pm 1\%$  of full-scale reading (in 20-100%) whichever is less.
- b) Repeatability of flow control:  $\pm 0.2\%$  of full-scale reading
- c) Linearity of mass flow measurement:  $\pm 0.5\%$  of full-scale reading.
- d) Calibration gas input ports - 6 nos.
- e) Response time - <60 sec. for 0-99 %
- f) Temperature range - 0-40°C
- g) Power supply - 240V AC (UPS)

**1.01.17** Analyser gas sampling system will be complete with sampling hood arrangement with SS hood, SS 316 manifold, moisture trap, air compressor of requisite capacity (minimum 10 LPM) and heat less type air dryer.

**1.01.18** Zero air generators will be with inbuilt catalytic converter. Make of Zero air generators should be same as offered AAQMS Analyzers against this bid specification.

**1.01.19** The analysers should be complete with calibration system. Calibration gas cylinders (as applicable) for NO<sub>x</sub>, SO<sub>2</sub>, CO, CO<sub>2</sub>, O<sub>3</sub>, Mercury Analyser, PM10 & PM2.5 analysers as required of appropriate capacity suitable for minimum 6 months calibration with SS 316 regulator. All the calibration gases provided along with the system must be NIST traceable. The analyser must have zero point internal calibration system. The calibration procedure will be integrated into the software system for automatic calibration.

**1.01.20** Hydrogen generator complete with fluid tank and all accessories –hydrogen purity of >99.99%.

**1.01.21** All consumables like Chemical reagents, filters, markers, papers etc. will be provided by bidder for 2 years continuous operation post commissioning.

**1.01.22** The analysers must function properly in Indian conditions without any defect between ambient temperature at site, 0 to 100% relative humidity and in high ambient dust level.

**1.01.23** All Analysers, Monitors and Sensors will be fully integrated in the Rack Cabinet which is installed in shelter and fully calibrated and tested before call for inspection. Total integrated analyser system along with shelter will be functionally inspected at Bidder's place prior to dispatch to site.

## **1.02.00 AAQMS Analyser Shelter**

### **1.02.01 General Requirement**

The minimum size of shelter will be 4 meters (Length) x 3 meters (Width) x 2.5 meters (Height). To accommodate the panels, work stations, tables, revolving tilting chairs, cupboard, UPS, battery etc.

The analyser shelter will be a completely assembled unit suitable for installation on a concrete platform (Minimum Size: 5(L) x 4 (W) x 1 (H) meters ). All internal piping and tubing will terminate in bulkhead connections. Internal wiring will terminate in external junction boxes. All equipment including tubing, conduit fittings, junction boxes etc. will be installed so as not to interface with the removal of analysers, sample handling systems and related equipment, accessibility for maintenance will be the prime consideration.

### **1.02.02 Construction features**

- i. The Analyzer Shelter shall consist of a self-framing exterior skin assembled on a rigid primed and painted steel superstructure. All materials used in the construction shall be non- combustible.
- ii. Wall panels design to be completely weather resistant. The design shall allow for thermal expansion / contraction of the structure over the complete range of ambient temperatures applicable for the location without causing harmful buckling or opening of joints, etc. Materials of construction shall be 2mm thick SS 304 sheet for external walls and 18 gauge

painted galvanized steel for internal walls with ribbed interlocking. The ribbed interlocking shall

provide a strong column for the sheets on the side valves, where the “U” profile created at the edges, when interlocked with the second sheet, increases the section modulus of ribbing.

iii. The wall panels of the shelter will be insulated and designed for the given ambient conditions by glass rock wool approx. 100 mm insulation thickness.

iv. Roof panels design and construction to be completely weather resistant. The design will allow for thermal expansion/contraction of the structure over the complete range of ambient temp. Applicable for the location without causing harmful buckling or opening of joints etc.

v. The base structure of the shelter will be constructed using ISMC (1501125) ISMB (100) welded property and adequately sized to ensure structural rigidity to prevent deformation during dragging, lifting, loading and unloading of the shelter.

vi. The roof panels will be provided with 80mm thick rock wool insulation.

vii. All insulation materials are to be fire retarding.

viii. The analyzer house will have two doors, one as the main entrance and the other as the emergency of the shelter.

ix. The doors are to be mounted on special hinges to ensure gas tight construction of the shelter.

x. Doors will be sturdy, double walled, insulated with rock wool and open to the outside.

Each door will have a window with transparent toughened safety glass.

xi. *The main entrance will carry a SS plate indicating the plane area number and the tag-list of all the analyzers inside the shelter.*

xii. Analyzer shelters met the standards of the unknown building code with the following design loads:

i) Roof - 20 lb / sq ft live load

ii) Wind - 35 lb /sq ft at 0-30 ft above grade elevation

iii) Seismic zone - as applicable for project location (Udangudi, Tamil Nadu)

xiii. All tubes and cable entries to the shelter will be through multi-cable transit blocks – to ensure gas tightness of the shelter.

xiv. The floor is to be fabricated with anti-slip sheet and sealed continuously to ensure no loss of pressure.

xv. Each shelter will be provided with lightening protection system.

*Layout drawing of AAQMS shelter with dimensions along with positioning of doors, windows and internal items to be provided along with offer.*

**1.02.03 Painting**

- a) Preliminary cleaning involving removing of grease, oil, paint and dirt, which prevent pickling acid from coming in contact with the scale or mist.
- b) Structural painting will include scraping, chemical cleaning, one coat of each primer, one coat of epoxy zinc chromate red oxide primer and two coats of epoxy finish paint. The surface coating will take sufficient care of removing all the containment thus ensuring against premature and complete coating failure. Precautions to be taken to avoid air bubbles and uneven coat thickness.
- c) Internal sheet metal: the internal walls will be powder coated.
- d) Painting for the shelter is completed in every respect before dispatch. No painting will be done at site except touch up of scratches made during site erection.

**1.02.04 Environmental conditioning**

Analyzer shelters will be environmentally conditioned to keep the inside atmosphere of the shelter at a constant temperature of 24°C ( $\pm$ ) 3 °C to obtain repeatability and reliability of the analyzers and also a comfortable working environment for workmen. For this purpose, 1.5 Ton 'split type' industrial grade air conditioner (02 Nos., 1 working & 1 standby) to be provided. Air conditioner will be able to work continuously under ambient worst conditions. A 300 mm single phase (230/240 V AC) exhaust fan with safety grills & flap type louver will be provided in the shelter. Hygrometer will be provided to measure & display the humidity inside the shelter. Similarly, thermostat will be provided to measure & display the Temperature inside the shelter. All Air conditioner will be energy efficient with highest star rating.

**1.02.05 Lighting**

- a) Illumination level in the shelters will be at a minimum of 300 lux at 750mm elevation inside the shelter. Maintenance factor will be 0.65.
- b) External dome type lighting will be under the overhangs to provide sufficient illumination for maintenance work.
- c) Power switches for internal and external lighting will be provided near to the main entrance on the outside of the shelter.

**1.02.06 Fire detection & protection:**

Necessary fire & smoke detection devices, 2 nos. Fire Extinguishers, fire detection & protection measures for each analyzer shelter will be provided as per regulatory requirement.

**1.02.07 Platform for AAQMS Shelter:**

Platform of suitable size and Height ( Min. 5 x 4 x 1 Meter) is required to be constructed by the Bidder. Shelters is required to be installed at platform at site of each AAQMS Station as a part of scope of supply. Layout drawing is to be submitted along with offer.

**1.02.08 Earth Pit for AAQMS.**

The Supplier will provide earth pit for AAQMS.

**1.02.09** Industry standard revolving chairs with wheels and with provision for adjustment of height (hydraulically/gas lift) will be provided for the CAAQMS shelters, CAAQMS rooms. These will be designed for sitting for long duration such that these are comfortable for the back. Chair pedestal will be made of 5mm thick MS plate covered with polypropylene

cladding. Arm-rests in one piece will be of poly-urethane and twin wheel castor of glass filled nylon.

#### **1.02.10 Uninterruptible Power Supply (UPS) System**

UPS of suitable capacity (3Ø Input, 1Ø Output, Min 6 KVA) with all accessories like battery (1 Hour backup) and battery charger will be provided. Battery shall be maintenance free type. Battery sizing calculation indicating no of batteries to be offered along with UPS details and technical datasheet to be provided along with offer. UPS at each shelter would be required for AAQMS components and computer. UPS would not be required for Air Conditioner.

#### **1.03.00 Power Distribution Board**

Power distribution board for distribution of UPS & 230 V AC power for all individual consumers such as individual analyzers, auxiliary equipment inside and around the shelter, lighting receptacles shall be provided. Each of the main systems shall have an individual isolation circuit breaker mounted next to the individual power users. Telephone/mobile connection with a minimum 2 years prepaid charges post commissioning shall be provided for each AAQMS Stations.

#### **1.04.00 PC based Data Acquisition System (DAS)**

For AAQMS Station the DAS system for each AAQMS Station shall collect, store and analyze air quality data from all instruments of the Station. For these purpose all instruments shall be interfaced with local DAS system suitably either through a serial link or by hardware.

The application software shall have following features:

1. Calculation of arithmetic mean values, average values at different fixed intervals and user defined time periods like hourly / weekly / monthly / yearly etc.
2. Calculation of pollution load and wind roses (by interfacing meteorological data wherever provided).
3. Generation of reports for at different fixed intervals like daily, weekly, annual etc. and for user defined periods.
4. Generation of reports in the form of line / column charts / tables / curves / graphics etc.
5. Generation of reports for pollution load, wind rose, Station etc
6. Comparison of data of various parameters for the same monitoring station.
7. Generation of reports for real time data and based on archived data.
8. Display of real time (on-line momentary values) and archived values in tabular texts and graphic formats.
9. Facility for calibration windows for analyzer calibration.
10. Real time monitoring of status of all analyzers and sensors with diagnostics for maintenance personnel.
11. Alarm annunciation of analyzer/sensor abnormal conditions.

Work Stations PC specification will be as below:

- 01. CPU : Latest intel i7 processor
- 02 Preferable Make : HP/DELL /IBM-Lenova
- 03 Main Memory : 8 GB DDR @ 800 MHz expandable to 16GB / higher
- 04 Drives : DVD – RW
- 05 Hard Disk : 500 GB SSD or higher
- 06 Monitor : 24” LED type
- 07 Communication port : 2 serial plus one parallel, 4 USB
- 08 Expansion slot : 5
- 09 Connectivity : Ethernet LAN
- 10 Operating system : Latest windows software (64 bit)
- 11 Softwares : Latest version of MS office, (profession) Client’s Software and other softwares as required
- 12 Features : 101 keys keyboard and mouse with mouse pad.
- 13 Accessories : Industrial grade furniture (Table & Chair for work Station)
- 14. Misc. Requirements: Graphic output cards.  
Sound card & Internal speakers.  
Wireless internet & Blue tooth Interface.  
Any other required software/hardware

**1.04.01 Wireless Connectivity:** LAN connectivity (wireless RF Connectivity) shall be provided for each AAQMS Station for data communication.

#### **1.05.00 Central AAQMS monitoring**

**1.05.01** Monitoring and report generation of AAQMS for the whole power station shall be a centralized system and can be carried out either through a centralized PC based Data Acquisition system or in MIS. For this purpose, all individual analyzer data from each AAQMS Stations shall be collected in PC based DAS / Plant MIS system by interfacing each AAQMS Stations suitably through a serial communication link.

Work Stations PC specifications will be same as given in specification at 1.13.00 along with Laser Jet Printer & UPS for PC.

AAQMS instruments shall be provided with provision for bidirectional connectivity over ModBus/RS-232/RS-485 with End user’s central cloud server for real time data monitoring, remote diagnostics & remote calibration checks, etc., complying with CPCB IT Division document “Protocol for real time data management from industries or the latest regulatory requirement prevailing at the time award of the contract. All necessary hardware and software required at instrument end shall be provided by the Contractor. Necessary details like scheme, register addresses of analyzer, etc. shall also be provided by the Contractor for implementation of above. The Contractor shall fully assist TANGEDCO’s agency involved in implementation of above connectivity. In addition to above requirement, 4-20 mA connectivity to DDCMIS shall be provided by the Contractor.



**1.05.02** Central AAQMS DAS system will perform following functions:

- a) To collect all the data from individual AAQMS stations at prescribed time or on request.
- b) Ability to manage multiple remote AAQMS stations.
- c) Monitoring, analyze, report generation and archiving of data.

**1.05.03** Central AAQMS DAS system software will have following features

- a) Calculation of arithmetic mean values, average values at different fixed intervals and user defined time periods like hourly/weekly/monthly/yearly etc. for each remote station.
- b) Calculation of pollution load and wind roses (by interfacing meteorological data)
- c) Generation of reports for at different fixed intervals like daily, weekly, annual etc. and for user defined periods.
- d) Generation of reports in the form of line/column charts/tables/curves/graphics etc.
- e) Generation of reports for pollution load, wind roses, station etc.
- f) Comparison of data of various parameters for the same monitoring station.
- g) Inter comparison of data between different monitoring stations.
- h) Generation of reports for real time data and based on archived data.
- i) Facility for calibration windows for analyzer calibration.
- j) Real time monitoring of status of all analysers and sensors with diagnostics for maintenance personnel.
- k) Alarm annunciation of analyser/sensor abnormal conditions.
- l) Display of real time (on-line momentary values) and archived values in tabular texts and graphic formats.

**1.06.00 Design, Functional & Performance Requirements.**

**1.06.01** AAQMS offered will ensure operability, maintainability and reliability. This system offered will be consistent with modern practices and will be compliance with all applicable codes, standard guides, statutory regulations and safety requirements.

**1.07.00 Meteorological Monitoring System (MMS)**

**1.07.01** A meteorological monitoring system (MMS) will be provided in line with the recommendation of the regulatory authority. Meteorological data will be monitored with in the Plant Premises at One (1) Location. The Exact Location of the Monitoring Station will Be decided during Project Implementation Phase Based On The Central & State PCB Guidelines. The Following parameters will Be monitored:

- a) Wind Direction
- b) Wind Speed
- c) Ambient Temperature
- d) Ambient Pressure
- e) Solar Radiation
- f) Relative Humidity
- g) Rainfall

**1.07.02** MMS will Be Continuous On-Line Type. MMS will allow monitoring, logging of parameter Values, Archiving and Report Generation for Environmental Monitoring Authorities and Plant Management Personnel.

**1.07.03** MMS will be complete with all the necessary measuring equipment and accessories and shall be housed in a walk-in shelter, environmentally conditioned (if required for measuring equipment), complete with lighting and convenience receptacles. For this purpose, MMS equipment can be housed in one AAQMS Station shelter. Alternatively, a separate shelter for housing MMS equipment shall be provided.

**1.07.04** Output signals of all meteorological monitoring analyzers shall be connected to plant DCS /MIS for monitoring, archiving and report generation for environmental monitoring authorities. Necessary software for the purpose shall be loaded into MIS.

#### **1.07.05 SPECIFICATIONS OF METEOROLOGICAL SENSORS**

	<b>Wind Speed Sensor</b>	<b>Wind Direction Sensor</b>	<b>Ambient Temperature Sensor</b>	<b>Relative Humidity (RH) Sensor</b>	<b>Solar Radiation Sensor (Solarimeter)</b>
Principle	Frequency proportional to wind speed	Potentiometric type Sensor	PRT -100 Type Resistance Temperature Detector	Thin film capacitance type sensor	Thermopile
Range	0 - 210 Km / Hr	0-360 deg	0-50 deg C	0-100% RH	Spectral Range : 0.25 - 60 Micron , Measurement range:-0-1500 Watt/m <sup>2</sup>
Accuracy	± 1%	± 3°	± 0.25 deg C	±3% Of Full Scale Reading	+ 3.5 %
Threshold	0.3 m/sec	0.3 m/ sec	---	---	---
Operating Temperature	0 to 50 deg C	0 to 50 deg C	0 to 50°C	0 to 50°C	0 to 50 deg C
Radiation shield	---	---	Non Aspirated Radiation Shield	Non Aspirated Radiation Shield	Non Aspirated Radiation Shield

#### **1.07.06 Specifications of Rain Gauge**

1	Accuracy	± 0.5 - 1 %
2	Sensitivity	0.5 mm
3	Operating Temperature	0 to 50 deg C

#### **1.07.07 Meteorological Mast**

One Meteorological Mast of telescopic type and of 10-meter height to be placed adjacent to one AAQMS Station. The Mast is required for mounting the Meteorological Sensors. Necessary Hangers and Holders along with electrical Grounding Set will be provided for installation of

the Sensors. Material of Construction of the Mast will be metallic i.e. heavy grade aluminum and robust and will be resistant to atmospheric corrosion. Wind load limit will be more than 8.5 sq. ft at 50 mph.

#### **1.08.00 Additional Work Station**

As per the TNPCB requirement environment parameters will be uploaded to TNPCB's web server. One no of PC as per specs at cl. 1.13.00 with UPS and necessary software (as recommended by TNPCB) with modem & dedicated internet connection (min. 3 years prepaid / postpaid charges in bidder's scope after I&C at site) and necessary I/O cards to access the mA output from various analyzers, is to be supplied for uploading the parameters of AAQMS Analysers.

#### **1.09.00 Specification for Digital Display Board**

Digital display board for the display of all AAQMS parameters and for sixteen (16) analog signals of Stack Emission Monitoring system at the main gate shall be provided. Stack emission parameters would be provided by BHEL at CDAS PC.

Display board specification shall be as follows:

1. Size of the display – 4 Feet (H) X 8 Feet (L) minimum.
2. Visibility Range - 80-100 mtr (Size of display will be suitable to achieve the visibility range).
3. No of Display lines – 5
  - as following:
  - a. Name of company,
  - b. Date and Day
  - c. Ambient air quality parameters with units
  - d. Meteorological parameters with Units
  - e. Stack parameters with Units
4. Display of colour elements - Colour (RGY)
5. Minimum life span - 5 years
6. Ambient Temperature - Maximum 50°C
7. Humidity Range – 0 - 99%
8. Language - English only
9. Colour gradient - Cluster LED based
10. Display casing - Weather proof casing IP 65 with Canopy.
11. Type - Microcontroller/Microprocessor driven
12. LED matrix - 2X64X128 for above display size.
13. LED pitch - 0.6"
14. Signal input to the display board - (i) Data communication through RS 232/485 /Ethernet or suitable protocol from CAAQMS station for all parameters of CAAQMS and Meteorological parameters.  
(ii) Provision for 16-Analog signals from stack monitoring Device/DDCMIS.
15. Power Supply - 230V AC from UPS.
16. Platform and Mounting structure - 01

**1.10.00 TRAINING REQUIREMENT**

Bidder will provide training to end user for Theory & design features, Trouble shooting and fault analysis for AAQMS (Min. 5 Man days).

**1.11.00** Only Single Point power supply would be provided at each AAQMS & display board location by BHEL. All other works/items related to installation, commissioning, demonstration and handing over upto the satisfaction of end user as per technical specification requirement will be in Bidder's scope.

**1.12.00** For all PC's, general MS Windows latest, MS Office, MS Visual studio, Adobe Acrobat, Antivirus (Professional) software shall be included in all the PC's including the application software to suit the project specific requirement.

**1.13.00** Minimum Configuration of Personal Computers required in tender specification:

01. CPU : Latest intel i7 processor
- 02 Preferable Make : HP/DELL /IBM-Lenova
- 03 Main Memory : 8 GB DDR @ 800 MHz expandable to 16GB / higher
- 04 Drives : DVD – RW
- 05 Hard Disk : 500 GB SSD or higher
- 06 Monitor : 24" LED type
- 07 Communication port : 2 serial plus one parallel, 4 USB
- 08 Expansion slot : 5
- 09 Connectivity : Ethernet LAN
- 10 Operating system : Latest windows software (64 bit)
- 11 Software : Latest version of MS office, (profession) Client's Software and other software as required
- 12 Features : 101 keys keyboard and mouse with mouse pad.
- 13 Accessories : Industrial grade furniture (Table & Chair for work Station)
14. Misc. Requirements: Graphic output cards.  
Sound card & Internal speakers.  
Wireless internet & Blue tooth Interface.  
Any other required software/hardware

**1.14.00 Documents Requirement**

Following data sheet/drawing would be submitted by bidder after placement of PO before start of manufacturing:

- a. Data sheet for CAAQMS including all technical details of items as per Cl. 1.01.00.
- b. Data Sheet for Wireless Communication System.

**2.00.00 General Terms & Conditions**

**2.00.01 Installation & Commissioning:** The supplier will erect & commission all the items covered enquiry at site to integrate the system, demonstrate the performance of the Equipment and all its accessories to ensure compliance with complete specifications & parameters quoted by them to the satisfaction of BHEL/end user.

**2.00.02 O & M Manual:** 3 hard copies of O&M manual, 05 CD ROM copies of O&M manual and 05 soft copy of O&M manual in English language giving complete technical information for operation and maintenance of the items.

**2.00.03 Packing & Dispatch:** All the items in the enquiry will be packed separately in a suitable water proof vibration packing box capable of bearing air, water and road transit hazards. **“HWR AAQMS”** should be written in bold letters on all four sides of the boxes. Packing boxes will be properly identified and marked with BHEL’s (India) Purchase Order Number.

**2.00.04 Guarantee:** The equipment will be guaranteed for a period of 24 months from the date of dispatch or 18 months from the date of Installation & Commissioning, whichever is earlier.

**INTEGRITY PACT****Between**

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

**and**

\_\_\_\_\_, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

**Preamble**

The Principal intends to award, under laid-down organizational procedures, contract/s for \_\_\_\_\_

\_\_\_\_\_ (hereinafter referred to as "Contract"). The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint panel of Independent External Monitor(s) (IEMs), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

**Section 1- Commitments of the Principal**

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles: -
  - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
  - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
  - 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

**Section 2 - Commitments of the Bidder(s)/ Contractor(s)**

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during participation in the tender process and during the contract execution.

- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

### **Section 3 - Disqualification from tender process and exclusion from future contracts**

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process, terminate the contract, if already awarded, exclude from future business dealings and/ or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

### **Section 4 - Compensation for Damages**

- 4.1 If the Principal has disqualified the Bidder (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above, the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

**Section 5 - Previous Transgression**

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

**Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)**

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions.

**Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors**

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

**Section 8 -Independent External Monitor(s)**

- 8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.



- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a Bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some Bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

## **Section 9 - Pact Duration**

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties till the final completion of contract for successful Bidder, and for all other Bidders 6 months after the Contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

**Section 10 - Other Provisions**

- 10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.
- 10.2 Changes and supplements as well as termination notices need to be made in writing.
- 10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.
- 10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders / contractors who have entered into this Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.
- 10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.

-----  
For & On behalf of the Principal  
(Office Seal)

Place \_\_\_\_\_  
Date \_\_\_\_\_

Witness: \_\_\_\_\_  
(Name & Address) \_\_\_\_\_  
\_\_\_\_\_

-----  
For & On behalf of the Bidder/ Contractor  
(Office Seal)

Place \_\_\_\_\_  
Date \_\_\_\_\_

Witness: \_\_\_\_\_  
(Name & Address) \_\_\_\_\_  
\_\_\_\_\_

## Certificate

In line with Government Public Procurement Order No. P-45021/2/2017-BE-II dt. 15.06.2017 & P-45021/2/2017-PP (BE-II) dated 28.05.2018, we hereby certify that we M/s \_\_\_\_\_(supplier name) are local supplier meeting the requirement of minimum local content (50%) as defined in above orders for the material against Enquiry No. \_\_\_\_\_

Details of location at which local value addition will be made is as follows:

\_\_\_\_\_  
\_\_\_\_\_

We also understand, false declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.

Seal and Signature of Supplier

**Buyer Specific ATC document for “Ambient Air Quality Monitoring System (AAQMS)” of Udanqudi project site**

1.	<p><b>Customer/BHEL Approval:</b></p> <p><b>For customer/BHEL approval, following documents are required:</b></p> <ul style="list-style-type: none"> <li><b>A</b> List of experience wherein vendor / OEM has supplied in 660 MW Super Critical Thermal Power Plants (along with unpriced PO copies).</li> <li><b>B</b> Customer satisfactory certificates (end user certificates).</li> </ul> <p><b>Price bid of only those bidders will be opened who are finally approved by customer/BHEL.</b></p>
2.	<p><b>Quality Requirement:</b></p> <p>(i) Final Inspection will be witnessed by BHEL / BHEL nominated Third Party Inspection Agency (TPIA) at works of successful bidder.</p> <p>(ii) Successful bidder to submit quality plan in line with technical specification in prescribed format for approval of customer / BHEL within 30 days of Purchase Order. BHEL will provide approval of quality plan within 30 days from the date of submission. Any delay in submission / approval will be in respective account.</p> <p>The delivery period of 150 days is inclusive of time for quality plan submission and approval.</p>
3.	<p><b>MDCC (Material dispatch clearance certificate) Clause:</b></p> <p>Please note that material shall be dispatched only after issue of Material dispatch clearance certificate (MDCC) by BHEL. For issue of MDCC, you are required to submit the set of documents (i.e. Packing list, guarantee certificate, Test / inspection reports &amp; Calibration certificates etc.) at least 15 days prior to scheduled delivery.</p> <p>BHEL will release MDCC within 07 days from the date of receipt of complete documents as detailed above.</p> <p>The delivery period of 150 days is inclusive of 07 days taken by BHEL to issue MDCC.</p>
4.	<p><b>Pre-Qualification Requirement (PQR):</b></p> <p>The Pre-Qualification Requirements (PQR) have been made part of bid. All the bidders should ensure submission of complete details and documents as called for in the same. The offers submitted by the bidders would be scrutinized with respect to Pre-Qualification Requirements first.</p> <p><b>Techno-Commercial offer of only those bidders shall be evaluated who meet the Pre-Qualification Requirements.</b></p>
5.	<p><b>Technical Specification Requirement:</b></p> <p>(A) Please quote your valuable offer as per BHEL Specification enclosed with the bid documents.</p> <p>(B) Bidders to upload point-wise compliance of BHEL Specification along with the offer as a token of acceptance.</p>

6.	<p><b>Validity:</b></p> <p>Offer will be valid for 180 days from bid end date and extensions thereof.</p> <p><b>BHEL will reserve the right to reject any or all quotations, quoting validity less than 180 days.</b></p>
7.	<p><b>Delivery Period:</b></p> <p>The material should be supplied within 150 days of purchase order.</p> <p>This period includes following:</p> <ul style="list-style-type: none"> <li>• 30 days from the date of PO for supplier to submit the documents (drawings / datasheet &amp; Quality Plan) for approval.</li> <li>• 30 days for documents approval by BHEL / End User</li> <li>• 07 days for inspection of material by BHEL / BHEL's nominated TPIA</li> <li>• 07 days for issuing dispatch clearance from the date of receipt of documents mentioned in Clause No. 3 of this document.</li> <li>• 07 days for arranging dispatch of material from the date of providing MDCC by BHEL.</li> </ul> <p>Any delay in document submission / approval / Inspection / dispatch clearance will be in respective account.</p>
8.	<p><b>Payment Terms:</b></p> <ul style="list-style-type: none"> <li>• 90% payment after receipt of material at site against submission of PBG @5% of Order value valid till entire Guarantee period. The PBG will be in BHEL format and from one of the BHEL consortium banks. For name of BHEL consortium bank, please visit our website <a href="http://hwr.bhel.com">hwr.bhel.com</a>.</li> <li>• Balance 10% payment after installation and commissioning of item at site.</li> <li>• Payment will be released by BHEL within following days from the date of receipt of material at site: <ul style="list-style-type: none"> <li>- 45 days for Micro and Small enterprises.</li> <li>- 60 days for Medium enterprises</li> <li>- 90 days for Non MSME enterprises</li> </ul> </li> </ul>
9.	<p><b>Post Order Document approval:</b></p> <p>Drawings/Data sheets/Quality Plan (QP) will be submitted to BHEL for BHEL/customer approval within 30 days of purchase order. The documents shall be complete in all respects. To ensure completeness of documents (as per specifications) BHEL would have in person meeting/ video-conference within first 15 days of PO (if requested by supplier well in advance). However, delay in documents approval due to vague / in-complete submission of documents shall be on supplier's account.</p> <p>BHEL will arrange the approval of the drawings/data sheets/QP within 30 days of their receipt. In case of delay on account of BHEL, delivery shall be re-scheduled accordingly.</p>
10.	<p><b>Price Basis:</b></p> <p>Please confirm that prices have been quoted on F.O.R. Udangudi site basis including all taxes. Prices will remain firm and fixed during the entire validity and execution of the project.</p>

11.	<p><b>Evaluation criteria:</b></p> <p>Evaluation will be done on the basis of Total Landed cost up to Udangudi project site (<b>Total Value-wise evaluation</b>).</p>
12.	<p><b>Installation and Commissioning at site:</b></p> <p>The supplier will erect &amp; commission all the items at site to integrate the system, demonstrate the performance of the Equipment and all its accessories to ensure compliance with complete specifications &amp; parameters quoted by them to the satisfaction of BHEL/end user. <b><i>Cost for the same should be inclusive in the quoted prices.</i></b></p> <p>Installation and Commissioning will be done at following address:</p> <p>SE/ (PROJECTS) 2X660 MW UDANGUDI STPP STG-I, TANGEDCO, UDANGUDI, THOOTHUKUDI-628215</p> <p><b><i>Failing to comply the above clause, the offer will be rejected straightaway.</i></b></p>
13.	<p><b>Guarantee:</b></p> <p>The equipment will be guaranteed for a period of 24 months from the date of dispatch or 18 months from the date of Installation &amp; Commissioning, whichever is earlier.</p> <p><b>Failing to comply to the guarantee clause, the offer will be rejected straightaway.</b></p>
14.	<p><b>Document:</b></p> <p>3 hard copies of O&amp;M manual, 05 CD ROM copies of O&amp;M manual and 05 soft copy of O&amp;M manual in English language giving complete technical information for operation and maintenance of the items.</p>
15.	<p><b>Packing &amp; Dispatch:</b></p> <p>All the items in the enquiry will be packed separately in a suitable water proof vibration packing box capable of bearing air, water and road transit hazards. <b>“HWR AAQMS”</b> should be written in bold letters on all four sides of the boxes. Packing boxes will be properly identified and marked with BHEL’s (India) Purchase Order Number.</p>
16.	<p><b>Arbitration Clause:</b></p> <p>In case of any dispute arising out of as in connection with this contract, the same shall be referred to arbitration under Arbitration &amp; Conciliation Act 1996 of a sole arbitrator who shall be appointed by mutual consent of the parties. The seat &amp; venue of arbitration shall be Haridwar.</p> <p>The proceedings shall be conducted in English. The Governing law of contract shall be the substantive law of India.</p>
17.	<p><b>General Clause:</b></p> <p>All other commercial terms and conditions will be governed by General Terms and Conditions (GTC) GeM GTC 4.0 v1.17_9 Aug 2024_09Aug24.</p>

18.	<p><b>E-invoicing:</b></p> <p>E-invoicing under GST has been implemented w.e.f. 01.08.2023 for all the taxable persons having turnover more than Rs. 5.00 cr. it has been specified by the govt that it is mandatory to mention a valid unique invoice reference no. (IRN) and QR code as generated from govt. portal on a tax invoice. Based on such information, GST ITC as claimed by BHEL in GST returns shall be matched with the corresponding details uploaded by supplier in E-invoicing system.</p> <p>In case the vendor / contractor delays or fails to provide all the documents as per the purchase order / work order at the time of submitting tax invoice to BHEL, any subsequent financial loss to BHEL on account of vendor/contractor shall be to vendor's / contractor's account. BHEL has further right to take necessary steps to protect its interest at the time of release of payment. This further requires inclusion of IRN and QR code on tax invoice as announced by govt. of india w.e.f. 01.08.2023.</p>
19.	<p><b>Conflict of Interest among Bidders/ Agents:</b></p> <p>"A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. <b>The bidder, found to have a conflict of interest shall be disqualified.</b> A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:</p> <ul style="list-style-type: none"> <li>a) they have controlling partner (s) in common; <b>or</b></li> <li>b) they receive or have received any direct or indirect subsidy/ financial stake from any of them; <b>or</b></li> <li>c) they have the same legal representative/agent for purposes of this bid; <b>or</b></li> <li>d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; <b>or</b></li> <li>e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/Assemblies from. one bidding manufacturer in more than one bid; <b>or</b></li> <li>f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/dealer. There can be only one bid from the following: <ul style="list-style-type: none"> <li>1. The principal manufacturer directly or through one Indian agent on his behalf; and</li> <li>2. Indian/foreign agent on behalf of only one principal, <b>or</b></li> </ul> </li> <li>g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; <b>or</b></li> <li>h) In case of a holding company having more <b>than</b> one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business. "</li> </ul>

20. **EARNEST MONEY DEPOSITE (EMD) / Bid Security:**

13.1 Interested vendors must submit their offer along with the following Earnest Money Deposit (EMD) in a separate sealed envelope:

Details	Amount In INR	Amount in Foreign Currency	Type
EMD	<b>INR 6,00,000/-</b> (INR Six Lacs Only)	Equivalent Foreign currency	Refundable

13.2 EMD shall not carry any interest.

13.3 Modes of deposits will be as per General Terms and Conditions (GTC) GeM GTC 4.0 v1.17\_9 Aug 2024\_09Aug24. Following modes are also acceptable:

- Electronic Fund Transfer credited in BHEL account (before tender opening).
- Banker's cheque/ Pay order/ Demand draft, in favour of BHEL (along with offer).
- Fixed Deposit Receipt (FDR).
- Bank Guarantee from any of the Scheduled Banks. The EMD shall remain valid for a period of 45 (forty-five) days beyond the final bid validity period as asked in NIT.
- Insurance Surety Bonds.

The demand draft shall be in favor of "BHEL Haridwar". E-Payment is also acceptable. For e-payment, RTGS details are as mentioned below:

Bank Details	SWIFT Details of bank	Contact Details of Banker
STATE BANK OF INDIA RANIPUR BRANCH, OPP: BHEL MAIN GATE, SECTOR-5, RANIPUR, HARIDWAR, UTTRAKHAND, INDIA PIN CODE : 249403	SWIFT NO : SBININBB225 CC ACCOUNT NO : 10667995458 IFSC CODE : SBIN0000586	Chief Manager (IBD) Contact No. +91 1334 224201 +91 1334 226125 Fax: +91 1334 226512

13.4 EMD exemption will be allowed as per criteria laid down in General Terms and Conditions (GTC) GeM GTC 4.0 v1.17\_9 Aug 2024\_09Aug24.

13.5 Bids not accompanied with requisite EMD or bids accompanied with EMD of inadequate value shall be liable for rejection, wherever exemption is not allowed.

**13.6 Forfeiture of EMD:**

- A bidder's EMD will be forfeited if the bidder withdraws or amends its/his tender or impairs or derogates from the tender in any respect within the period of validity of the tender or if the successful bidder fails to furnish the required performance security within the specified period mentioned in the Tender.
- EMD by the tenderer to be withheld in case any action on the bidder is envisaged under the provisions of extant "Guidelines on Suspension of business dealings with suppliers/ contractors" and forfeited/ released based on the action as determined under these guidelines.
- Bid securities of the unsuccessful bidders shall be returned to them after expiry of the final bid validity period / latest by the 30th day after the award of the contract. Since it is a two-part bidding, bid securities of unsuccessful bidders during first stage i.e. technical evaluation shall be returned within 30 days of declaration of result of first stage i.e. technical evaluation.
- Bid security/EMD of the successful bidder shall be returned only on conclusion of the order and receipt of a Performance Security/Performance Bank Guarantee of 5% of contract value (excluding taxes) from contractor / Supplier.



21.	<p><b>Breach of contract, Remedies and Termination:</b></p> <p>In case of breach of contract, performance bank guarantee available with BHEL against the said contract is atleast 10% of the contract value, the same be encashed. In case the value of the security instruments available is less than 10% of the contract value, the balance amount be recovered from other financial remedies (i.e. available bills of the contractor, retention amount, etc. with BHEL) or legal remedies be pursued. Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract.</p>
22.	<p><b>Item Description in Packing List:</b></p> <p>Bidders to note that "Item Name" and "Unit of measurement" in the packing list should be in line with BHEL description.</p> <p>BHEL description will be provided to successful bidder before dispatch of material.</p>
23.	<p><b>Acceptance of offers from country Sharing Land Border with India:</b></p> <p>I. Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turkey projects) only if the bidder is registered with the Competent Authority. Further, any bidder (including bidder from India) having specified Transfer of Technology (ToT) arrangement with an entity from a country which shares a land border with India, shall also require to be registered with the same competent authority.</p> <p>II. "Bidder" means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.</p> <p>III. "Bidder (or entity) from a country which shares a land border with India" for the purpose of this Order means: -</p> <ol style="list-style-type: none"> <li>An entity incorporated, established or registered in such a country; or</li> <li>A subsidiary of an entity incorporated, established or registered in such a country; or</li> <li>An entity substantially controlled through entities incorporated, established or registered in such a country; or</li> <li>An entity whose beneficial owner is situated in such a country; or</li> <li>An Indian (or other) agent of such an entity; or</li> <li>A natural person who is a citizen of such a country; or</li> <li>A consortium or joint venture where any member of the consortium or joint venture falls under any of the above</li> </ol> <p>IV. The beneficial owner for the purpose of (iii) above will be as under:</p> <p>1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.</p> <p>Explanation:</p> <ol style="list-style-type: none"> <li>"Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;</li> <li>"Control" shall include the right to appoint majority of the directors or to control the</li> </ol>

management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;

2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership or entitlement to more than fifteen percent of capital or profits of the partnership;

3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;

4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;

5. In case of a trust, the identification of beneficial owners) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.

VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

VII. The registration shall be valid at the time of submission of bid and at the time of acceptance of bid.

VIII. If the bidder was validly registered at the time of acceptance / placement of order, registration shall not be a relevant consideration during contract execution.

**Note:** Following declarations would be required from bidders (if applicable):

(A) "I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached]"

(B) "I have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement. I certify that this bidder does not have any ToT arrangement requiring registration with the competent authority.

**OR**

\* have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement. I certify that this bidder has valid registration to participate in this procurement."

24. **Integrity Pact:**

(a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors OEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

Sl.	IEM	Email
1.	Shri Otem Dai, IAS (Retd.)	<a href="mailto:iem1@bhel.in">iem1@bhel.in</a>
2.	Shri Bishwamitra Pandey, IRAS (Retd.)	<a href="mailto:iem2@bhel.in">iem2@bhel.in</a>
3.	Shri Mukesh Mittal, IRS (Retd.)	<a href="mailto:iem3@bhel.in">iem3@bhel.in</a>

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

(c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

**Note:**

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below:

Details of contact person(s)-

Mr. Shashi Pal Designation: A. E. (PPX-BOI) Main Administrative Building, 4 <sup>th</sup> Floor HEEP, BHEL, Haridwar- 249403 Uttarakhand, India Email ID: <a href="mailto:palsh@bhel.in">palsh@bhel.in</a> Tel: +91 1334 28 1941	Mr. Deshraj Yadav Designation: Dy. Manager (PPX-BOI) Main Administrative Building, 4 <sup>th</sup> Floor HEEP, BHEL, Haridwar- 249403 Uttarakhand, India Email ID: <a href="mailto:deshraj@bhel.in">deshraj@bhel.in</a> Tel: +91 1334 28 1187
--	---