केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE GOVT. OF INDIA

F. No-14011/1/2018-WQM-I

18.5.2018

To

Md Nasimuddin, I.A.S
Principal Secretary to Govt of Tamil Nadu /Chairman (FAC)
Tamil Nadu Pollution Control Board
76 Mount Salai, Guindy, Chennai -600032, Tamil Nadu

Subject: -TNPC Board –Cauvery River Pollution –Original Suit No 02/2015 (State of Tamil Nadu Vs State of Karnataka & Hon'ble Supreme Court of India) –Joint River Water Sampling and Analysis –regarding

Ref: Letter No TS1/TNPCB/F.011973/2017, dated 05.04.2018
Ref: CPCB letter No 1401/1/2018-MON /18950 dated 21.3.2018

Sir,

This is in reference to above mentioned TNPCB letter reference dated 5.4.2018, wherein TNPCB requested CPCB for suggested that installation of online monitoring system at the inter State borders of river Cauvery within the jurisdiction of Tamil Nadu at the cost of CPCB.CPCB is unable to take up the work as suggested by TNPCB. However, CPCB extends support in finalising the technical specifications and installation of RTWQMS. The technical specifications are enclosed as ready reference.

Yours faithfully

(A. Sudhakar)
Member Secretary

Encl: As above
Copy to:

(i) Regional Directorate : For Information & provide technical support to TNPCB pl.
Central Pollution Control Board
1st & 2nd Floors, Nisarga Bhavan
A-Block, Thimmaiah Main Road
7th D Cross, Shivanagar, Bengaluru –560 079, Karnataka

(ii) PS to CCB : for kind information of 'CCB' please.

(A. Sudhakar)

Technical Specifications for Supply and installation of Real Time Continuous Water Quality Monitoring Station

1. BACKGROUND:

CPCB has planned for installation of Real Time Water Quality Monitoring Network across Ganga Basin for ten parameters viz. pH, turbidity, conductivity, temperature, ammonia, Dissolved Oxygen, chlorides, nitrates, Bio-chemical Oxygen demand (BOD), Chemical Oxygen Demand (COD) consisting of 10 number of standalone unmanned remote water monitoring stations/system with GSM/GPRS/3G modem and other communication modes for transmission of data to a central receiving station located at CPCB central office at New Delhi. The Water Monitoring Stations shall provide real time data through GSM/GPRS network at scheduled interval and as and when requested by the users. Each Water Monitoring Station should be connected and capable of transmitting data to central receiving station at **CPCB Head Quarter**, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, DELHI - 110 032, INDIA and other Zonal Offices/ State Pollution Control Boards/ Ministry of Water Resources through Central Receiving Station. Basic Network Architecture is shown in Annexure-II.

Central receiving station will have capability to receive, analyze and archive the data received from ten unmanned Remote stations.

2. OVERALL REQUIREMENTS OF REAL TIME WATER QUALITY MONITORING SYSTEMS TO BE SUPPLIED

The network comprises of One Central Receiving Station to receive, process, archive and visualize data collected and transmitted by several remote stations.

- The network will start with 10 stations and the architecture should be modular to accommodate additional stations as per need.
- All the remote stations should be operational in a real time mode and central station should be able to access any remote station in network mode.
- The remote stations should be field operational and tolerant to extreme environmental conditions in India, in high or low temperatures, high humidity coastal conditions and high temperature desert conditions.
- The remote stations should be rugged and should not require manual intervention for at least 5 years except routine calibration, battery replacements and the relocation of rapid deploy (portable station) on an as needed basis. This is expected to be twice per year. Option of manual intervention may be incorporated in equipments installed at remote site.
- The communication between Remote and Central Receiving station must be two-way communication system.
- Remote station should have built in GPS receiver for automatic positioning.
- The data must have portability to central receiving station via cellular GSM/GPRS/ CDMA networks, Ethernet, PSTN etc.
- Options for other modes of data retrieval should be available such as USB, RS232 port.
- The software installed on Central Receiving Station must have provision for data acquisition, data archival, data analysis, data display and report generation in A4 format with the all parameter value display and also it would be possible to process and analyze all the measured and calculated parameters.

- Operator from Central Receiving station must be able to configure parameters of remote stations via software.
- The central server data need to be distributed to all Zonal Offices and State Pollution Control Boards. Vendor should provide a web enabled software to distribute the data and products to authorized users with highly secured mode.
- Type of reports to be generated from Central Receiving Station: Format of report will be decided after awarding work to successful bidder. However, tentative report format for reference is as below:
  - Minimum value with time MaximumValue Average value - Daily
  - Minimum value with time MaximumValue Average value - Monthly
  - Minimum value with time MaximumValue Average value - Yearly

3.0 TECHNICAL SPECIFICATIONS OF REMOTE STATION

The Remote Station for Water Quality Monitoring Network should have a standalone operating terminal, appropriate for outdoor installation for continuous measurement of eight parameters. Sensors connected to an advanced processing unit, complete with an electronic measurement and processed-data storage, provided as well with an integrated GSM/GPRS/3G radio-modem. Said radio-modem allows transmitting the data to a Central Receiving Station where all data for eight parameters are prepared and presented, with reliable and precise data updated in real time, fed by the continuous measurements from all the remote sites.

3.1 GENERAL SPECIFICATIONS OF WATER QUALITY MONITORING STATIONS:

Water Quality Monitoring Station consists of a concrete structure compound of 10X10X10 feet containing analyzer and sensors for following ten parameters along with a battery, and trained engineer with security personal for drawing sample from river and a communication device for transmitting data to Central receiving station:

1. pH
2. Conductivity
3. Turbidity
4. Dissolved Oxygen (DO)
5. Bio-Chemical Oxygen Demand (BOD)
6. Chemical Oxygen Demand (COD)
7. Chlorides
8. Nitrates
9. Ammonia
10. Temperature

The equipment should have following minimum features/specifications:

1. All sensors must have flexibility to equip either with multi-parameter probe or single probe. The instrument should be capable of having connectable field replaceable sensors/probes for all the required parameters. These probes/sensors should be capable of being removed without opening the main system or exposing the internal electronics to the environment.
2. The instrument should be capable of working in fresh, polluted or seawater.

3. The instrument should be capable of operating in water depths at least up to 200 feet. Field cables for use up to different depths (25, 50, 100, 200 feet) may be quoted.
4. The instrument should be capable of operating in a self-powering mode from an internal power supply (using cell batteries) for at least 45 days with a full sensor payload at a 15 minute sampling interval.
5. The instrument should also have the capability of being powered by an external 12V DC-power supply through an interface cable.
6. The instrument should have a non-volatile flash disk memory capable of storing 1,50,000 individual readings. Loss of battery power should not cause loss of memory, and a memory backup battery should not be required.
7. The instrument should have the capability of updating its internal software with newer versions via a disk in the field by the end user, or from the web.

3.1.1 Specification for pH, mV:

Measuring principle	:	Electrode (with Silicon body)
Alphanumeric display	:	1 line X 16 characters or better (Digital LCD)
Operating Temperature	:	-5^0 to 60^0C
Humidity	:	100 % without condensation
Power Supply	:	220 VAC ± 10% 47 to 53 Hz (Battery/AC Power)
pH measurable range	:	0.00 to 14.00± 0.01 pH
Resolution	:	0.01mv
Response Time	:	30 sec
Accuracy	:	0.01 pH
Electrode	:	Glass or Antimony
Automatic Cleaning	:	Compressed Air/ Other
Calibration	:	Multipoint calibration

3.1.2 Specification for Conductivity:

Measuring Principle	:	Electrode (Glass body with platinum electrode)
Alphanumeric display	:	1 line X 16 characters or better (Digital LCD)
Operating Temperature	:	-5^0 to 60^0C
Humidity	:	100 % without condensation
Power Supply	:	220 VAC ± 10% 50 Hz (Battery/AC Power)
Conductivity measurable range	:	0.2mS to 40 Siemens
Response Time	:	30 sec
Accuracy	:	1% of range
Automatic Cleaning	:	Compressed Air/Other

3.1.3 Specification for Turbidity:

Measuring principle	:	Optical
Operating Temperature	:	-5^0 to 60^0C
Humidity	:	100 % without condensation
Power Supply	:	220 VAC ± 10% 47 to 53 Hz

		(Battery/AC Power)
Turbidity measuring range	:	0- 400 NTU/ 40 – 4000 NTU
Resolution	:	0.001 NTU
Response Time	:	2 min or better
Automatic Cleaning	:	Compressed air/ Other and Sensor will clean the surface of optic before measuring value

3.1.4 Specification for Dissolved Oxygen:

Measuring Principle	:	Optical/Electrode
Alphanumeric display	:	1 line X 16 characters or better (Digital LCD)
Operating Temperature	:	-5^0 to 60^0C
Humidity	:	95 % without condensation
Power Supply	:	220 VAC ± 10% 50 Hz (Battery/AC Power)
DO measurable range	:	0-30 ppm
Response Time	:	30 sec
Accuracy	:	0.01ppm
Automatic Cleaning	:	Compressed Air/ Other

3.1.5 Specification for BOD:

Measuring method	:	Microbial fuel cell/UV absorption measurement- Spectral Absorption Coefficient (SAC)
Measuring range	:	0.1-50 mg/l (adjustable)
Measuring / response time	:	10 minutes or adjustable
Display	:	1 line X 16 characters or better (Digital LCD)
Operating temperature range	:	-5^0 to 60^0C
Power Supply	:	220 VAC ± 10% 50 Hz (Battery/AC Power)
Relative Humidity	:	100 % without condensation
Automatic cleaning	:	Compressed air/other

3.1.6 Specification for COD:

Measuring method	:	Electrochemical oxidation/UV Absorption measurement- Spectral Absorption Coefficient (SAC)
Measuring range	:	0.1-200 mg/l (adjustable)
Measuring / response time	:	10 minutes or adjustable
Operating temperature range	:	-5^0 to 60^0C
Power Supply	:	220 VAC ± 10% 50 Hz (Battery/AC Power)
Relative Humidity	:	100 % without condensation
Automatic cleaning	:	Compressed air/other

3.1.7 Specification for Chloride:

Alphanumeric display	:	1 line X 16 characters or better (Digital LCD)
Operating Temperature	:	-5^0 to 60^0C
Humidity	:	100 % without condensation
Power Supply	:	220 VAC ± 10% 50 Hz (Battery/AC Power)
Temperature measurable range	:	-10^0 to 60^0C
Response Time	:	30 sec
Automatic Cleaning	:	Compressed Air/ Other

3.1.8 Specification for Nitrate:

Alphanumeric display	:	1 line X 16 characters or better (Digital LCD)
Operating Temperature	:	-5^0 to 60^0C
Humidity	:	100 % without condensation
Power Supply	:	220 VAC ± 10% 50 Hz (Battery/AC Power)
Temperature measurable range	:	-10^0 to 60^0C
Response Time	:	30 sec
Automatic Cleaning	:	Compressed Air/ Other

3.1.9 Specification for Dissolved Ammonia:

Measuring Principle	:	Electrode
Alphanumeric display	:	1 line X 16 characters or better (Digital LCD)
Operating Temperature	:	-5^0 to 60^0C
Humidity	:	95 % without condensation
Power Supply	:	220 VAC ± 10% 50 Hz (Battery/AC Power)
Ammonia measurable range	:	0.00 to 100.00 ppm
Response Time	:	30 sec
Accuracy	:	5% of the reading
Electrode	:	Amperometric mambraned Cell or Other
Automatic Cleaning	:	Compressed Air/ Other method

3.1.10 Specification for Temperature:

Alphanumeric display	:	1 line X 16 characters or better (Digital LCD)
Operating Temperature	:	-5^0 to 60^0C
Humidity	:	100 % without condensation
Power Supply	:	220 VAC ± 10% 50 Hz (Battery/AC Power)
Temperature measurable range	:	-10^0 to 60^0C
Response Time	:	30 sec
Automatic Cleaning	:	Compressed Air/ Other

3.2 Specification for Data Logger:

ADC Resolution	:	16 bit or better
Operating Temperature range	:	-10°C to + 55°C
Internal Memory	:	1 MB RAM minimum
Battery Backup (internal)	:	Lithium Battery, storage: 2 years h)
Real- Time Clock	:	GPS synchronized
Sample Intervals	:	1 sec. to 24 hr. in 1 second Increments (user selectable)
Visual display	:	16 Character or more, alphanumeric LED/LCD to operate in temp. Range -10°C to +55°C
Communication ports	:	RS232/422/485 ,CMOS,USB
Telemetry/communications	:	The NMT should have provision for interfacing with following type of Communications: i) GSM/GPRS/ CDMA ii) Ethernet,Wi-Fi/PSTNRadio Link
Power consumption	:	Less Power Consumption

PowerSupply:

a) Battery	:	Single 12V chargeable maintenance-free battery 65 AH capacity
b) Charge controller	:	Internal or External

3.3 POWER SOURCE AT REMOTE STATION

The Remote station shall have the power backup system with Solar Panel with 15 Ah Sealed Maintenance free Battery and Solar Controller Charger. The external battery can be charged through Solar Panel or from 220 Volt 50 Hz, AC Power supply. The power backup should be sufficient to support the operation for remote terminal at least 2 days without main supply. This should be supported with the power budget calculations.

3.4 SPECIFICATION FOR ENCLOSURE FOR REMOTE STATIONS:

Weatherproof Enclosure	:	The enclosure type will depend on one of the two different types of installations (fixed and rapid deploy/portable). The installations with BOD and COD measurements shall be a robust, durable, weather-proof cabinet placed within a 10x10 building that is properly ventilated. The rapid deploy/portable systems will be mounted within a floating platform of the bidders choosing, and will house all components, including power supply and charging system (solar). Both systems will have IP-67 Protection.
Architecture (indicative)	:	Site by Site basis.
Security	:	Should be supported/equipped with

		Standard sensors to check the unauthorised intrusion and have ability to produce telecommunication alarm if the enclosure has been opened. One security official also required
Cabling	:	All cabling will be protected via armoured Conduit
Flexible	:	There shall be provision of adopting/ installing standard interfaces and sensors

3.4.1 SPECIFICATION FOR DATA COLLECTION PLATFORM AT REMOTE STATIONS:

Alphanumeric display	:	Push button to display sensor data, change Offsets (if required), and make programming changes
Operating Temperature	:	-5^0 to 50^0C
Humidity	:	95 % without condensation
Power Supply	:	12/24 V DC
Analog Input	:	4 single ended input (2 Differential), and as required by the sensor package being offered
A/D Resolution	:	16 bit or greater
Digital Input/Output	:	4 DI, 4 DO
Tipping Bucket Input	:	1
Serial Input	:	SDI-12 v.1.3, RS-232, and other as required by the supplier sensor solution
Telemetry I/O	:	GSM/GPRS, CDMA, INSAT, VSAT, Terrestrial Radio with any two telemetry options to be simultaneously used in addition to any other sensors or communication devices that are part of the platform
Internal Data Collection	:	Sufficient to store one-year of data for 10 sensors, data and time, taken at 15 minute intervals
External Data Collection	:	USB port and RS-232/Ethernet interface to download data
Programming Adapter	:	RS-232 and/or Ethernet with unlimited copies and rights to use programming software
Charging System	:	Solar power and battery operation (except Where BOD/COD are used) for autonomous operation for 4 days minimum. BOD/COD sites will have AC Power

3.4.2 SPECIFICATION FOR DATA COMMUNICATION AT REMOTE STATIONS

Operating Temperature	:	-5^0 to 50^0C
Humidity	:	95 % without condensation
Power Supply	:	12/24 V DC

Telecommunication Protocol	:	GSM/GPRS, CDMA, or other mobile Network telecommunications protocol
Accessories	:	Appropriate antenna (x-yagi or omni) with required connectors and cabling
Form factor	:	Radio will be modular and can be replaced separately from any other piece of equipment (such as the data collection platform)
Software	:	Either built into the Data Collection Platform or the Radio to provide radio diagnostics such as network availability and confirmation of transmission.

4.0 SPECIFICATION OF CENTRAL RECEVING STATION

The **Central Receiving Station** will have software installed on Central Terminal for data acquisition, data archival, data analysis, data display, report generation and visualization. Visualization of the data can be done for single remote station or multiple remote stations together in a standalone server, as well as, over internet. The Central Receiving station and software can incorporate and handle any number of remote stations.

By means of the Application, the Central Receiving Center would carry out the functions like Communications Management with all the remote terminals, via GSM/GPRS/CDMA, radio, etc, Programming of the remote terminals (sampling period, alarm thresholds, clock synchronization, etc.), Data Retrieval (in real time or by command) with automatic and/or manual operation and data storage in a suitable database, or alternatively in a SQL database, in order to allow the users to carry out their own data analysis and data processing, Full graphics analysis of data received from the Water quality remote Stations, with multiple graph display options, such as zoom function, copy print-outs, etc.

Central Receiving Station would receive and store in a database, all data transmitted by the Water quality Monitoring Remote Stations across India. The number of remote stations that can be accomodated by CRS must be for up to 200 stations. Central Receiving Station shall provide and be equipped for interrogation of up to 10 stations simultaneously.

The Central Receiving Station shall also be supplied with Time Series software where the raw data record can be corrected according to the calibration findings and other deviations in the measurement thus creating an official data for record. This data shall also be available as part of the Web dissemination, though it is recognized that this record may be somewhat delayed from the real-time data collection.

4.1 SPECIFICATION OF HARDWARE FOR CENTRAL RECEIVING STATION

4.1.1 DUAL REDUNDANT, HOT STANDBY SERVERS – 1 NO'

The server has 2 TB HDD or latest for data receiving, retrieval and archiving with software for receiving, processing, visualization, data basing and archiving and communication accessories including cables, civil work, modems, switches etc.

Specifications

1. The servers will be fixed in a 19" (800x1000mm) 42" rack with casters and glass door. The architect of the servers should be 100% redundancy with heat beat / status being reported to the administrator on Email/SMS in case of the failure event.

2. The purpose of this server is to host the real-time data collection activities, including activities to feed the time series data base in real-time for further processing, feed the web server as required, and manage the data communication to the remote sites.
3. Both servers will be loaded with original software's and should be always in Hot position to take over from main server to secondary server and vice versa.
4. The data base will be updated in both the servers in real time to avoid any loss of data in case of server failure.
5. The performance/benchmark during the acceptance of system will include,
    - Raid 5 implemented on both servers.
    - Automatic fail over process.
    - Automatic / manual fail back process.
    - Intimation to administrator during fail over / fail back.
    - Time taken during failover (should be less than 20 seconds)
    - Both the servers will be connected to a common keyboard and monitor through a KVM switch.
    - 24 port Giga switch will be installed in the rack for connecting the nodes
    - Dual port Wan hardware firewall should be provided

The hardware details of the sever is (2 Numbers, identical servers required for Hot redundancy located within Central Station in 19" rack)

1) Manufactured by ISO 9000 and 14000 manufacturing unit HP/COMPAQ/IBM/DELL ONLY

2) Model - Will be specified as the latest available at the time of delivery with manuals.

3) Processor- 64 bit processor. Intel Xeon Quad Core or higher with minimum, 2 MB L2 Cache memory, Front Side Bus – 800 Mhz.

4) Rack Mountable- 4U / 6U- Rack Mountable Server with rack mounting kit

5) No. of processors- 2 numbers (Dual Processor)

6) Memory- 8 GB RAM / Scalable to 16 GB min, ECC DDR RAM memory (800 MHz minimum) 7- Bays available - 8 bays – six hot swap disk bays. (i) diskette, (ii) DVD Writer

7) HDD- 2* 1 TB(hot plug) Ultra 160 SCSI disks. 10 K RPM

8) Controller - Dual Channel Ultra 320 SCSI Controller

9) Raid- Dual Channel Ultra 320 Raid controller with 128 MB battery backed ECC cache

10) Networking- 2 x 10/100/1000 MBPS Ethernet controller

11) Ports - Two USB ports and 1 serial

12) Bus Slots- According to the requirements of the function of the hardware/software

13) Systems Management - Dedicated Service Processor with LAN connectivity to provide for remote console and management / diagnostics independent of the hardware and OS

Remote power cycling of server (power on and off), Remote POST – Remote Access to RAID and SCSI configuration through Remote POST Console Shared serial port allowing connection to the Dedicated Service Processor / PCI Card and / or the operating system through a single modem. Monitor temperature, fans and power supplies , Pre failure warranty on CPU, memory & HDD.

14) DVD Writer, DVD RW Drive

15) Fans- System fans for cooling for power supply and processor

16) Power Supply- Redundant Hot Pluggable power supply , 2 x 600 W or more (N*1 redundancy).

17) Software - Installation and configuration utilities, System Administration Software.

18) Operating System- Win Server (latest available version), with media and manual, Antivirus for Win Server Antivirus should provide comprehensive Virus protection for Windows based network. It must provide Virus protection at the Gateway for all inbound and Outbound HTTP, SMTP & FTP Traffic across the network (with hardware Firewall).

19) Keyboard- Standard Keyboard (104 Keys)

20) Mouse - PS/2 type Microsoft or equivalent scroll mouse

21) Monitor- 19" Flat Panel LCD Monitor. Resolution of 1600 x 1200 or better. MPR-II compliant/FCC class B Certified/UL certified. Digital DVI-D and analog inputs.

22) Accessories & Service support - Good quality mouse pad and dust cover from the system and must have service support in Delhi.

23) **Router, USB Adapter, and Notebook Card**

Specifications:

IP Sharing Method: NAT (Network Address Translation)

Firewall: NAT, SPI (Stateful Packet Inspection)

Clients: Up to 253 total

Wireless Clients: Up to 16 total

DHCP Server: Supported

User Interface: HTTP (Web Browser)

Wired Networking Standards: WAN: IEEE 802.3, IEEE 802.3u, 10/100Base-Tx

LAN: IEEE 802.3, IEEE 802.3u, 10/100Base-Tx

Protocols Supported: TCP/IP, UDP, CSMA/CD, DHCP, AppleTalk®, IPX/SPX, NetBEUI

ISP Protocols Supported: Static, Dynamic, PPPoE, PPTP

VPN Support: PPTP/ IPSec pass-through (Single)

Power Supply: Input: 240VAC 60Hz

4.1.2 WEB ENABLED SERVERS – 1 NO'

All Specifications are same as above server but not hot redundant. The central server data need to be shared with web Enabled Server for distribution to all Zonal Offices and State Pollution Control Board Authorities.

4.1.3 DATA PROCESSING WORK STATION COMPUTER – 1 NO'

Specifications:
The Data Processing Work Station shall be used to post process the real-time data. The time series database will reside on this workstation. This workstation shall also handle ancillary activities which are at this time not defined.

Workstation shall have equivalent or better specification defined as follows:

Operating system installed	Genuine Windows® 7 Ultimate, with Media, 64-bit, English
Processor type	Dual Core Intel® Xeon® Processor X5270 (3.5GHz,6M L2,1333)
Form factor	Rack mount
Memory	16GB, DDR2 SDRAM FBD Memory, 667MHz, ECC
Memory slots	4 DIMM slots
Internal drives	2 drives, 1 TB, SATA 3Gb/s NCQ
Hard Disk Capacity	2 x 1TB
Hard disk drive	7200 rpm speed
Storage controller	Integrated 4-channel SATA 3.0 Gb/s controller with NCQ and RAID 0 & 1 capability
Optical drives	8 x DVD-ROM ; 8 x DVD+/-RW Double Layer
Internal audio	Integrated HD Audio (Realtek ALC262), optional PCI Sound Blaster X-Fi XtremeGamer, optional HP Thin USB Powered Speakers

Expansion slots	4 full length slots: 1 PCI Express (PCIe) x16 graphics, a PCI Express (PCIe) x4 (x1 electrical), 2 PCI slots
External I/O ports	2 USB 2.0 (front), optional IEEE 1394, 1 headphone, 1 microphone; 6 USB 2.0, 1 standard serial, 1 audio line in, 1 audio line out; Internal: 2 USB 2.0, two RJ-45 Ethernet ports
Graphic card 01	2.5GB NVIDIA® Quadro® 5000, DUAL MON, 2DP & 1DVI
Monitors	Three 22" Monitors VGA/DVI, with interface to workstation. Also, interface to the 42 " plasma display below.
Network interface	Integrated Broadcom 5755 10/100/1000 LAN (PCIe)

4.1.4 UPS – 1 NO'

APC or any standard manufactures make of proper size to provide backup to all servers. Shall use sealed maintenance free batteries only. State the size you will be providing complete with the calculations of power draw from the servers that will be on the UPS. The UPS shall provide 2 hours Power back to Hot redundant servers, web servers and data processing computer.

4.1.5 PRINTER:

Printer : HP Color LaserJet CM1312nfi MFP (CC431A) or better.

4.1.6 EXTERNAL HARD DISK-2 NO.

External Hard Disk : Seagate – 2.0 Tera Byte

5.0 - 42 INCH PLASMA SCREEN FOR VISUALIZATION OF DATA – 1 NO'S

Specifications

42" widescreen Plasma 1080p HDTV with Increased native contrast ratio, PC input, new anti-reflective filter, deep color technology, game mode, built-In SD card slot/ Gallery Player ready to View, HDMI Inputs and VIERA Link HDAVI control.

1. Manufacturer: Panasonic/Samsung/LG/Hitachi
2. Product Name: Panasonic Viera TH-42PZ85U 42" Plasma TV or equivalent
3. Product Type: Plasma TV , Actual Screen Size: 42"
4. Compatible Technology: HDTV , Aspect Ratio: 16:9 , Features: Closed Caption , Video System: ATSC
5. Contrast Ratio: 30000:1 , Comb Filter: 3D Y/C Digital , Maximum Resolution: 1920 x 1080
6. Total Output Power: 20W
7. Audio Decoding: Stereo , Sound System: Surround
8. Ports: 2 x HDMI Digital Audio/Video In
9. Language Support: English
10. Input Voltage Range: 120 V AC , Frequency: 60Hz

6.0 SPECIFICATION OF SOFTWARE FOR CENTRAL RECEIVING STATION

Software package for the communication, from measuring and acquisition stations, both locally and remotely via a PC. Intuitive and easy to use application which runs on Windows.Windows® Operating System (XP SP2, Windows 7, Windows Server 2008). Data Retrieval in real time or by command with automatic and/or manual operation and data storage in PostGreSQL, SQL Server, in order to allow and carry out the data analysis and data processing.

Software Management:

- Software capable for requesting, downloading, editing, processing and representation and management of data.
- The software integrates the entire data request commands made to the stations in real time data or data saved in the memory.
- Software allows the user to change and/or modify the configuration of the stations, enable to perform tasks such as date and time synchronisation with the computer and adds new measuring channels specifying the different sampling and storage periods, as well as the statistical calculations to be stored.

Multiple communication possibilities

- Public Switched Telephone Network (PSTN)
- Mobile phone system (GSM/GPRS)
- Communication via IP link (client or server)
- Direct communication via serial port (RS232)
- Optimal-Alternative communications systems (Radio, Satellite, Optical Fiber)

Window for enquiry and configuration of each station

- Name, number and abbreviation of the station
- Location, Latitude, Longitude coordinates
- Connection type and telephone, if any**.**
- Configuration of channels, parameter and calculations
- Photography which represents the actual station ("Associate image")

Hand on Operations

The following parameters of stations must be configurable for each station.

- Allow the Setting of Date/Time of the station.
- Real time data request from each channel.
- Downloading of data stored in the station
- Downloading the station's configuration of PC
- Downloading of PC's configuration to the stations
- Updating the station's Firmware

Data Analysis

- Data enquiry over several days
- Comparison of readings between stations
- Daily statistics enquiry
- Strip charts of the daily statistics.
- Comparison between the daily statistics of various stations
- Comparison between parameters from the same station or from different stations

Visualization of Data

- Enquiry of data in table form
- Enquiry of data in graph form
- Enquiry of data in map form
- Temporary graphs composition window

Additional Features

- Printing of various reports and graphs.
- Zoom in and Zoom out facility with automatic graph scale Resizing
- Registers all the events like Information messages, error messages.
- Information of the communications resources used by the PC at that moment
- Exportation of readings to text files (.txt) in CSV format and MS-EXCEL.

7.0 WEB ENABLED SOFTWARE FOR DATA DISTRIBUTION

The Web Software Platform must be able for web posting of the data available on the central server at CPCB Headquarter, Delhi, in such a way that all authorized persons with an internet connection (ADSL) would have the possibility to access to the information of all the water quality monitoring terminals. The user can customize the way to display up to ten parameters. The user can play the role as administrator and define other user's access rights. Considering data transmission from the remote terminals to the Central Server is carried out via GPRS cellular network, data can be updated, for example, every 5 minutes or 10 minutes, or 15 minutes, as programmed by the CPCB Officials. The Web Enabled Software must have following features:

1) Only authorized users can access the web enabled data
2) The format for administrator for issue of user id and password should be provided.
3) Log of user accessing the web enabled data with complete detail of data accessed and downloaded should be maintained.
4) The authorized user should have access to current data and historical data.
5) User should have provision for full graphical plotting of the time series of the data and comparison of data from historical data of the station.
6) In graphical representation should have full attributes, which should be displayed by positioning cursor on the map.
7) The selected station by clicking on the map must show the geographical information and status of the stations, for example Name of station, Station ID, Latitude, Longitude, Height (msl) etc.
8) On selecting a station, the complete menu of the data should be displayed.
9) Data can be selected both in Tabular and graphical format
10) The graphical display for all eight parameters should be available
11) The graphical plot of water quality data analysis are available for the user
12) Links to perform data downloads for any period of record, by station, group of stations, sensor, or group of sensors.

8.0.TRAININGTOCPCBOFFICIALS

Training will be conducted in two phases:

(i) Familiarization programme under which 4 officials of CPCB will be given in depth training for 15 working days at works/equipment manufacturing industry. To and fro travel, boarding and lodging will be borne by successful supplier at (OEM) works at supplier cost.

(ii) The manufacturer / supplier should provide in-depth training for 5 working days which include 1 day in-house training on handling of software and 2 days in field training on hardware and software to CPCB/ SPCBs/Water resources/World Bank officers preferably during Delhi installations including operation and maintenance of the system and about all

software aspects in respect of Remote & Central Receiving stations. This training will be conducted in Delhi for all the SPCBs and other officers.

(iii) The Bidder shall furnish the schedule and program of the training to the Board within 30 days after the notification of award in such a manner that proper training is imparted to Board staff members.

(iv) A thorough multimedia training course (DVD, External HDD, Flash Drive, etc.) will be provided by the bidder which will include the following modules:

a. Data station installation, configuration, operation, maintenance and troubleshooting. This will include the data collection system, data communication system, sensors, and all components related to the remote data stations.
b. Data receive station installation, configuration, operation and maintenance. This will include the data collection system hardware and software. In depth training on how stations are added or removed from the network will be included in the training, along with troubleshooting.
c. Data validation and correction software use, including configuration, operation and maintenance. This will be training on time series data base software used for the correction of data (in the event the sensor(s) have drifted or other problems).
d. Web server installation, configuration, operation, maintenance and troubleshooting. This will include in depth training on the configuration of the web server including the addition/subtraction of data stations/sensors, as well as the configuration of web products, such as tabular data reports, graphics, map interfaces, and alarms as specified.

(v) Provision of training

The supplier shall provide the training to the Board staff at CPCB Delhi for ten (10) days to (10) persons after the performance test and commissioning. Training should include but not limit to the following:

1) Inspection of the Equipment.
2) Precautions in Use of the Equipment.
3) Basic measurement principle.
4) Principles of operation of the Equipment.
5) Start-up and shutdown procedure.
6) Operation of the Equipment.
7) Calibration method.
8) QA / QC.
9) Data management and software application.
10) Safety precautions.
11) Basic maintenance procedure.
12) "Do's" and "Don'ts" in operation of the Equipment.
13) Handling of hazardous chemicals and gas.
14) Others, which are deemed to be necessary by the Supplier.

In case the Equipment for training requires the supplemental and / or supporting Equipment, the Supplier shall carry out the training including such Equipment.

The supplier shall discuss and finalize the detailed contents and schedule of the training program in consultation with the Board during installation of the Equipment.

The suppliers shall furnish the training manual and / or CD as required for training for all the Equipment supplied under the scope of work of this document.

Contents of training manual and / or CD for the Equipment are as follows:

1. Principle of the Equipment.
2. Operation and calibration of the Equipment.
3. Maintenance and basic repair of the Equipment
4. Safety instruction of the Equipment
5. Others, which are deemed to be necessary by the Supplier

9.0. WARRANTYANDMAINTENANCE

9.1 The manufacturer should provide a comprehensive warranty of at least five years after commissioning of the system in the field. The manufacturer shall take on the work of servicing and routine maintenance of field equipment once in a month. Response time for rectifications of faults in the field Remote station equipments should not be more than 48 hours.

9.2 Available Spares for Maintenance

If the sensor calibration is required to be performed away from the field (in a controlled environment such as a laboratory), spare sensors that are fully calibrated shall be provided to prevent data loss. It shall not be acceptable to remove a sensor for calibration that will cause loss of data greater than the time that is required to simply replace the sensor. These spares shall become the property of CPCB at the end of warranty, and shall be fully functional and calibrated at that time.

9.3 Penalty for delay in O&M and capturing of data

1. If the down time is more than two days, the warranty period will be presumed to be extended by a period twice the down time.
2. If data capture rate for a station is found to be less than 95% in a year, there will be a proportionate deduction from the balance 20% amount/bank guarantee (equivalent to each station) which is to be released after warranty period. This maximum downtime equates to 18.25 days of downtime per year, or an average of 26 hours of downtime per month, or an average of 16.8 hours of downtime per week.

10.0 COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT (CAMC)

10.1 Vendor must quote for the CAMC separately. Vendor will be responsible for the communication of data generated from remote station to central receiving station and other nodes during warranty and CAMC period. Bidder will be responsible for operation and maintenance of the instrument therefore, Bidder must quote for CAMC along with their offer for 2 years which will start after expiring of 5 years of comprehensive warranty.

11.0 OPERATION & MAINTENANCE OF RTWQMS:

11.1 The Contractor's responsibilities shall include without limitations the following works to be carried out on the Water Quality Monitoring Stations installed under this Contract during the Operation & Maintenance of the stations:

a) Operation and Maintenance of all the commissioned equipments and amenities as supplied by the Manufacturer under the Contract including services during forced and planned outages and overhauls.

b) The Contractor shall take over the entire Real Time Water Quality Monitoring Station (including all equipment) for O&M after execution of Indemnity Bond as per format placed at Attachment-12, Section III of bid document

c) The Contractor shall provide to the owner a monthly summary of all operation and maintenance activities performed by the contractor during each month.

d) Operation and Maintenance Obligations:

In implementing its obligations to operate and maintain the facility under this Contract, the Contractor shall:

i. Undertake comprehensive maintenance including i.e. schedule and breakdown maintenance & repair at site and keep Board informed daily data as per Attachment 3 of Section –II.

ii. Obtain permission from the owner and inform the O&M for any assistance for which equipment is required to be sent to the works. Contractor shall arrange substitute equipment to keep RTWQMS station operational

iii. Take reasonable action to assure that the Personnel deployed at Real Time Water Quality Monitoring stations (RTWQMS)

11.2 Owner shall arrange for the following and contractor shall guide and assist the owner:

a) The Owner shall pay O&M charges at the end of each quarter to the Contractor, in accordance with the payment terms detailed in Special Conditions of Contract.

b) Owner shall pay all fess including Service Tax, etc., imposed upon Owner by the Applicable Law.

c) The Owner shall identify and hand over the site for erection and commissioning of RTWQMS Monitoring Stations free from all encumbrances

d) The Owner shall make the arrangement for electricity and telephone connection at the site. However, monthly charges for both electricity and phone bill shall be borne by the Contractor.

e) Owner shall provide space and necessary furniture for setting central monitoring station at each city.

10.2 PAYMENT CONDITION

CAMC payment will be released against bank guarantee in two parts (on yearly basis).

ListofSpares

S No.	Description	Quantity (in No.)
RTWQMS Equipment		
1	Data logger and transmission system with built-in display, suitable signal conditioning for analog/digital sensors, serial (RS-232 interface) SDI-12 interface	3
2	Sealed Maintenance free rechargeable batteries 12 V (65 AH) or better as required to meet autonomy specifications	3
3	Battery chargers for charging the battery (3 each for Solar regulators and AC/Mains battery charging	3
4	System operation, maintenance and service manuals (Hard copies) and CDs containing soft copies	3
GSMEquipment with suitable cables andconnectors		
5	GSM/GPRS/3G Modem	3
Sensors		
6	pH/ temperature sensor with suitable connector and cable	3
7	Conductivity/ Ammonia sensors with suitable cable	3
8	BOD/COD sensors with suitable cable	3
9	Turbidity/DO sensors with suitable cable	3
10	Chlorides and Nitrates sensors with suitable cables	3
11	Sensor mast assembly with suitable enclosures for housing the different sensors free from solar radiation etc.	3

No advance payment will be made towards installation, civil works and turnkey charges.

11. TESTING,INSTALLATION

11.1 All the equipments shall be installed and brought into suitable conditions for operation by the supplier at the sites designated by the Board. The supplier shall make all the necessary and proper adjustments and arrangements', including the utility supplies and connections, foundation and erection works in order to install the Equipment in adequate conditions for operation.

11.2 Only the best installation practices are to be applied, and all the installation works must be done to the satisfaction of the Board and the supplier shall carry out his works in a neat and proper workman manner. The installation shall be planned and carried out in such a way so as not to damage installation materials and the Equipment.

11.3 All the installing Equipments, tools, materials, labour, logistics and all the other requirements for installation shall be provided by the Supplier.

11.4 Bidder shall depute Engineer/supervisor for on-site assembly, installation, commissioning and start up of the supplied equipment. Bidder should offer the complete system with complete turnkey implementation including installation, testing and commissioning to the satisfaction of CPCB officers. The equipment will be installed at CPCB's identified sites. The installing mast and civil work will depend upon the requirement of the site. Height of Mast can be upto 4 mt. or as per site requirement and material is of GI pipe adjustable in length and should be rust proof and weather proof.

11.5 The successful bidder will be allocated predefined list of stations as per Annexure-I

11.6 INSPECTION AND TEST

The Board shall have the right to inspect and the test the Equipment to confirm their conformity to the specifications without any extra charge to the Board by the Contractor. The Contractor shall notify the Board and the Consultant in writing, in a timely manner (at least 21 days in advance), of the schedule of inspections and test.

The inspections and test shall be conducted on the premises of the Contractor and/or the Manufacturers and the sites. If conducted on the premises of the Contractor and/or the Manufacturers, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the Consultant for the inspections and test at no charge to the4 Board.

Should any inspected or tested Equipment fail to conform to the Specifications, the Board may reject the Equipment, and the Contractor shall either replace the rejected Equipment or make alternations necessary to meet the Specifications requirements free of cost to the Board.

No pre dispatch inspection is envisaged for equipment of foreign origin and contractor shall furnish factory test/inspection reports as furnished below of the manufacturer along with the dispatch documents. However, the Board reserves the right to appoint at its cost, any inspection agency (other than suggested by contractors) which will be binding on the contractor.

- Performance Test Certificate
- Certificate of Traceability
- Verification of System Completeness
- Product Certificate

For the equipment of Indian contractor should submit check list for equipment for approval of CPCB. For container, contractor should take prior approval of the drawing from CPCB.

Contractor should notify date of pre-dispatch inspection to the CPCB at least 15 (fifteen) days ahead of inspection.

The Board's right to inspect, test, where necessary, reject the Equipment after the Equipment's arrival in India shall in no way limited or waived by reason of the Equipment having previously been inspected, tested and passed by the Board prior to the Equipment's shipment from the country of origin.

12. DOCUMENTATION

i. The authorization of representation from the manufacturer of the major equipments should be submitted by the bidder along with the technical bids.

ii. The bidders shall submit literature/brochures of the products and components being offered in the technical bid in response to this tender enquiry.

iii. Note: - Failure to provide these documents along with technical bid will be deemed as NON-COMPLIANCE. All such technical bids will be considered as NON-RESPONSIVE and are liable to be REJECTED.

iv. The manufacturer should provide detailed manuals for operation, servicing and maintenance of each sub system including all block diagrams and detailed circuit diagrams.

v. The catalogues of all the vital components used in the system should also be provided.

vi. The copies of software listings may be provided in the form of CD ROMs or other suitable media. All manuals should be given in printed form also.

vii. Separate hard & soft copies of manuals must be provided for each station.

13. COMPLIANCE/NON-COMPLIANCESTATEMENT

The bidder shall submit a detailed item-wise compliance / non-compliance statement referring para-wise to the requirements given in this document. The compliance statement shall be supported by original brochure(s) of the equipment or sub component from the manufacturer. In case the original brochure is silent on any part of tender specification, it shall be supported by an undertaking by the manufacturer, if claimed complied.

The technical specifications and other requirements contained in this document are essentially required by the indenter. However, reasons for non- compliance, even of small nature shall be mentioned clearly. Silence on any part of the technical specification or failure / omission to provide any such details will be treated as non-compliance.

14. DELIVERY SCHEDULE

a) Delivery: Supply, Installation & Commissioning of all 10 RTWQMS (hardware and software) in HDC shall be done as per details given in Section-VI Schedule of Requirement.

Delivery of the equipment should be done at the Office of the CPCB, East Arjun Nagar,

Delhi-110031.

After the acceptance of the material at stores, the successful bidder should be responsible for transportation, installation and erection of RTWQMS at the predefined site at the Annexure-1 at the cost of the Bidder.

15. SITEPREPARATION

The successful bidder shall prepare the RTWQMS site according to the type of station required. For fixed sites a small structure may need to be put in place. The 'rapid deploy' sites will be of a floating platform type to be specified by the bidder. The 'rapid deploy' sites shall be moved approximately twice per year, once just prior to monsoon season, and then again just after monsoon season. Specifications may be suggested by vendor as needed as per site requirement (Annexure-III). All civil work has to be done by successful bidder engineers.

16. SYSTEMDESIGNREVIEW

After award of contract a detailed design review meeting will be conducted where full technical details of the system will be mutually discussed between CPCB official and successful bidder engineers.

17. RECURRING CHARGES FOR THE GSMNETWORK

The recurring charges for the GSM/Internet and other communication charges will be reimbursed by the CPCB on annually basis to the successful bidder after showing original bills after the end of years.

18. HANDING OVER OF STATION

On expiry/closure/termination of the Contract Agreement, stations shall be handed over to Board in working condition to the satisfaction of Board. Few or all the spares procured by the Contractor and unused as on date of handling over may be purchased by the Owner at his discretion provided Contractor is able to provide reasonability of the costs of such spares. In addition the Contractor shall provide consumables equivalent to three months consumption on expiry/closure/termination of the Contract Agreement without any extra financial implication.