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جمهورية العراق  
وزارة الكهرباء  
المديرية العامة لإنتاج الطاقة الكهربائية في البصرة  
قسم الشؤون التجارية

No. : 39  
DATE : 12 / 1 / 2015

**SUB./Re. Advertising TENDER No. 5/2/24/1180 S**

The General Directorate of Electrical Energy Production in Basrah is advertising tender to supply **(supply installation and operation the Equipment of contionus emission monitoring system ( CEMS) )** to Hartha power station according to the specifications and general conditions as attached . So those who want to participate, should consult Commercial department to buy the tender conditions for non-refundable amount of (275,000 I.D) and submit primary insurances( bid bond) amounting to (25000) twenty five thousand dollar issued by accredited bank in Iraq. knowing that the potential amount of the material is(1,250,000)\$ . The deadline of receiving offers is 12 o'clock of the official work day dated 11.02.2015 In case the closing date happens to be an nnexpected official holiday, The closing date will be the next official work day after the holiday

Our directorate is not obliged to accept the lowest offer.

[www.moelc.gov.iq](http://www.moelc.gov.iq)  
E-mail: [trading@gdeepbasra.com](mailto:trading@gdeepbasra.com)

  
Tahseen Zaki Salem  
Director General  
12 / 1 / 2015

|                                     |                            |
|-------------------------------------|----------------------------|
| Power Station: Hartha power station | المحطة : الهارثة           |
| REF NO. 5/2/24/1180 S               | رقم الطلب : ١١٨٠/٢٤/٢/٥ أس |

## Request summary

### Supply ,installation and operation the Equipment of Continuous Emission Monitoring System (CEMS) for units (2&3) in Hartha thermal power station ( TOW SETS ONE FOR EACH UNIT )

#### 1- PURPOSE OF request:-

This document provides the specifications for Continuous Emission Monitoring System (CEMS) to be installed for the operation of Units 2 and 3 of the Al Hartha Power Station, as required in the project's ESMP. It identifies and defines acceptable methods and specifications for the supply, installations and operation of the CEMS.

The CEMS specifications presented in this document are mainly based on standards and specifications prepared by regulatory authorities from USA, Canada and Australia

#### 2- GENERALAL REQUIRMENTS:-

##### MONITORING PARAMETERS

The CEMS shall be capable of monitoring the following parameters:

- Sulfur dioxide (SO<sub>2</sub>);
- Nitrogen oxides (NO<sub>x</sub>) expressed as nitrogen dioxide (NO<sub>2</sub>);
- Carbon monoxide (CO);
- Particulate matter (PM);
- Oxygen (O<sub>2</sub>);
- Carbon dioxide (CO<sub>2</sub>);
- Total hydrocarbons (THC)
- Stack gas volumetric flow rate and velocity; and
- Stack gas temperature.

#### 3- International CEMS Regulations/Guidelines:-

In the absence of specific Iraqi regulatory guidelines and requirements on CEMS, internationally accepted guidelines have been adopted to define the technical specifications of the CEMS to be installed. Specifically, the CEMS should comply with the following standards:

- USEPA 40 CFR Part 75 (Continuous Emission Monitoring) Subpart B (Monitoring Provisions); and
- USEPA 40 CFR Part 60 Appendix B, Promulgated CEMS Performance Specifications.

In addition, the CEMS accuracy (analyzer detection limit, span, response time, etc.) must also comply with specifications set out in the following standard, in addition to the USEPA standard listed above:

- Department of Environment and Conservation, Government of Western Australia. Continuous Emission Monitoring System (CEMS) Code for Stationary Source Emissions , October 2006.

The CEMS to be installed and operated as part of the Units 2 and 3 of the Al Hartha Power Station shall comply with the technical requirements of the above regulations, as specified in this document (see Section 4.0).

All other aspects of the CEMS not specifically mentioned in this document (i.e. CEMS auxiliaries, installation procedures, sampling point location, etc.) shall be in accordance with internationally accepted standards

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All other aspects of the CEMS not specifically mentioned in this document (i.e. CEMS auxiliaries, installation procedures, sampling point location, etc.) shall be in accordance with internationally accepted standards.

#### **4- SUPPLIER QUALIFICATIONS :-**

Successful execution of a project of this nature requires a proven track record and technical competency of the supplier and its subcontractors. The following are the minimum required qualifications:

- Bidders must propose CEMS (including equipment, software and QA/QC system) that are in compliance with internationally accepted standards (i.e. USEPA Performance Specifications for CEMS);
- Bidders shall be a CEMS manufacturer or a joint venture of trading company and CEMS manufacturer. A joint venture company shall demonstrate proven track record of the venture;
- Bidders must have a proven track record in the supply, installation, and maintenance and provision of technical support for similar CEMS requirement. Proof of satisfactory completion of previous projects that are in use for at least five (5) years shall be provided;
- Bidders must have good financial standing and at least three (3) years audited financial statement shall be provided;
- Bidders must have the capability of providing after-sales technical and maintenance services for the CEMS. They shall have an established technical support system and shall provide details of this system;
- Bidders must be able to work and provide after sales services in Iraq considering the current and future security situations;
- Bidders must nominate a Project Manager, which should be in a senior level with at least ten (10) years of relevant experience. All suppliers shall assure technical competency of the Project Manager and all personnel to be involved in the project; and
- Bidders must have an ISO Quality Management Systems certification (i.e. ISO 9000:2008).

#### **CEMS SPECIFICATION:- 5-**

##### **GENERAL SPECIFICATIONS**

The following are the general specifications for the CEMS to be installed for the Unit 2 and 3 of the Al Hartha Power Station:

- The CEMS, including all its auxiliaries, shall comply with the performance specifications outlined in Section 2.2 of this document;
- The CEMS, particularly the gas analyzers, shall be of the conventional dilution-extractive type; or similar (provision of different type must be justified);

- The CEMS shall be equipped with data acquisition system (DAS) that is capable of processing the data output from the CEMS analyzers. The DAS shall be able to

process and produce data that are compatible in preparing reports required by the relevant authorities;

- The analyzers and monitors shall incorporate a microprocessor that would allow the operator to check certain operating parameters, perform calibration automatically and perform numerous diagnostic functions;
- The CEMS shall be designed and installed to ensure reliable operation with a minimum frequency and duration of system outages for maintenance and repair. The system shall provide 95% data availability when maintained according to factory recommended procedures;
- All system components shall be industrial quality and suitable for use in the environmental conditions in Basra, Iraq;
- The CEMS shall include all necessary auxiliaries (i.e. for power supply, cables, etc.), particularly auxiliaries that requires special connectors; and
- Complete engineering and technical documentation of the system, including as built, shall be supplied as part of the system.

Detailed specifications of the gas analyzers and monitors are provided in the subsequent sections. All other parts of the CEMS to be proposed by bidder, which are not included in the detailed specifications, are subject for approval.

1-The origin of the materials of the system mentioned (USA or Western European , Japan )

2- The temperature of the ambient air for the sensors ( near the stack and duct gases) required in paragraphs (6-4, 5- 4.4 to 4.3 - 4.2 to 4) not less than 85 C°

3- The probes (sensors) operation temperature required in paragraphs (6-4, 5- 4.4 to 4.3 - 4.2 to 4) (-40~450 C°)

4- Preferably sensors installed the system on the gas stream (Gas duct) and for ease to can be checking maintenance, inspection and monitoring.

5- Installed sensors belonging to the system (CEMS) and be at the gas stream (Gas duct) link between the chimney and boiler for the two units (2,3) / gas stream schemes available at the beneficiary in the case of the demand by the company implemented

6- linking all control signals in the system with the proposed control unit (2.3) directly

7- provide the beneficiary plans PI diagram schemes installed the system offered by the supplier

8- The payment after completing the monument, examination and operating in the form of payments determined by the beneficiary process

9- Warranty period of one year from the date of initial receipt after 72 hours continuous operation ,

Include all faults workmanship warranty period, and also resulting of bad construction.

10- The company processed to provide a training program covers all technical and operational details and maintenance of the monument and the training before materials processing

11- Dimensions Duct gases before stack (mm 1800 × 5600)

Lower temperature after the Air heater 125 ° C

Furnace pressure of no more than (715 mmH<sub>2</sub>O)

12- Supplying period of (120 Day) after LC opening

- Installation period of (40 Day )

-Operation period (3 Days)

#### 6- CEMS QUALITY ASSURANCE REQUIREMEN :-

The CEMS shall include a written Quality Assurance Plan and should contain details of the following aspects, as minimum;

- Quality policy and objectives;
- Document control system;
- Continuous Emissions Monitoring System (CEMS) regulatory mandates and CEMS description;
- Organization and responsibilities;
- Facilities, equipment, and spare parts inventory;
- Methods and procedures (analysis and data acquisition);
- Calibration and quality control (QC) checks;
- Maintenance (preventive);
- Performance audits;
- Systems audits;
- Corrective action program;
- Data review, verification, and validation;
- Reporting; and
- Recordkeeping.

## **7- CEMS INSTALLATION REQUIREMENTS:-**

### **Sampling Plane Location**

The CEMS sampling plane is the area of the emission stack and duct gas that provides representative sample of the actual emissions and where the sampling probe should be installed. This location shall be determined by the following:

- The location satisfies the minimum siting criteria of USEPA 40 CFR 60 Method 1, as follows :-
  1. Selecting another location where there is no cyclonic (or swirling) or stratified flow condition; or
  2. Eliminating the cyclonic (or swirling) or stratified flow condition by straightening the flow, e.g., by installing straightening vanes.
- The location shall be where the effects of condensation, coating, erosion, or other conditions that could adversely affect flow monitor performance are minimized.

### **4.9.2 Measurement Point**

The CEMS measurement point is the point in the DUCT GASES section where sample will be drawn. This location shall be determined by either of the following

- Measurement point should be within the central area of the duct cross section; or
- Measurement point should be no less than 1.0 meter from the duct wall.
- Monument requires all of the equipment of the system sensors and areas taking models of gases emitted from the combustion in DUCT gases before the chimney) and is not installed in stack so that it can be maintained and easily accessible

### **Monitoring Point for Volumetric Flow and Diluents (O<sub>2</sub> and CO<sub>2</sub>)**

The CEMS monitoring point for volume flow and O<sub>2</sub> and CO<sub>2</sub> should satisfy the requirement for sampling plane location (see Section 4.5.1). For O<sub>2</sub> and CO<sub>2</sub> monitors, it should be located at a position that is as close as possible to the sampling probe of gas analyzers to ensure representative measurement. It should be noted, however, that these monitors should not interfere with the sampling probe operation (i.e. it should not disturb gas flow).

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### 8- CEMS SUPPLIER SCOPE OF WORKS:-

#### SUPPLY, INSTALLATION AND COMMISSIONING SCOP

The scope of the successful bidder for the CEMS to be installed for the Unit 2 and 3 of the Al Hartha Power Station include the following:

- Supply and installation of complete CEMS, including all analyzers, monitors and associated auxiliaries (i.e. cables, probes, etc.). Warranty of all equipment and system will be subject for approval;
- Supply and installation of all electrical system requirements for the power supply of the CEMS (i.e. power cables, electrical conduit, breakers, etc.);
- Supply of all consumables for two (2) years; and

Determine the consumables (specify type and code number and quantity) for two years. Identification materials for calibration (types and code number and quantity) and install the validity of the end of the material processed with calibration materials processing backup for a specific period depending on the expiry date of Article

- Requires the identification page of data within the main DCS unit to read all the devices of the system (CEMS)
- Construction of platforms, housings and all necessary structural supports for the installation of the CEMS;
- Start-up, verification of correct operation and commissioning of the CEMS, auxiliaries and all associated equipment. This scope shall also include certification testing, as follows:

1. Initial testing for drift, response, etc. If necessary, relative accuracy testing should also be considered;
2. Supply of all required calibration gases and necessary equipment for the testing; and
3. Provision of a Certification Testing Report.

### 9- TRANSFER OF TECHNOLOG:-

Transfer of technology and capacity building for the relevant Al Hartha personnel, to include the following:

- Training on the operation, troubleshooting and maintenance of the CEMS, auxiliaries and all associated equipment;
- Provision of Overall Operations Manual and a written quality assurance (QA) manual and training on the use of the same; and
- Provision of as-built engineering drawings for the CEMS, its auxiliaries and all associated equipment.
- Provide a certified training curriculum includes training on the system paragraphs of (CEMS) and schedule for training and locate training establishment in the country of origin of the system.
- Dispatch of five persons specialists (2Chemists- 2 Control-1 Boilers) to the country of origin for the purposes of training on the operation and maintenance of the system (CEMS) before the processing period of the system for a period of two weeks, except for travel days and shall bear all the costs of travel.

### 10- MAINTENANCE SERVICES :-

The scope of the successful bidder for the CEMS shall include the following maintenance service.

- One (1) year maintenance contract, which shall commence after successful completion of the certification testing. The maintenance contract shall include the following, as minimum:
1. Quarterly maintenance visits, to include complete system diagnostics;
  2. Provision for emergency visits and repairs. All repairs, including any replacement of equipment or parts during this phase should be covered by warranty; and
  3. Provision of online (telephone, email, etc.) technical assistance.

2015/11/11  
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رئيس كيميائي  
Abdul Rahman A. Abdulla  
WT and Enviro -Manager

مع إضافة ملاحظات  
المرفقة

توقيع المحطات

مدير المحطة

المدير التجاري

# Specifications of Continuous Emission Monitoring System (CEMS)

| Client                                                                                                                                                                                                                                                                                          | Project Name                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Government of Iraq, Ministry of Electricity /<br/>General Directorate of Electrical Energy<br/>Production /<br/>Rehabilitation project of Units 2&amp; 3 in Hartha<br/>Thermal Power Station in Basra</p>  | <p>IDA No. 4289 (Emergency<br/>Electricity Reconstruction<br/>Project (EERP) )<br/>Consulting Services for the<br/>Environmental and Social<br/>Management Plan (ESMP)<br/>Implementation for<br/>Rehabilitation of Units 2&amp; 3<br/>in Hartha Thermal Power<br/>Station in Basra</p> <p>Tender NO : 1180</p>                                                       |
| <p><b>Request summary:</b><br/><b>Supply , installation and operation the<br/>Equipment of Continuous Emission<br/>Monitoring System (CEMS)</b><br/><b>( TOW SETS ONE FOR EACH UNIT )</b></p>                                                                                                   | <p>Contact with :<br/><a href="mailto:Rahman.tememy@yahoo.com">Rahman.tememy@yahoo.com</a><br/>Environmental Manager-<br/>Mobil : 00964 780 1401642</p> <div data-bbox="1034 1525 1358 1637" style="border: 1px solid black; padding: 5px;"> <p>ميد الرحمن عبد الكريم عبد الله<br/>رئيس كيميائي الم<br/>Abdul Rahman A. Abdulla<br/>WT and Enviro -Manager</p> </div> |

## TABLE OF CONTENTS

|                                                        |          |
|--------------------------------------------------------|----------|
| <b>1.0 Introduction .....</b>                          | <b>1</b> |
| 1.1 Project Overview .....                             | 1        |
| 1.2 Purpose of this Document .....                     | 1        |
| <b>2.0 General Requirements .....</b>                  | <b>1</b> |
| 2.1 Monitoring Parameters .....                        | 1        |
| 2.2 Regulatory Guidelines and Requirements .....       | 2        |
| 2.3 Supplier Qualifications .....                      | 3        |
| <b>3.0 Process Overview and Site Conditions .....</b>  | <b>3</b> |
| 3.1 General Description of the Power Station .....     | 3        |
| 3.2 Fuel Specifications .....                          | 5        |
| 3.3 Flue Gas Characteristics .....                     | 5        |
| 3.4 Plant layout and Stack Configuration .....         | 5        |
| <b>4.0 CEMS Specifications .....</b>                   | <b>5</b> |
| 4.1 General Specifications .....                       | 5        |
| 4.2 Gas Analyzers .....                                | 6        |
| 4.3 Particulate Matter (PM) Analyzer .....             | 7        |
| 4.4 Diluents Monitors .....                            | 8        |
| 4.5 Physical Gas Conditions Monitors .....             | 1        |
| 4.6 Data Acquisition System (DAS) .....                | 1        |
| 4.7 CEMS Quality Assurance Requirements .....          | 2        |
| 4.8 CEMS Installation Requirements .....               | 2        |
| <b>5.0 CEMS Supplier Scope of Works .....</b>          | <b>4</b> |
| 5.1 Supply, Installation and Commissioning Scope ..... | 4        |
| 5.2 Transfer of Technology .....                       | 4        |
| 5.3 Maintenance Services .....                         | 4        |
| <b>6.0 References .....</b>                            | <b>5</b> |

## LIST OF TABLES

|                                                                                                                        |   |
|------------------------------------------------------------------------------------------------------------------------|---|
| Table 2.1 – Maximum Allowable Emission Limits of Air Pollutants Emitted from Hydrocarbon Fuel Combustion Sources ..... | 2 |
| Table 3.1 – General Specifications of the Major Equipment of Units 2 and 3 of Al Hartha Power Station .....            | 4 |
| Table 3.2 – Specifications of the Fuel Supply .....                                                                    | 5 |
| Table 3.3 – General Characteristics of Flue Gas Emissions .....                                                        | 5 |
| Table 4.1 – Design Specifications for SO <sub>2</sub> .....                                                            | 6 |
| Table 4.2 – Design Specifications for NO <sub>x</sub> .....                                                            | 7 |
| Table 4.3 – Design Specifications for CO .....                                                                         | 7 |
| Table 4.4 – Design Specifications for O <sub>2</sub> .....                                                             | 8 |
| Table 4.5 – Design Specifications for CO <sub>2</sub> .....                                                            | 8 |

## LIST OF FIGURES

|                                                                       |   |
|-----------------------------------------------------------------------|---|
| Figure 4.1 – Minimum Requirement for Sampling Plane Location .....    | 3 |
| Figure 4.2 – Minimum Requirement for Measurement Point Location ..... | 3 |

## LIST OF ABBREVIATIONS

|                   |                                            |
|-------------------|--------------------------------------------|
| °C -              | Celsius                                    |
| %wt -             | Weight Percent                             |
| CFR -             | Code of Federal Regulations (US)           |
| CEMS -            | Continuous Emissions Monitoring System     |
| CO -              | Carbon Monoxide                            |
| CO <sub>2</sub> - | Carbon Dioxide                             |
| CPU -             | Central Processing Unit                    |
| DAS -             | Data Acquisition System                    |
| Dome -            | Dome International LLC                     |
| ESIA -            | Environmental and Social Impact Assessment |
| ESMP -            | Environmental and Social Management Plan   |
| HP -              | High Pressure                              |
| hr -              | Hour                                       |
| HSE -             | Health, Safety and Environment             |
| IDA -             | International Development Association      |

|                      |                                                |
|----------------------|------------------------------------------------|
| IP -                 | Intermediate Pressure                          |
| ISO -                | International Organization for Standardization |
| kV -                 | Kilo-volts                                     |
| LP -                 | Low Pressure                                   |
| mg/Nm <sup>3</sup> - | Milligram per Normal Cubic Meter               |
| MoE -                | Ministry of Electricity (Iraq)                 |
| MW -                 | Megawatt                                       |
| MWe -                | Megawatt Electrical                            |
| NO <sub>2</sub> -    | Nitrogen Dioxide                               |
| O <sub>2</sub> -     | Oxygen                                         |
| PM -                 | Particulate Matter                             |
| QA/QC -              | Quality Assurance / Quality Control            |
| RAM -                | Random Access Memory                           |
| rpm -                | Revolution per Minute                          |
| RTD -                | Resistance Temperature Detectors               |
| SO <sub>2</sub> -    | Sulphur Dioxide                                |
| TSP -                | Total Suspended Particulates                   |
| t/hr -               | Tons per Hour                                  |
| UK                   | United Kingdom                                 |
| USA -                | United States of America                       |
| USEPA -              | United States Environmental Protection Agency  |

## DEFINITION OF TERMS

### Accuracy

The degree of closeness/agreement of the CEMS measured value to the true value. The true value is measurement value determined using a Reference Method (i.e. 40CFR60 Method 5 for PM).

### Calibration

Comparison of a measurement standard or instrument with another standard or instrument to detect, correlate, report or eliminate by adjustment any inaccuracy of the compared measurement values.

### Calibration Drift

The difference between in the CEMS output readings from the established reference value after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

### Calibration Gas

A gas certified by laboratory to have an accurately defined concentration that is used as a comparative standard in analytical instrumentation.

**Censorial Area** The concentric area that geometrically similar to the stack or duct cross section and is no greater than 1% of the stack or duct cross-sectional area.

### CEMS

An integrated system used to continuously monitor pollutant concentration or emission rates and generally consists of sample interface, pollutant analyzer, data recorder, etc.

### Diluents Gas

A major gaseous constituent in the emission gas stream used to dilute the pollutant mixture in dilution type analyzer, i.e.  $O_2$  and  $CO_2$  for combustion sources.

**Drift** An undesired change in output, over a period of time that is unrelated to input or equipment adjustment.

**Extractive Monitoring System**

A system that draws gas sample from the stack and transport gas sample to analyzer.

**Lower Detection Limit**

The minimum value that an analyzer/monitor can measure.

**Quality Assurance**

An integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process or system satisfy the requirement of the end user.

**Representative Sample**

A sample whose characteristics reflect those of the population from which it is drawn.

**Response Time**

The time required for the CEMS to display on the data recorder 95% of a step change in the pollutant concentration.

**Reference Value**

The known concentration of a calibration gas or the measured value using a Reference Method of measurement.

## **Sampling Plane**

The part of stack or duct length where emission gases are well mixed and where the measurement probe and monitors are installed in order to obtain a representative sample of the actual emission.

**Sampling Point**

The individual positions in the sampling plane where samples are drawn.

**Span**

The highest value of a parameter that an analyzer/monitor is required to measure.

**Zero Drift**

The difference between the CEMS response to a low-range calibration value and the reference value after a stated period of operation during which no unscheduled maintenance, repair or adjustment took place.

## 1.0 INTRODUCTION

### 1.1 PROJECT OVERVIEW

The Government of Iraq has received financing from the International Development Association (IDA) for "Consulting Services for the Environmental and Social Management Plan (ESMP) Implementation for Rehabilitation of Units 2 & 3 in Hartha Thermal Power Station in Basra" as part of the Emergency Electricity Reconstruction Project (Loan number: IDA No. 4289).

This Emergency Electricity Reconstruction Project is in line with the Ministry of Electricity's (MoE) current priorities that include the rehabilitation of existing power plants to increase electricity generation capacity and address shortfall. The main component of the project is the financing of the rehabilitation of Units 2 and 3 of the Al Hartha Power Station.

An Environmental and Social Impact Assessment (ESIA) for the Rehabilitation of the Hartha Power Plant has been prepared. The ESIA included an Environmental and Social Management Plan (ESMP) that describes the mitigation, monitoring and institutional measures to be carried out during the implementation of the project to eliminate adverse environmental and social impacts or to reduce them to acceptable levels. The MoE has appointed Dome International LLC (Dome) to provide assistance in implementing the ESMP.

### 1.2 PURPOSE OF request

This document provides the specifications for Continuous Emission Monitoring System (CEMS) to be installed for the operation of Units 2 and 3 of the Al Hartha Power Station, as required in the project's ESMP. It identifies and defines acceptable methods and specifications for the supply, installations and operation of the CEMS.

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## 2.0 GENERALAL REQUIRMENTS

### 2.1 MONITORING PARAMETERS

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- Carbon monoxide (CO);
- Particulate matter (PM);

- Oxygen (O<sub>2</sub>);
- Carbon dioxide (CO<sub>2</sub>);
- Total hydrocarbons (THC)
- Stack gas volumetric flow rate and velocity; and
- Stack gas temperature.

## 2.2 REGULATORY GUIDELINES AND REQUIREMENTS

### 2.2.1 Iraqi Air Emission Standard

Relevant air emission limits established by the Iraqi Ministry of Environment (MOE) are listed in Tables 2.1.

**Table 2.1 – Maximum Allowable Emission Limits of Air Pollutants Emitted from Hydrocarbon Fuel Combustion Sources**

| Substance                                                                                          | Sources                            | Max. Allowable Emission Limits (mg/Nm <sup>3</sup> ) |
|----------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------|
| Visible emissions                                                                                  | All sources                        | 250                                                  |
| Nitrogen oxides (expressed as nitrogen dioxide (NO <sub>2</sub> )) (NO <sub>x</sub> )              | Fuel combustion units: Gas fuel    | 240                                                  |
|                                                                                                    | Fuel combustion units: Liquid fuel | 500                                                  |
|                                                                                                    | Turbine units: Gas fuel            | 70                                                   |
|                                                                                                    | Turbine units: Liquid fuel         | 150                                                  |
| Sulphur dioxide (SO <sub>2</sub> )                                                                 | All sources                        | 500                                                  |
| Total suspended particles (TSP)                                                                    | All sources                        | 250                                                  |
| Carbon monoxide (CO)                                                                               | All sources: Existing              | 500                                                  |
|                                                                                                    | All sources: New                   | 250                                                  |
| Source: Iraq, National Limitations on Emissions in Activities and Work, Directive Number 3 of 2012 |                                    |                                                      |

### 2.2.2 International CEMS Regulations/Guidelines

In the absence of specific Iraqi regulatory guidelines and requirements on CEMS, internationally accepted guidelines have been adopted to define the technical specifications of the CEMS to be installed. Specifically, the CEMS should comply with the following standards:

- USEPA 40 CFR Part 75 (Continuous Emission Monitoring) Subpart B (Monitoring Provisions); and
- USEPA 40 CFR Part 60 Appendix B, Promulgated CEMS Performance Specifications.

In addition, the CEMS accuracy (analyzer detection limit, span, response time, etc.) must also comply with specifications set out in the following standard, in addition to the USEPA standard listed above:

- Department of Environment and Conservation, Government of Western Australia. Continuous Emission Monitoring System (CEMS) Code for Stationary Source Emissions , October 2006.

The CEMS to be installed and operated as part of the Units 2 and 3 of the Al Hartha Power Station shall comply with the technical requirements of the above regulations, as specified in this document (see Section 4.0).

All other aspects of the CEMS not specifically mentioned in this document (i.e. CEMS auxiliaries, installation procedures, sampling point location, etc.) shall be in accordance with internationally accepted standards.

## **2.3 SUPPLIER QUALIFICATIONS**

Successful execution of a project of this nature requires a proven track record and technical competency of the supplier and its subcontractors. The following are the minimum required qualifications:

- Bidders must propose CEMS (including equipment, software and QA/QC system) that are in compliance with internationally accepted standards (i.e. USEPA Performance Specifications for CEMS);
- Bidders shall be a CEMS manufacturer or a joint venture of trading company and CEMS manufacturer. A joint venture company shall demonstrate proven track record of the venture;
- Bidders must have a proven track record in the supply, installation, and maintenance and provision of technical support for similar CEMS requirement. Proof of satisfactory completion of previous projects that are in use for at least five (5) years shall be provided;
- Bidders must have good financial standing and at least three (3) years audited financial statement shall be provided;
- Bidders must have the capability of providing after-sales technical and maintenance services for the CEMS. They shall have an established technical support system and shall provide details of this system;
- Bidders must be able to work and provide after sales services in Iraq considering the current and future security situations;
- Bidders must nominate a Project Manager, which should be in a senior level with at least ten (10) years of relevant experience. All suppliers shall assure technical competency of the Project Manager and all personnel to be involved in the project; and
- Bidders must have an ISO Quality Management Systems certification (i.e. ISO 9000:2008).

## **3.0 PROCESS OVERVIEW AND SITE CONDITION**

### 3.1 GENERAL DESCRIPTION OF THE POWER STATION

The Al Hartha Power Station is a thermal power plant using natural gas as main fuel and liquid fuel as standby fuel (heavy fuel oil and crude oil). Units 2 and 3 of the Al Hartha Power Station (the Project scope) are currently being rehabilitated with funding provided under IDA No. 4289 (Emergency Electricity Reconstruction Project). As part of the rehabilitation Unit 2 and 3 of the Al Hartha Power Station will each be provided with individual steam boiler and steam turbine generator and will have a capacity of 200 MW each. The overall efficiency of the power station's Units 2 and 3 is estimated to be 40.57% using natural gas and 40.13% using fuel oil.

The steam boiler for each unit will be of natural-circulation type with steam generating capacity of 660 tons/hr each. Each boiler unit will be of single furnace and gas-tight type, operating under supercharging. The furnace of the boilers will be equipped with sixteen (16) gas/fuel oil burners. It is also designed for combustion of gas and liquid fuel mixture (which is a possible case during start-up). Each boiler will be equipped with forced draft fans and recirculation fans for the supply of air into the furnace.

The steam turbines of each unit (2 and 3) consist of a single combined HP/IP axial flow and a single axial double flow LP turbine in tandem. The steam from the boiler units HP steam enters the HP/IP turbine rotor and expands into 12 stages. It is then exhausted into the reheat section of the boilers before entering the IP section of the turbine where it expands into 12 stages towards the 8 stages LP turbine.

The generators of Units 2 and 3 are hydrogen cooled and will operate at 18 kV, supplying a transformer which will increase the voltage to 400 kV. Table 3.1 provides general specifications of the major equipment of Units 2 and 3 of the Al Hartha Power Station.

**Table 3.1 – General Specifications of the Major Equipment of Units 2 and 3 of Al Hartha Power Station**

| Parameters                           | Data     |
|--------------------------------------|----------|
| <b>Boiler</b>                        |          |
| HP Steam Production                  | 660 t/hr |
| HP Steam Temperature                 | 541 °C   |
| HP Steam Pressure (at boiler outlet) | 131 bar  |

### 3.3 FLUE GAS CHARACTERISTICS

Table 3.3 provides the available general design characteristics of the flue gas to be emitted during the operation of Units 2 and 3 of the Al Hartha Power Station. It should be noted that these data are based on preliminary boiler information and other parameters should be established by the supplier based on the fuel characteristics presented in Table 3.2. An actual stack emission testing should be considered, if found to be necessary.

Table 3.3 – General Characteristics of Flue Gas Emissions

| Parameters                                                                                                                                           | Data                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Boiler Exhaust Gas Temperature (using natural gas)*                                                                                                  | 143 °C +/- 10            |
| Boiler Exhaust Gas Temperature (using liquid fuel)*                                                                                                  | 163 °C +/- 10            |
| NO <sub>x</sub> Emissions (using natural gas)*                                                                                                       | 180.0 mg/Nm <sup>3</sup> |
| NO <sub>x</sub> Emissions (using heavy fuel/crude oil)*                                                                                              | 350.0 mg/Nm <sup>3</sup> |
| *Data from Technical Specification of Replacement Boilers (Al Hartha Power Station Refurbishment Project, Contract Agreement, ICB No. ICB-MoE1/2007) |                          |

|                                         |                   |
|-----------------------------------------|-------------------|
|                                         |                   |
|                                         |                   |
| Reheat Steam Production                 | 555.5 t/hr        |
|                                         |                   |
| Reheat Steam Temperature/Inlet Pressure | 375 °C / 38.7 bar |
|                                         |                   |
| Reheat Steam Temperature (outlet)       | 541 °C            |
|                                         |                   |
| Natural Gas Consumption at Full Load    | 48,000 Nm3/hr     |
|                                         |                   |
| Fuel Oil Consumption at Full Load       | 54 t/hr           |
|                                         |                   |
| <b>Steam Turbine</b>                    |                   |
|                                         |                   |
| Nominal Output                          | 200 MW            |
|                                         |                   |
| HP Steam Inlet Flow                     | 624.3 t/hr        |
|                                         |                   |
| HP Steam Temperature                    | 538 °C            |
| HP Steam Pressure                       | 124.5 bar g       |
| HP Exhaust Pressure                     | 37.2 bar g        |
| IP Steam Inlet Flow                     | 526.8 t/hr        |
| P Steam Temperature                     | 538 °C            |
|                                         |                   |
|                                         |                   |
| IP Steam Inlet Pressure                 | 33.4 bar g        |
|                                         |                   |
| LP Steam Inlet Flow                     | 497.6 t/hr        |
|                                         |                   |
| LP Steam Temperature                    | 315 °C            |
|                                         |                   |
| LP Steam Inlet Pressure                 | 5.9 bar g         |
| Operating Speed                         | 3000 rpm          |

| Generator and Exciter |          |
|-----------------------|----------|
| Nominal Rating        | 250 MVA  |
| Generating Voltage    | 18 kV    |
| Power Factor          | 0.8      |
| Cooling Medium        | Hydrogen |
| Exciter Voltage       | 440 V    |
| Exciter Field Current | 3037 A   |

### 3.2 FUEL SPECIFICATIONS

Table 3.2 provides the basic specifications of natural gas and liquid fuel (heavy fuel oil and crude oil) to be used in Units 2 and 3 of the Al Hartha Power Station.

**Table 3.2 – Specifications of the Fuel Supply**

| Heavy Fuel Oil (% weight)                                             | Natural Gas (% volume)   | Crude Oil                |
|-----------------------------------------------------------------------|--------------------------|--------------------------|
| Carbon - 85.5                                                         | Methane - 79.4           | API - 23.1               |
| Hydrogen - 11.5                                                       | Ethane - 15.8            | Pour Point - 40 °C       |
| Sulfur - 2.5                                                          | Nitrogen - 1.14          | Sulfur - 3.7 %wt         |
| Sediment - 0.3                                                        | Carbon Dioxide - 1.93    | Specific Gravity - 0.915 |
| Specific Gravity - 0.9169                                             | Propane - 1.5            |                          |
|                                                                       | Specific Gravity - 0.672 |                          |
| Note: The natural gas to be used contains <0.01 ppm H <sub>2</sub> S. |                          |                          |

### 1- 4.5.1 Oxygen (O<sub>2</sub>)

The O<sub>2</sub> monitor principle of operation shall be of paramagnetic technique and must comply with the design criteria specified in Table 4.4, as minimum.

Table 4.4 – Design Specifications for O<sub>2</sub>

| Design Parameters                   | Required Specifications |
|-------------------------------------|-------------------------|
| Lower Detection Limit               | ≤ 0.5% O <sub>2</sub>   |
| Interference Rejection (sum total)  | ≤ ± 1.0% O <sub>2</sub> |
| Analyzer Span                       | 0-21% O <sub>2</sub>    |
| Temperature-Responsive Zero Drift*  | ≤ ± 0.5% O <sub>2</sub> |
| Temperature-Responsive Span Drift** | ≤ ± 0.5% O <sub>2</sub> |
| Response Time (95%)                 | ≤ 200 seconds           |
| Cycle Time                          | ≤ 15 minutes            |

\*Represents actual value (i.e. ≤ ± 0.5% O<sub>2</sub> means monitor must be able to detect 0.5% O<sub>2</sub> or less, not 0.5% of 21% span value).

\*\*For every 10 °C change in analyzer operating temperature within the ambient temperature range (in Basra, Iraq).

### 2- 4.5.2 Carbon Dioxide (CO<sub>2</sub>)

The CO<sub>2</sub> monitor principle of operation shall be of NDIR technique and must comply with the design criteria specified in Table 4.5, as minimum:

Table 4.5 – Design Specifications for CO<sub>2</sub>

| Design Parameters                  | Required Specifications  |
|------------------------------------|--------------------------|
| Lower Detection Limit              | ≤ 0.5% CO <sub>2</sub>   |
| Interference Rejection (sum total) | ≤ ± 1.0% CO <sub>2</sub> |
| Analyzer Span                      | 0-25% CO <sub>2</sub>    |
| Temperature-Responsive Zero Drift* | ≤ ± 0.5% CO <sub>2</sub> |
| Temperature-Responsive Span Drift  | ≤ ± 0.5% CO <sub>2</sub> |
| Response Time (95%)                | ≤ 200 seconds            |
| Cycle Time                         | ≤ 15 minutes             |

\*Represents actual value (i.e. ≤ ± 0.5% CO<sub>2</sub> means monitor must be able to detect 0.5% CO<sub>2</sub> or less, not 0.5% of 21% span value).

\*\*For every 10 °C change in analyzer operating temperature within the ambient temperature range (in Basra, Iraq).

## 4.6 PHYSICAL GAS CONDITIONS MONITOR

| 1- | 4.6.1 Temperature Sensor | <p>The temperature sensor shall be of thermocouple type and must satisfy the following requirements:</p> <ul style="list-style-type: none"><li>▪ The sensor span must be <math>\geq 1.5</math> times of the license limit; and</li><li>▪ The sensor response time must be <math>\leq 60</math> seconds.</li></ul> |
|----|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2- | <b>4.6.2 Volumetric Flow and Velocity Monitor</b> | <p>The volume flow and velocity monitor shall be of ultrasonic type and must satisfy the following requirements:</p> <ul style="list-style-type: none"> <li>▪ Lower detection limit must be <math>\leq 1.0</math> m/s;</li> <li>▪ The monitor span must be <math>\geq 1.5</math> times of the expected maximum value;</li> <li>▪ The sensor response time (95%) must be <math>\leq 10</math> seconds; and</li> <li>▪ The system design must allow cleaning of flow element and there should be no interference from moisture.</li> </ul> |
|    |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## 4.7 DATA ACQUISITION SYSTEM (DAS)

|    |                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3- | <b>4.7.1 DATA ACQUISITION SYSTEM (DAS)</b> | <p>The DAS to be installed as part of the CEMS should electronically record all measurements and automatically calculates and records emissions in the required units of measure. It must comply with the following requirements, as minimum:</p> <ul style="list-style-type: none"> <li>▪ The system should record, reduce and report CEMS analyzer and monitor data relative to the significant digits, units and the time period specified in relevant emission standard;</li> <li>▪ The system should automatically determine an excess emission or malfunction in the system;</li> <li>▪ The system must create a permanent electronic record of valid and invalid CEMS average values, calibration, low and high-level calibration drift (including negative drift) and audit results;</li> <li>▪ The system must provide a continuous and instantaneous readout of CEMS values (in appropriate units);</li> <li>▪ The system must determine and print user-selectable time-specified averages for all individual channels for certification and performance testing purposes;</li> <li>▪ The system must record values from the system analyzers monitors at specific frequency (for specific parameter) and automatically flag invalid data; and</li> </ul> |
|----|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>▪ The system must automatically flag off-scale data and control daily zero/span calibration drift checks.</li> </ul> <p>The DAS should use a Microsoft-based operating system and should include the following hardware, as minimum:</p> <ul style="list-style-type: none"> <li>▪ CPU with latest processor (i.e. Intel® Core™ i7) with at least 4GB RAM;</li> <li>▪ Multiple hard-drives for data storage (each with 100 GB or greater);</li> <li>▪ Colored flat panel monitor, printer and DVD drive; and</li> <li>▪ Data back-up drive (i.e. USB).</li> </ul> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 4.8 CEMS QUALITY ASSURANCE REQUIREMEN

The CEMS shall include a written Quality Assurance Plan and should contain details of the following aspects, as minimum:

- Quality policy and objectives;
- Document control system;
- Continuous Emissions Monitoring System (CEMS) regulatory mandates and CEMS description;
- Organization and responsibilities;
- Facilities, equipment, and spare parts inventory;
- Methods and procedures (analysis and data acquisition);
- Calibration and quality control (QC) checks;
- Maintenance (preventive);
- Performance audits;
- Systems audits;
- Corrective action program;
- Data review, verification, and validation;
- Reporting; and
- Recordkeeping.

## 4.9 CEMS INSTALLATION REQUIREMENTS

### 4.9.1 Sampling Plane Location

The CEMS sampling plane is the area of the emission stack and duct gas that provides representative sample of the actual emissions and where the sampling probe should be installed. This location shall be determined by the following:

- The location satisfies the minimum siting criteria of USEPA 40 CFR 60 Method 1, as follows :-
1. Selecting another location where there is no cyclonic (or swirling) or stratified flow condition; or

2. Eliminating the cyclonic (or swirling) or stratified flow condition by straightening the flow, e.g., by installing straightening vanes.

- The location shall be where the effects of condensation, coating, erosion, or other conditions that could adversely affect flow monitor performance are minimized.

#### **4.9.2 Measurement Point**

The CEMS measurement point is the point in the DUCT GASES cross-section where sample will be drawn. This location shall be determined by either of the following

- Measurement point should be within the central area of the duct cross section; or
- Measurement point should be no less than 1.0 meter from the duct wall.
- Monument requires all of the equipment of the system sensors and areas taking models of gases emitted from the combustion in DUCT gases before the chimney) and is not installed in stack so that it can be maintained and easily accessible

#### **4.9.3 Monitoring Point for Volumetric Flow and Diluents (O<sub>2</sub> and CO<sub>2</sub>)**

The CEMS monitoring point for volume flow and O<sub>2</sub> and CO<sub>2</sub> should satisfy the requirement for sampling plane location (see Section 4.5.1). For O<sub>2</sub> and CO<sub>2</sub> monitors, it should be located at a position that is as close as possible to the sampling probe of gas analyzers to ensure representative measurement. It should be noted, however, that these monitors should not interfere with the sampling probe operation (i.e. it should not disturb gas flow)

### **5.0 CEMS SUPPLIER SCOPE OF WORKS**

#### **5.1 SUPPLY, INSTALLATION AND COMMISSIONING SCOP**

The scope of the successful bidder for the CEMS to be installed for the Unit 2 and 3 of the Al Hartha Power Station include the following:

- Supply and installation of complete CEMS, including all analyzers, monitors and associated auxiliaries (i.e. cables, probes, etc.). Warranty of all equipment and system will be subject for approval;
- Supply and installation of all electrical system requirements for the power supply of the CEMS (i.e. power cables, electrical conduit, breakers, etc.);

- Supply of all consumables for two (2) years; and

Determine the consumables (specify type and code number and quantity) for two years. Identification materials for calibration (types and code number and quantity) and install the validity of the end of the material processed with calibration materials processing backup for a specific period depending on the expiry date of Article

- Requires the identification page of data within the main DCS unit to read all the devices of the system (CEMS)
- Construction of platforms, housings and all necessary structural supports for the installation of the CEMS;
- Start-up, verification of correct operation and commissioning of the CEMS, auxiliaries and all associated equipment. This scope shall also include certification testing, as follows:
  1. Initial testing for drift, response, etc. If necessary, relative accuracy testing should also be considered;
  2. Supply of all required calibration gases and necessary equipment for the testing; and
  3. Provision of a Certification Testing Report.

## 5.2 TRANSFER OF TECHNOLOG

Transfer of technology and capacity building for the relevant Al Hartha personnel, to include the following:

- Training on the operation, troubleshooting and maintenance of the CEMS, auxiliaries and all associated equipment;
- Provision of Overall Operations Manual and a written quality assurance (QA) manual and training on the use of the same; and
- Provision of as-built engineering drawings for the CEMS, its auxiliaries and all associated equipment.
- Provide a certified training curriculum includes training on the system paragraphs of (CEMS) and schedule for training and locate training establishment in the country of origin of the system.
- Dispatch of five persons specialists to the country of origin for the purposes of training on the operation and maintenance of the system (CEMS) before the processing period of the system for a period of two weeks, except for travel days and shall bear all the costs of travel.

## 5.3 MAINTENANCE SERVICES

The scope of the successful bidder for the CEMS shall include the following maintenance service:

- One (1) year maintenance contract, which shall commence after successful completion of the certification testing. The maintenance contract shall include the following, as minimum:
  1. Quarterly maintenance visits, to include complete system diagnostics;
  2. Provision for emergency visits and repairs. All repairs, including any replacement of equipment or parts during this phase should be covered by warranty; and
  3. Provision of online (telephone, email, etc.) technical assistance.

## 6.0 REFERENCES

Department of Environment and Conservation, Government of Western Australia. "Continuous Emission Monitoring System (CEMS) Code for Stationary Source Emissions", October 2006.

United States Environmental Protection Agency (USEPA) 40 CFR Part 75, Continuous Emission Monitoring. Data retrieved from [www.ecfr.gov](http://www.ecfr.gov).

USEPA 40 CFR Part 75 CEMS Performance Specification 2 for SO<sub>2</sub> and NO<sub>x</sub>.

USEPA 40 CFR Part 75 CEMS Performance Specification 4 for CO.

USEPA 40 CFR Part 75 CEMS Performance Specification 11 for PM.

USEPA 40 CFR Part 75 CEMS Performance Specification 3 for O<sub>2</sub> & CO<sub>2</sub>.

USEPA 40 CFR 60 Appendix F – Quality Assurance Procedures (Procedure 1: Quality Assurance Requirements for Gas Continuous Emission Monitoring Systems Used for Compliance Determination).

USEPA 40 CFR Part 75 CEMS Field Audit Manual, 16 July 2003

flame ionization detector (FID) and must comply with the must meet the requirements of 40 CFR Part 60, Appendix B, Performance Specification 8A.

## Legal Conditions of Tender No. 1180/ 2015.

### **First Article:- Legal Condition**

1. Accrediting the differentiation criteria and weighting rates for the conformable offers in order to award as specified in the Second Article
  2. Prices to be on CIP Al Kahlaa P.S. Stores.
  3. Payment conditions to be : by non confirmed irrevocable L/C payable as follows :
    - 10% down payment against a B/G approved issued by an accredited bank in Iraq .
    - 15 % to be paid upon arrival of goods at the Iraqi borders and presentation of shipping documents and commercial invoice.
    - 70 % to be paid after executing all the works in compliance with our specification and requirements, and final receiving and acceptance .
    - 5% to be paid after expiry of warranty period.
  4. The Directorate has the right to cancel the invitation with out confiscating the offer submitter, only the price of buying the tender documents will be returned.
  5. Submitting elementary insurances amounting to (25000) twenty five thousands dollars in the form of a certified check (checks issued from the private banks for maximum amounting to one hundred million Iraqi Dinars only, will be accepted), or guarantee bond issued by an accredited Iraqi bank addressed to the Directorate and in the name of the offer submitter (authorized manager or exclusively to the establishers of the participated company) . The guarantee bond must be addressed to the this directorate and mentioning the name and NO. of the specified invitation. The guarantee bond must not be conditioned, payable with the request and the validity of the guarantee bond should be effective for at least 28 days of the expiry of the offer validity mentioned on article (27) of these conditions. Otherwise the offer will not be considered.
  6. Submitting final insurances in the form of Performance Bond amounting to (5%) of the total contract price after being notified about the award and before signing the contract ,on the same conditions mentioned above, provided that the insurance must be effective during the contract and warranty period, these insurance will not be released until the Final Acceptance Certificate is issued and settling the final payment. Parts of the performance bond amount can be released after the fina receipt of that parts and issuing its Final Acceptance Certificate which confirm that the materials are ready to be used .
  7. Commercial and a technical offer in English and Arabic are to be submitted in two separate sealed envelopes in one envelope stamped with the company or bureau stamp with the no. of tender, closing date, tender subject, company or bureau name with full address (including Website, E-mail, and the name of the authorized person and his phone number) written on it. Offers must not be scratched, deleted, adding and without any reservation. Offers must be stamped and signed on all the pages and attachments by the authorized manager, mentioning the number of pages. Bidder must submit 2 compact disc (CD) containing all papers and documents submitted in the offer along with the original document, first CD should be put with offer in the envelope and the second CD will be closed and stamped by the offers receiving committee and will be returned to the company. In case of any difference in the document the company will return it sealed and stamped to the director general of the Directorate to open it by himself in front of the company or its representative to observe the document.
- and as follow :-
- A- The technical offer, in English and Arabic language, must consist all the required documents , such as (the required technical specification , specifying the program and materials delivery dates and catalogues ,if existed, and authorization from the manufacturing company legally certified for the supplying purposes) and the company legal documents (the company establishing certificate notarized by the foregine attachè, company CV, minutes, internal system of the company, company manager passport and the personal documents of the authorized manager of the company branch in Iraq, and his authorization to run the branch which he resident in issued by the company or the institute administration, its final accounts dully legalized according to the law showing the capital of the bidder which should be equal or more than the potential amount of this tender otherwise he will not be authorized to submit for this item, and valid contractor classification identity no less than the ninth grade specialized in mechanical and electrical works, along with valid and original letter from the general institute of taxes to participate in tenders addressed to this directorate and give No. and date to the offer and the full address of the company supported by a confirmation from municipal council showing in details the Iraqi companies address. Bidder address mentioned in the offer will be accredited for correspondences and notifications, bidder must notify the directorate about each change on the address within seven days.
  - B- Commercial offer , in English and Arabic language, includes the price only in No. and writing in clear way and mentioning the total price and pricing each item and give No. and date to the offer.
  - C- Upon submitting the commercial and technical offers with more than one origin specified and required by the tender documents contractor must specify the price of each origin submitted.

8. The bidder must submit an identical works and for the last three years which should be legalized by the concerned governmental sides showing the followings:-
- Implementation period\ which is included in the original and additional contract period.
  - Implementation level.
  - Number of works\ settled by specialization
9. In case that more than one bidder participated in submitting one offer to execute the contract, their responsibility will be solidarity and teamed up to execute the contract. Provided that an official legalized partnership contract must be submitted with offer.
10. Bidder must visit the site at Najibiah to make sure of the work requirements and to be informed about all the required details for the project and perform full site survey before submitting the offer and make all investigation about the nature of the work and the surrounding conditions and obtain all the necessary information which may affect the bidder obligations, whom the tender is awarded to, in one way or another or may affect the financial balance of the tender or any risk that may overcome the work other wise the bidder will be fully responsible on work execution within the limits and the prices mentioned in his tender.
11. The authorized manager for more than one company is not allowed to submit more than one offer for the same tender.
12. This Directorate is obliged to address the Ministry of Planning/ Contractors Classification Department to obtain the issuance validity of classification identity granted to contracting companies and contractors before the award and completing the contracting procedures in order to assure the legal position of the offer submitter.
13. The offer that includes elementary insurances and final insurances issued from Dijla and Al Forat Bank, Al-Eqtisad Bank, Al Basra International Bank for Finance and Investment, Al Bilad Islamic Bank, Al Warkaa Investment Bank, Al Motahid Investment Bank and also all the Russian Banks will be rejected in any form because of banning the deal with the mentioned banks.
14. The foreign company whom the tender is awarded to it must open a branch in Iraq and provide us with the company branch registration certificate valid for this year and legalized by Companies registration Office in Iraq according to the regulations of foreign bureaus and branches No. (5) for the year 1989 and regulation of the branches registration and commercial representation offices of foreign No. 149 for the year 2004.
15. This tender has **one year** maintenance period starting from the date of receiving the work by the Directorate which is known as ( Initial Receiving). In case the maintenance period had not been mentioned in the offer, it will be considered as implied agreement to this condition.
16. Warranty: **one year** from the date of receiving and accepting the materials. Warranty to be clearly mentioned in the offer and to be covered completely by performance bond. Warranty includes visible and invisible defects. This
17. The tender conditions of the mechanical and electrical engineering works is considered part & parcel of the contract.
18. The bidder (manufacturer or Production company) which cannot contract directly with General Directorate, should submit an authorization for one licensed Iraqi trading agents according to Iraqi law to arrange the commercial representation, those Iraqi agents must not included in the interruption decisions of tender that are applicable in Iraq, the authorized commercial representative should submit all official documents regarding his authorization from the manufacturer or Production company of materials that are alleged to be a contract with this General Directorate including the certificate of origin which should be legalized according to Iraqi law with a copy of trading authorization contract to insure the authorities of the licensed commercial representative when he submit the offer on behalf of the manufacturer or Production company including the contract signing authority and the commitment of the representative company in the contractual obligations stipulated with the directorate, The commercial representative should be submit contract including its intactness from the Iraqi law, or otherwise the criminal law or any other related laws will applied upon him.
19. The company whom the tender is awarded to it must insure the contract works and the liability of others according to the conditions of the mechanical and electrical engineering works contract at the accredited insurance companies and submit the insurance documents.
20. The contracting company must supply its' employees with all industrial safety measures and provide us with safety plan which will be executed at site in case the works had been executed.

21. A-Liquidated damages for delayed item will be in the rate of (25%) of the contract price according to the following equation:-  

$$\frac{\text{the amount of contract} \pm \text{any change in the amount}}{\text{the period of contract} \pm \text{any change in the period}} \times 25\% = \text{the Liquidated damages for one day}$$
- B-Liquidated damages will be reduced according to the achievement ratio of contractual obligations which limited at the contract procedures which issues the first reception certificate of the work accomplish, supplied material or service required that should be conforming and ready to used and applying the following equation.  

$$\frac{\text{Value of the unaccomplished obligations}}{\text{total period of the contract}} \times 25\% = \text{the Liquidated damages for one day}$$
- C- Liquidated damages must be applied after the end of the contract period plus the additional periods granted to contractor.
22. Supplier must submit the material inspection certificate issued by an international inspector company contracted by Ministry of Planning/ Central System of quality control on the second party expense alongwith submission of the quality control inspection reports to enable inspector committees of checking them.
23. Submitting the insurance document from any accredited side and in case that the shipping documents don't include the above mentioned document the insurance premium will be cut out from his payment according to the rate specified by the insurance national company.
24. Submitting a demand of task facilitation for customs output for the shipment's materials within (45) days before the shipment arrival to the Iraqi border outlet and otherwise the Directorate doesn't bear the responsibility of the delay in the freeing measures of customs.
25. Upon materials delivery second party must provide us with the customs declaration issued by the outlet border.
26. The Directorate is not bound to accept the lowest offers on the account of quality
27. -Limiting the validity of the offer with period no less than (120) one hundred and twenty days from the date of closing the tender. If it wasn't mentioned in the tender, it will be considered an implied approval on this item.
28. Origin of goods to be clearly indicated and before the materials enters Iraq a selling invoice, insurance document and origin certificate in the name of the supplier exclusively issued by the trade and industry chamber of the manufacturing country and notarized from the Iraqi Embassy and the trade attaché in the origin country must be submitted. The issuance conformity would be verified through General Inspector Office of the Trade Ministry, and provide us with the commercial bills which should be approved by the Iraqi Embassy or the trade attaché in the origin country. If there is no Embassy or a Trade attaché in the origin country, notarizing the origin certificates by the Iraqi Embassies and Iraqi Trade Attaché in the neighbouring countries of the country or (any third country) will be accepted in case that origin has a Diplomatic representation each in Iraq and origin country.
29. The Iraqi current situation is not considered as force majeure.
30. The contractor must pay the stamp fees (2 per thousand), the judicial (legal) fees, costs of approving the contract, costs of advertising in the local newspaper, costs of the contract legal translation after awarding and before signing the contract.
31. The tender is subject to Iraqi taxation laws and the supplier must pay all taxes and fees resulted from contract implement.
32. The contract to be concluded should be written in English and Arabic languages
33. Any disputes or differences arising out of the execution of the contract shall be settled amicably, in the event of non-agreement the subject shall be referred to the Iraqi courts and the Iraqi laws and regulations shall be applied.
34. The envelopes must be put in the box by the contractor or his official representative in presence of the secretary of the tenders committee after writing down the information of the tender and its no. and the date and time of submitting the envelope and the name of the person that carry the offer and his full address and it must be registered in a special book and a receipt of receiving the offer must be organized in two copies one of them must be given to the offer submitter and the other should be kept by the secretary of the tenders committee.
35. Offers that are less or more than 20% of the potential amount specified for the award purposes will not be considered.
36. The offer must be clear and complete and comply with all the items required in the tender
37. The offers that don't comply with the technical specifications or submitted after the tender closing date will not be considered even if it is the lowest price
38. The offer will not be considered if it includes a correction or delete without the sign or the stamp of the contractor.
39. The presentation with final price is not negotiable and no conditions or reservations with the offer will be accepted.
40. The total period of contract implementation ( day) including (supplying & installation) from the date of L/C opening. Contractor is obliged to submit the specification and drawings in order to be approved before starting the manufacturing within the contract period.
41. The supplier must commit to deliver the materials to the Directorate or any other side related to the Directorate.

42. This tender is subject to stamp fees laws and governmental debts collecting laws No. 56 for the year 1977 and The Income Taxes Laws or any other Laws

43. The bidder whom the tender is awarded to him and will be notified of the awarding decision has to consult the legal department within (14) fourteen working days from the awarding notifying date to pay the fees and sign the contract otherwise a delay penalty will be imposed on him according to the equation in item (21) and for (15) fifteen days and its total amounts will not be contained in the rate specified in item (21) and then the bidder will receive a formal warning on the necessity of signing the contract during (15) other days from the notifying date otherwise he will be considered abstainer and the winning bidder will be considered abstainer and all legal procedures will be held against him including confiscating the primary insurances of the abstained bidder and to execute on his own expense (price fiddance) according to the valid instruction.

44. The amounts agreed upon in the contract will be paid according to the stipulated payment conditions and the Directorate has the right to reject the not conforming materials and on the account of the supplier and the time needed to exchange the materials will not be considered a stop period of the contract and will be considered with the total period of the contract.

45. The final account shall not be settled until the contractor brings what approve his clearance from the General Institution of Taxes whether he was exempted or not exempted from taxes.

46. The contractor identity is considerable and he is not allowed to give up the contract or any part of the work that he is in charge of to another subcontractor unless the Directorate agrees provided that the subcontractor must have all conditions and specification by which the contract is awarded and through a demand from the main contractor if it insures the speed of work accomplishing with obligation of contract conditions.

47. Giving up the contract to another contractor from the inside is not allowed.

48. The company must submit (C.V) including the engineering, technical and administrative staff and vehicles related to the company and any other materials.

49. The contractor must bear all the expenses resulted from the engineering and technical tests.

50. Counting the prices of all offers according to united basis and the written price will be accredited in case that it is different from the price in No. so as the unit price will be accredited in case that the item price is not correct.

51. The contractor whom the tender is awarded to him must notify the Retirement and Social Insurance Office of his contract employees. Its clearance will not be setted until the contract brings his tax clearance letter issued by the above mentioned Office.

52. If there is an item or items stated with out price in the presented offer in this case the cost of this item or items (and in limits of the quantities beside it) will be considered contained in the total price of the offer.

53. All applicable laws and decisions and regulations will be applied in every case has not been mentioned in the conditions and the contract.

54. All the conditions, specifications, maps, priced quantities schedule, the negotiating reports are considered part of the contract.

55. A) The Directorate has the right to cancel the contract and claim compensating the loss or lost penefits resulted from the contractor violation to any contract condition, the contract will be considered cancelled with no need to address a warning or courts interference.

B) This Directorate also has the right if the contractor violates any contract condition at the final phases of implementation of the contract to establish a committee to fasten the execution of the rest works, on the contractor expense and he will be a member of it and the abstained contractor must bear the administration cost rating to (20%) of the abstained works.

C) The Directorate has the right, before the liquedated damages reaches the maximum rate and after the dalay period reaches 25% of the contract period plus any additional periods granted, to issue a decision of works' withdrawal from the contractor when he violates the contract conditions and execute the violated works on his expense by another contractor with no need to address a warning.

D) This directorate has the right to confiscate the final insurances (Performance Bond)

56. The bidder is not allowed to delete any item from the tender documents' items or to do any correction in it.

57. The winning bidder will be considered abstainer if he:-

- a- Refused signing the contract after being notified with the award with no need to warn him.
- b- Submit unreal data by illegal ways which are against the tender conditions.
- c- Didn't submit the Performance Bond(5%).

2) This Directorate is allowed to apply all the legal procedures against the abstained bidder according to the governmental contracts instructions No.1 for the year 2014.

58. The elementary insurances will be cofiscated if the bidder(i) abstain from signing the contract after being notified with the awarding letter, (ii) the bidder has withdraw his offer before the validity expire and after closing the tender or

(iii) refused to correct his calculation mistakes in the offer and its impacts on the award decision and the applicable legal procedures mentioned in the governmental contract implementation instruction will be held against him.

59. The supplier must send the original shipping documents to the credit opening bank before or upon the goods arrival to outlet border which requires mentioning the name of the marine agent, vessel name & journey number. Otherwise the Directorate will bear the penalties and the legal results.

60. The supplier must submit the customs declaration (customs output document) with the reconstruction fee, if existed, upon delivering the materials to the station.

61. The Directorate is not responsible to pay the contractor any amounts resulting from the increment in the items quantities mentioned in the quantities' schedules.

62. The directorate has the right to partition the award of supplying merchandise and materials according to the tender requirements.

63. The directorate has the right to increase the quantity of contracted merchandise and materials for no more than the rate of the precaution amount stated in the applicable regulation at the contracting time.

64. The Directorate is not responsible to pay the costs of items which does not appear in the quantities' schedules intentionally or unintentionally that will affect the size, capacity and the operation of the project as stipulated whether these items were in the designs or not.

65. This directorate has the right to decrease the materials for no more than (15%) of the contract price.

66. The Directorate has the right to add new items (conditions) resulting from a new requirements that wasn't needed in this invitation and according to the federative balance.

67. Offer submitter must attach written commitment with his offer stating that he doesn't have any relation with Israel.

68. Attaching copy of these conditions with the offer.

**Second Article :-** differentiation criteria and weighting rates for the conformable offers nominated for award

| Item | Subject                                                                                                                                                                                                                           | Weighting Rates                  | Notes                                                                                                                                                                                                                                                                                                                                                  |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | The method and process implementing the contract according to the technical specification which includes:<br><br>- Technical specification.<br>- Availability of the evasive equipment<br>- Staff availability.<br>- Work method. | 40%<br><br>25%<br>5%<br>5%<br>5% | According to the advertised technical specification                                                                                                                                                                                                                                                                                                    |
| 2    | Submitted price                                                                                                                                                                                                                   | 20%                              | Price is final and not negotiable with the balance of the prices of the quantities schedule items                                                                                                                                                                                                                                                      |
| 3    | Origin                                                                                                                                                                                                                            | 10%                              | According to the technical specification                                                                                                                                                                                                                                                                                                               |
| 4    | Identical works                                                                                                                                                                                                                   | 10%                              | for the last three years which should be legalized by the concerned governmental sides showing the followings:-<br><ul style="list-style-type: none"> <li>• Implementation period\ which is included in the original and additional contract period.</li> <li>• Implementation level.</li> <li>• Number of works\ settled by specialization</li> </ul> |
| 5    | Financial competence and final accounts                                                                                                                                                                                           | 10%                              | Which shows the final accounts of the bidder, legalized by legal accountant showing the capital of the bidder and which should be equal or more than the potential amounts of this tender otherwise the contractor's right to be evaluated of this item is skipped                                                                                     |
| 6    | Implementation period                                                                                                                                                                                                             | 10%                              | Shows the ability to supply the materials within the contract period                                                                                                                                                                                                                                                                                   |

**Third Article:** attached Technical Specifications

البند (أولاً) :- الشروط القانونية

١ . يتم اعتماد معايير المفاضلة ونسب الترجيح للعروض المطابقة للمواصفات الفنية لأغراض الإحالة على النحو الوارد بالبند (ثانياً)

٢ . تقديم الأسعار على أساس المواد المشحونة CIP إلى مخازن محطة كهرباء الهارثة.

٣ . يكون الدفع عن طريق الاعتماد المستندي غير مثبت والغير قابل للنقض وبالشروط التالية :

أ . ١٠ % دفعة أولية مقابل خطاب ضمان مصرفي غير مشروط صادر من مصرف معتمد في العراق

ب . ١٥ % عند وصول المواد للحدود العراقية وتقديم وثائق الشحن والقوائم التجارية .

ج . ٧٠ % بعد تنفيذ العقد بأكمله وثبوت مطابقته للمواصفات الفنية المطلوبة.

د . ٥ % بعد انتهاء مدة الضمان بدون عوارض .

٤ . يحق لجهة التعاقد الحكومية إلغاء المناقصة دون تعويض مقدمي العطاءات .

٥ . تقديم التأمينات الأولية البالغة (٢٥,٠٠٠) خمسة وعشرون ألف دولار ، على شكل صك مصدق (تقبل الصكوك الصادرة من المصارف الأهلية ولحد مائة مليون دينار كحد أعلى) ، أو خطاب ضمان صادر من مصرف عراقي معتمد ومعنون لأمر المديرية وبأسم صاحب العطاء أو ( أي من المساهمين في الشركة أو الشركات بموجب عقد المشاركة ) ، ويشترط ب خطاب الضمان أن يكون موجهاً لهذه المديرية ، ويذكر فيه أسم ورقم المناقصة المعنية ، وأن لا يكون مشروطاً وأن يدفع حين الطلب ، وأن تكون مدة نفادية خطاب الضمان سارية المفعول إلى ما بعد إنتهاء مدة نفادية العطاء الوارد ذكرها بالفقرة (٢٧) من هذه الشروط وبمدة لا تقل عن ٢٨ يوم ، وبعبكسه يهمل العطاء .

٦ . تقديم التأمينات النهائية على شكل خطاب ضمان حسن التنفيذ للعقد بنسبة (٥%) خمسة من المائة من مبلغ العقد بعد التبليغ بكتاب الاحاله وقبل توقيع العقد ، وينفس الشروط اعلاه ، وعلى ان يكون ساري المفعول خلال مدة العقد ومدة الضمان ولا تطلق هذه التأمينات الا بعد صدور شهادة القبول النهائي وتصفية الحسابات النهائية ويجوز إطلاق اجزاء من مبلغ ضمان حسن التنفيذ بعد التسليم النهائي لتلك الاجزاء وصودر شهادة القبول النهائي لها بما يؤيد كونها مؤهلة للاستخدام .

٧ . يقدم العطاء الفني والتجاري باللغة العربية والانكليزية بظرفين منفصلين داخل ظرف واحد مغلق مختوم بختم الشركة أو المكتب ومكتوب عليه رقم المناقصة ، تاريخ الغلق ، موضوع المنافسة ، اسم الشركة أو المكتب مع عنوانها الكامل المتضمن ( موقع الانترنت ، البريد الالكتروني ، اسم الشخص المخول ورقم هاتفه ) ، وعلى ان تكون العروض خالية من الحك والشطب والإضافة وبدونه أي تحفظ مع ضرورة توقيع المدير المفوض وختم الشركة على

كافه صفحات العطاء الفني والتجاري المقدم وأية وثائق تقدم من قبل الشركة ، وذكر عدد الصفحات للعطاء وعلى مقدم العطاء تقديم قرص مدمج عدد ( ٢ ) يحتوي على كافة الاوراق والمستمسكات المقدمة للعطاء إضافة الى المستمسكات الأصلية ، الأول يوضع مع العطاء في الظرف المختوم من قبل الشركة والثاني يتم غلقه وختمه من قبل لجنة استلام العطاءات ويعاد الى الشركة ، وعند حصول اختلاف في الوثائق تقوم الشركة بإعادته مختوم ومغلق إلى مدير عام الدائرة ليقوم بنفسه فتحه أمام الشركة أو ممثل عنها ويتم الإطلاع من خلاله على الوثائق المقدمة وكما يأتي :-

أ . عرض فني باللغة العربية والانكليزية يتضمن كل الوثائق المطلوبة مثل ( المواصفات الفنية المطلوبة تحديد منهاج ومواعيد تسليم المواد والكتلوكات أن وجدت تخويل من الشركة المصنعة مختوم ومصدق أصولياً " لإغراض تجهيز الطلب ) ، مع الوثائق القانونية للشركة ( شهادة تأسيس الشركة مصدقة من الملحقيات التجارية في الخارج ، السيرة الذاتية للشركة ، محاضرها ، النظام الداخلي للشركة ، جواز السفر للمدير المفوض مع المستمسكات الشخصية للمدير المفوض في فرع الشركة في العراق ، وتخويل بإدارة الفرع والمقيم فيه فعلاً صادرة من إدارة الشركة أو المؤسسة ، حساباتها الختامية مصدقة أصولياً حسب القانون توضح رأس مال مقدم العطاء والذي يجب أن يكون مساو أو أكثر للكلفة التخمينية لهذه المناقصة وبخلافه يسقط حق المناقص بالتقديم لهذه الفقرة ، وهوية تصنيف مقاولين نافذة لا تقل عن الدرجة السادسة فما فوق اختصاص أعمال ميكانيكة وكهربائية ، وكتاب من الهيئة العامة للضرائب للدخول في المناقصات نافذ وبنسخة أصلية ومصورة ومعنون الى هذه المديرية مع إعطاء رقم وتاريخ العرض مع ذكر عنوان الشركة بالكامل وبصورة واضحة معزز بتأييد من المجلس البلدي يوضح العنوان بشكل مفصل بالنسبة للشركات العراقية ويتم اعتماد عنوان المناقص المثبت في العطاء عنواناً للمراسلات والتبليغات وعلى المناقص اشعار هذه المديرية بكل تغيير يطرأ على هذا العنوان خلال مدة سبعة ايام من تاريخ حصوله.

ب . عرض تجاري باللغة العربية والانكليزية يتضمن السعر فقط رقماً وكتابة وبشكل واضح بالمداد او بشكل مطبوع وذكر المبلغ الإجمالي وتسعير كل فقرة على حدة مع إعطاء رقم وتاريخ للعرض .

ج . على المناقص عند تقديم العرض التجاري والفني لأكثر من منشأ مطلوب ومحدد بمستندات هذه المناقصة ( التندر ) ان يتم تحديد سعر كل منشأ يقدم من قبلها .

٨ . على مقدم العطاء تقديم الأعمال المماثلة وتكون للسنوات الثلاث الأخيرة والتي يجب أن تكون مؤيدة ومصدقة من قبل الجهات الحكومية المعنية مع بيان الآتي :-

- ❖ مدة تنفيذ / تكون ضمن مدة العقد الأصلية والإضافية .
- ❖ مستوى التنفيذ .
- ❖ عدد الأعمال / يحدد حسب الاختصاص .

٩ . في حالة اشتراك أكثر من مناقص في تقديم عطاء واحد لتنفيذ العقد تكون مسؤوليتهم تضامنية وكفالية في ذلك التنفيذ على ان يقدم عقد المشاركة مصادق عليه أصولياً مع العطاء .

١٠. على مقدم العطاء زيارة الموقع الكائن في الهارثة للتأكد من متطلبات العمل والإطلاع على جميع التفاصيل المطلوبة للمشروع وأجراء المسح الميداني الشامل للموقع قبل تقديم العطاء وأجراء كافة التحريات بأنفسهم عن طبيعة العمل والظروف المحيطة به والحصول على المعلومات عن جميع الأمور التي يمكن بصورة أو بأخرى أن تؤثر على التزامات مقدم العطاء الذي ترسو عليه المقاول أو على التوازن المالي للمقاول أو بسبب ما قد يعترض العمل من مخاطر وبخلاف ذلك فإن مقدم العطاء يتحمل المسؤولية الكاملة عن تنفيذ الأعمال ضمن الحدود وبالأسعار المدونة بعطائه .

١١. لا يجوز لمدير مفوض في أكثر من شركة تقديم أكثر من عطاء واحد في المناقصة الواحدة .

١٢. تلتزم هذه المديرية بمفاتحة وزارة التخطيط / قسم تصنيف المقاولين لغرض الوقوف على صحة صدور هويات التصنيف الممنوحة لشركات المقاولات والمقاولين من عدمه قبل الإحالة والسير في الإجراءات التعاقدية للوقوف على سلامة الموقف القانوني لمقدم العطاء .

١٣. لا تقبل التأمينات الأولية أو النهائية الصادرة عن مصرف دجلة والفرات ومصرف الاقتصاد للاستثمار والتمويل ومصرف البصرة الدولي للاستثمار والتمويل ومصرف البلاد الإسلامي ومصرف الوركاء للاستثمار ومصرف المتحد للاستثمار وكذلك المصارف الروسية أيًا كان شكلها لمنع التعامل مع المصارف المذكورة

١٤. تلتزم الشركة الأجنبية التي تُحال عليها هذه المناقصة بفتح فرع لها في العراق مع تزويدنا بشهادة تسجيل فرع الشركة في العراق نافذه لهذا العام ومصادق عليها من قبل دائرة سجل الشركات في العراق استناداً لإحكام نظام فروع ومكاتب الشركات الأجنبية رقم (٥) لسنة ١٩٨٩ وتعليمات تسجيل فروع ومكاتب التمثيل التجاري للشركات الأجنبية رقم ١٤٩ لسنة ٢٠٠٤ .

١٥. لهذه المناقصة مدة صيانة ( سنة واحدة ) تبدأ اعتباراً من تاريخ استلام العمل من قبل هذه المديرية ويُعرف ( بالاستلام الأولي )، ويعتبر موافق ضمناً على هذه المدة في حالة عدم الإشارة الى ذلك بعطاء المناقص .

١٦. مدة الضمان سنة واحدة من تاريخ استلام المواد وقبولها فنياً ، وعلى المناقص تثبيتها بوضوح وتكون مغطاة كلياً بخطاب ضمان حسن الأداء ، والضمان يشمل العيوب الخفية والظاهرة .

١٧. تعتبر شروط المقاولات لأعمال الهندسة الميكانيكية والكهربائية جزءاً لا يتجزأ من العقد .

١٨. يلتزم المناقص ( الشركة المصنعة أو المنتجة ) الذي لا يستطيع التعاقد مباشرة مع هذه المديرية القيام بتحويل احد الوكلاء التجاريين العراقيين المجازين بموجب القانون العراقي لتنظيم الوكالة التجارية وان لا يكون هذا المناقص مشمول بقرارات المقاطعة الملزمة للعراق ، وعلى الوكيل التجاري المجاز تقديم كافة الوثائق الرسمية الخاصة بتحويله عن الشركة

المصنعة او المنتجة للمواد المزمع التعاقد عليها مع هذه المديرية ومن ضمنها شهادة المنشأ مصدقة أصولياً" وفقاً للقانون العراقي مع نسخة من عقد الوكالة التجارية للتأكد من الصلاحيات الممنوحة للوكيل التجاري المجاز عند تقديمه للعطاء نيابة عن الشركة المصنعة او المنتجة على ان تتضمن صلاحية توقيع العقود والتزام الشركة الموكلة بالالتزامات التعاقدية مع هذه المديرية ، وعلى الوكيل التجاري عند تقديمه للعطاء تقديم تعهد يتضمن سلامه موقفه من القانون العراقي وبخلافه يخضع لإحكام القانون الجنائي العراقي والقوانين الاخرى ذات العلاقة .

١٩ . تقوم الشركة التي تحال عليها المناقصة بالتأمين على اعمال المقاوله والتأمين على المسؤولية على الغير وفقاً لشروط المقاوله لاعمال الهندسة الميكانيكية والكهربائية ، لدى شركات التأمين المعتمدة وتقديم وثائق التأمين .

٢٠ . تلتزم الشركة المتعاقدة بتجهيز العاملين معها بكافة مستلزمات السلامة الصناعية وتزويدها بخطة السلامة التي سيتم تنفيذها موقعياً في حالة تنفيذ الأعمال .

٢١ . تكون نسبة الغرامة التأخيرية بنسبة لا تقل عن (٢٥%) وخمسة وعشرين من المئة من مبلغ العقد وتطبق المعادلة الآتية عند احتساب هذه الغرامة

مبلغ العقد ( مبلغ العقد + - أي تغيير في المبلغ ) × ٢٥ % = غرامه لليوم الواحد

مدة العقد الكلية (مدة العقد الأصلية + - أي تغيير في المدة)

ب/ يتم تخفيض الغرامات التأخيرية حسب نسب الانجاز للالتزامات التعاقدية المحددة في منهاج تنفيذ العقد والتي صدرت منها شهادة تسلم أولي للعمل المنجز او السلفة المجهزة او الخدمة المطلوبة للعمل ومهيئه للاستخدام حسب شروط العقد وتطبيق المعادلة كالاتي :

قيمة الالتزامات غير المنفذة × ٢٥ % = غرامة اليوم الواحد

مدة العقد الكلية

ج/ يتم استقطاع الغرامات التأخيرية عند انتهاء مدة العقد الأصلية مضافاً إليها المدد الإضافية الممنوحة للمتعاقدين

٢٢ . يجب تقديم شهادة فحص بالمواد من قبل شركة فاحصة دولية تم التعاقد معها من قبل وزارة التخطيط / الجهاز المركزي للتقريب والسيطرة النوعية ، وعلى نفقة الطرف الثاني وتقديم تقارير الفحص النوعي لتتمكن اللجان الفاحصة من تدقيقها .

٢٣ . تقديم وثيقة التأمين من أي جهة معتمدة وفي حالة عدم تقديمها ضمن مستندات الشحن يتم استقطاع قسط التأمين من مستحقاته وحسب ما تحدده شركة التأمين الوطنية .

٢٤. تقديم طلب تسهيل مهمة إخراج كمركي لمواد الشحنة خلال فترة لا تقل عن (٤٥) يوماً قبل وصول الشحنة إلى المنفذ الحدودي العراقي وبخلافه لا تتحمل المديرية مسؤولية التأخير في إجراءات التخليص الكمركي .

٢٥. عند تسليم المواد يجب تزويدنا بالتصريحة الكمركية صادرة من المنفذ الحدودي .

٢٦. المديرية غير ملزمة بقبول أو طأ العطاءات عند عدم مطابقتها للمواصفات الفنية وعدم الالتزام بالشروط المعلنة .

٢٧. تحديد نفادية العطاء بمدة لا تقل عن (١٢٠) مائة وعشرون يوماً من تاريخ غلق المناقصة ويُعتبر موافق ضمناً في حالة عدم الإشارة إلى ذلك

٢٨. يجب تثبيت منشأ المواد بصورة واضحة ، وقبل دخول المواد العراق يجب تقديم فاتورة البيع ووثيقة التأمين و شهادة منشأ المواد بأسم المجهز حصراً صادرة من غرفة تجارة وصناعة البلد المصنع على ان تكون مصدقة من الملحقيات التجارية في ذلك البلد وسيتم التأكد من صحة الصدور من خلال مكتب المفتش العام لوزارة التجارة، مع تزويدنا بالقوائم التجارية على ان تكون مصدقة من الملحقيات التجارية العراقية في الخارج . وفي حالة عدم وجود سفارة او ملحقية تجارية في بلد المنشأ بالإمكان قبول تصديق شهادات المنشأ من قبل السفارات والملحقيات التجارية العراقية في البلدان المجاورة لبلد المنشأ او ( أي بلد ثالث ) في حالة كون هذا البلد لديه تمثيل دبلوماسي في كل من العراق وبلد المنشأ .

٢٩. لا يعتبر الظرف الراهن في العراق من الظروف القاهرة .

٣٠. يدفع المتعاقد رسم الطابع ( اثنان بالآلف ) والرسم القانوني ورسوم تصديق العقد وأجور نشر الإعلان في الصحف المحلية واجور الترجمة القانونية للعقد بعد الإحالة وقبل توقيع العقد .

٣١. المناقصة خاضعة لقوانين الضرائب العراقية وعلى المتعاقد دفع كافة الضرائب والرسوم المترتبة على تنفيذ العقد .

٣٢. العقد الذي سيوقع سيكون باللغتين العربية والانجليزية .

٣٣. في حالة وجود خلاف عند تنفيذ العقد ، يصار الى حله بالطرق الودية وعند عدم الاتفاق يحال الموضوع الى المحاكم العراقية وتكون القوانين والأعراف العراقية هي الحاكمة .

٣٤. يتم إيداع الظروف من قبل صاحب المكتب أو الشركة أو ممثله الرسمي وبحضور سكرتير لجنة المناقصات بعد تثبيت المعلومات التي تخص المناقصة ورقمها وتاريخ وساعة إيداع الظرف واسم الشخص الذي يحمل العطاء وعنوانه الكامل ويدون بسجل خاص وينظم وصل بنسختين باستلام العطاء تسلم نسخة منه الى مقدم العطاء والآخر يحتفظ به سكرتير لجنة المناقصات .

٣٥. يستبعد العطاء الذي يقل أو يزيد بنسبة ٢٠% من الكلفة التخمينية المخصصة لأغراض الإحالة .

٣٦. يجب أن يكون العرض واضح ومتكامل ويلبي كافة الفقرات المطلوبة بالمناقصة.

٣٧. تستبعد العطاءات الغير مستوفية للشروط الفنية أو التي ترد بعد موعد غلق المناقصة وأن كانت أقل الاسعار .

٣٨. يهمل العطاء المتضمن تصحيح أو شطب أو حك غير موقع ومختوم من قبل صاحب العطاء .

٣٩. التقديم بسعر نهائي غير قابل للتفاوض ولا تقبل الشروط والتحفظات مع العطاء .

٤٠. مدة تنفيذ العقد بأكمله ( ) يوم وتشمل (التجهيز والنصب والتشغيل) (اعتباراً من تاريخ فتح الاعتماد المستندي ويلتزم المتعاقد بتقديم المواصفات والمخططات للمصادقة عليها لغرض المباشرة بالتصنيع ضمن مدة العقد المعروضة .

٤١. يتعهد المجهز بإيصال المواد إلى مقر المديرية أو أي جهة أخرى تابعة للمديرية وحسب الأحوال .

٤٢. تخضع هذه المناقصة لأحكام قوانين رسم الطابع وقانون تحصيل الديون الحكومية رقم ٥٦ لسنة ١٩٧٧ وقوانين ضريبة الدخل أو أية قوانين أخرى محل محلها .

٤٣. على من ترسو عليه المناقصة ويبلغ بقرار الإحالة رسمياً مراجعة قسم الشؤون القانونية خلال فترة (١٤) أربعة عشر يوم عمل من تاريخ التبليغ بالإحالة لدفع الرسوم وتوقيع العقد وبعبءه تفرض عليه غرامة تأخيرية تحدد حسب المعادلة المبينة في الفقرة (٢١) أعلاه ولغاية (١٥) خمسة عشر يوماً ولا يدخل مجموع مبالغها من ضمن النسبة المحددة في الفقرة (٢١) أعلاه بعدها يوجه للمحال عليه الطلب إنذاراً رسمياً بضرورة توقيع العقد خلال مدة (١٥) خمسة عشر يوماً أخرى من تاريخ التبليغ وبعبءه يعتبر ناكلاً وتتخذ بحقه كافة الإجراءات القانونية ومنها مصادرة التأمينات القانونية الأولية الخاصة بالمنافس الناكل والتنفيذ على حسابه ( فرق البدلين ) وعلى ضوء تعليمات العقود الحكومية النافذة .

٤٤. يتم تسديد المبالغ المتفق عليها بالعقد وحسب شروط الدفع المتفق عليها بين الطرفين ، ويحق للمديرية رفض الاعمال أو رفض المواد الغير مطابقة وعلى حساب المتعاقد ولا تعتبر مدة تبديل المواد أو رفض الاعمال مدة توقف للعقد وتحسب من ضمن المدة الكلية للعقد .

٤٥. لا يتم تصفية الحساب النهائي للمتعاقد ما لم يجلب ما يؤيد براءة ذمته من الهيئة العامة للضرائب أو فرع الضريبة الذي يتعامل معه المفاوض سواء كان معقياً أو غير معقياً من الضريبة .

٤٦ . شخصية المقاول محل اعتبار ، ولا يحق للمتعاقد إحالة أي جزء من المقاوله الى مقاول ثانوي الا بموافقة هذه المديرية ووفقاً للتعليمات النافذة ، ويشترط بالمقاول الثانوي ان تتوفر الشروط والمواصفات التي تم أحالة العقد بموجبها ويطلب من المقاول الرئيسي إذا كان من شأن ذلك تحقيق سرعة أنجاز العمل مع الالتزام بشروط العقد .

٤٧ . لا يجوز التنازل عن المقاوله او العقد الى متعاقد اخر من الباطن .

٤٨ . على الشركة ان تقوم بتقديم (C.V) يتضمن أسماء الكادر الهندسي والفني والإداري والليات التي تعود للشركة وأية مواد أخرى .

٤٩ . يتحمل المتعاقد كافة المصاريف المترتبة على الفحوصات الهندسية والفنية .

٥٠ . احتساب أسعار جميع العطاءات على أسس موحدة ويعول على السعر المدون كتابة في حالة اختلافه مع السعر المدون بالأرقام كما يعول على سعر الوحدة في حالة عدم صحة مبلغ الفقرة .

٥١ . يلتزم من تحال عليه المناقصة إعلام دائرة التقاعد والضمان الاجتماعي للعمال بالعقد ولا يتم تصفية ذمتها الأبعد قيام المتعاقد بجلب كتاب براءة ذمة من الدائرة اعلاه .

٥٢ . إذا وردت فقرة أو فقرات لم يدون سعر إزائها في العطاء المقدم ففي هذه الحالة تعتبر كلفة تلك الفقرة أو الفقرات ( وبحدود الكميات المدونة إزائها ) مشمولة بالسعر الإجمالي للعطاء .

٥٣ . تطبق جميع أحكام القوانين والتعليمات المرعية في كل حالة لم ترد بها نص في الشروط والعقد .

٥٤ . تعد الشروط والمواصفات الفنية والخرائط وجدول الكميات المسعر والكتاتوكات ومحاضر التفاوض جزء من العقد .

٥٥ . أ/ يحق لهذه المديرية فسخ العقد والمطالبة بالتعويض عما لحق هذه المديرية من خسارة وما فاتها من ربح جراء إخلال المقاول بأي شروط من شروط العقد او المقاوله ويعد العقد مفسوخاً من تلقاء نفسه دون الحاجة الى توجيه إنذار أو تدخل المحاكم .

ب/ يحق لهذه المديرية في حالة إخلال المقاول في المراحل النهائية لتنفيذ العقد تشكيل لجنة إسراع لتنفيذ الأعمال المتبقية على حساب المقاول ويكون المقاول ممثلاً فيها ويتحمل المقاول المخل التحميلات الإدارية بنسبة لا تزيد ( ٢٠ %) عشرين من المئة من كلفة الأعمال المخل بها .

ج/ كما يحق لهذه المديرية قبل بلوغ الحد الأعلى للغرامات التأخيرية وبعد بلوغ المدة التأخيرية ( ٢٥ %) خمسة وعشرون بالمئة من مدة العقد مضافاً إليها أي مدد اضافية ممنوحة إصدار قرار بسحب العمل من المقاول عند إخلاله ببند العقد وتنفيذ الأعمال المخل بها على حسابه عن طريق مقاول آخر دون الحاجة الى توجيه إنذار .

د/ كما يحق لهذه المديرية مصادرة التأمينات النهائية الخاصة بحسن التنفيذ .

٥٦. لا يجوز لمقدم العطاء شطب أي بند من بنود مستندات المناقصة أو إجراء أي تعديل فيها مهما كان نوعه .

٥٧/ يعد المناقص الفائز ناكلاً عند تحقق الحالات الآتية :

١. امتناعه عن توقيع العقد بعد التبليغ بكتاب الإحالة ودون الحاجة الى إنذاره
٢. عند تقديم بيانات غير حقيقة وبطرق غير مشروعة ومخالفة لشروط المناقصة
٣. عدم تقديم خطاب الضمان حسن التنفيذ (٥%) .

ب/ يحق لهذه المديرية اتخاذ كافة الإجراءات القانونية بحق المناقص الناكل وعلى ضوء تعليمات تنفيذ العقود الحكومية رقم (٢) لسنة ٢٠١٤

٥٨. يتم مصادرة التأمينات الأولية لمن تحال إليه المناقصة عند نكوله عن توقيع العقد بعد تبلغ بكتاب الإحالة أو عند سحب مقدم العطاء لعطالة خلال فترة نفاذيتها وبعد غلق المناقصة أو رفض التصحيح على أخطاء الحسابية في العطاء وانعكاسها على قرار الإحالة وتتخذ بحقه الاجراءات القانونية المنصوص عليها في تعليمات تنفيذ العقود الحكومية النافذة .

٥٩. يجب على المتعاقد إرسال مستندات الشحن الأصلية الى المصرف فاتح الاعتماد قبل أو مع البضاعة عند وصولها الى المنفذ الحدودية الجنوبية ويتطلب ذكر اسم الوكيل البحري والباخرة ورقم الرحلة . وبعبارة أخرى يتحمل المجهر الغرامات والتبعات القانونية .

٦٠. يجب على المتعاقد أن يقدم التصريحة الكمركية ( مستند الإخراج الكمركي ) مع رسم إعادة الأعمار ، أن وجد ، عند تسليم المواد الى مخازن المحطة .

٦١. عدم تحمل هذه المديرية أية مسؤولية عن دفع أي مبالغ للمتعاقد عن الزيادة في كميات الفقرات الواردة في جدول الكميات .

٦٢. يحق لهذه المديرية تجزئة أحوالة تجهيز السلع والمواد إذ ما اقتضت طبيعة المناقصة ذلك

٦٣. يحق لهذه المديرية زيادة كمية السلع والمواد المتعاقد عليها بما لا يزيد عن نسبة مبلغ الاحتياط المنصوص عليها بالتعليمات النافذة وقت التعاقد

٦٤. لا تتحمل هذه المديرية أية مسؤولية عن دفع كلف الفقرات التي لا تظهر في جدول الكميات سهواً أو تعمداً وعدم تنفيذها يؤثر في حجم أو طاقات أو تشغيل المشروع وبالشكل المتعاقد عليه سواء أكانت تلك الفقرات في التصاميم أم لا .

٦٥. لهذه المديرية إضافة فقرات جديدة ناتجة عن إضافة متطلبات جديدة لم تطلب بهذه المناقصة وحسب تعليمات الموازنة الاتحادية النافذة .

٦٦. يحق لهذه المديرية انقاص السلع والمواد المتعاقد عليها وبما لا يزيد عن (١٥%) من مبلغ العقد .

٦٧. يُهمل العطاء المقدم من الشركة التي يثبت لدينا وجود تعامل لها مع إسرائيل

٦٨. ترفق نسخة مختومة من هذه الشروط مع العطاء .

البند (ثانياً) :- معايير المفاضلة ونسب الترجيح للعروض المطابقة للمواصفات الفنية والمرشحة للإحالة لهذه المناقصة :-

| ت | الموضوع                                                                                                                                            | نسبة الترجيح                              | الملاحظات                                                                                                                                                                                                                                                            |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ١ | منهج واسلوب تنفيذ العقد وفقاً للمواصفات الفنية المطلوبة وتتضمن:                                                                                    | ٤٠ %                                      | وحسب الشروط والمواصفات الفنية المعلنة .                                                                                                                                                                                                                              |
|   | <ul style="list-style-type: none"> <li>المواصفة الفنية</li> <li>توفر المعدات</li> <li>التخصصية</li> <li>توفر الكادر</li> <li>منهج العمل</li> </ul> | ( ٢٥ % )<br>( ٥ % )<br>( ٥ % )<br>( ٥ % ) |                                                                                                                                                                                                                                                                      |
| ٢ | السعر المقدم                                                                                                                                       | ٢٠ %                                      | السعر نهائي وغير قابل للتفاوض ، مع توازن الأسعار لفقرات جدول الكميات .                                                                                                                                                                                               |
| ٣ | المنشأ                                                                                                                                             | ١٠ %                                      | وحسب الشروط والمواصفات الفنية المعلنة.                                                                                                                                                                                                                               |
| ٤ | الأعمال المماثلة                                                                                                                                   | ١٠ %                                      | تكون للسنوات الثلاثة الأخيرة والتي يجب ان تكون مؤيدة من قبل الجهة المعنية مع بيان الآتي : <ul style="list-style-type: none"> <li>مدة التنفيذ / تكون ضمن مدة العقد الأصلية والإضافية .</li> <li>مستوى التنفيذ .</li> <li>عدد الأعمال / يحدد حسب الاختصاص .</li> </ul> |
| ٥ | الكفاءة المالية                                                                                                                                    | ١٠ %                                      | إذ توضح الحسابات الختامية لمقدم                                                                                                                                                                                                                                      |

|   |                        |                                                                                        |                                                                |
|---|------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------|
|   |                        | والحسابات الختامية                                                                     |                                                                |
|   |                        | العطاء ، والمصادق عليها أصوليا حسب القانون، توضح راس مال مقدم العطاء وحسب هذه الشروط . |                                                                |
| ٦ | مدة تنفيذ العقد بأكمله | ١٠ %                                                                                   | وتوضح القدرة على الالتزام بتنفيذ العقد بأكمله خلال هذه المدة . |

البند ثالثاً : المواصفات الفنية كما فى المرفق .

## 4- CEMS SPECIFICATION

### 4.1 GENERAL SPECIFICATIONS

The following are the general specifications for the CEMS to be installed for the Unit 2 and 3 of the Al Hartha Power Station:

- The CEMS, including all its auxiliaries, shall comply with the performance specifications outlined in Section 2.2 of this document;
- The CEMS, particularly the gas analyzers, shall be of the conventional dilution-extractive type; or similar (provision of different type must be justified);

- The CEMS shall be equipped with data acquisition system (DAS) that is capable of processing the data output from the CEMS analyzers. The DAS shall be able to

process and produce data that are compatible in preparing reports required by the relevant authorities;

- The analyzers and monitors shall incorporate a microprocessor that would allow the operator to check certain operating parameters, perform calibration automatically and perform numerous diagnostic functions;
- The CEMS shall be designed and installed to ensure reliable operation with a minimum frequency and duration of system outages for maintenance and repair. The system shall provide 95% data availability when maintained according to factory recommended procedures;
- All system components shall be industrial quality and suitable for use in the environmental conditions in Basra, Iraq;
- The CEMS shall include all necessary auxiliaries (i.e. for power supply, cables, etc.), particularly auxiliaries that requires special connectors; and
- Complete engineering and technical documentation of the system, including as built, shall be supplied as part of the system.

Detailed specifications of the gas analyzers and monitors are provided in the subsequent sections. All other parts of the CEMS to be proposed by bidder, which are not included in the detailed specifications, are subject for approval.

**1-The origin of the materials of the system mentioned (USA or Western European , Japan )**

**2- The temperature of the ambient air for the sensors ( near the stack and duct gases) required in paragraphs (6-4, 5- 4.4 to 4.3 - 4.2 to 4) not less than 85 C°**

**3- The probes (sensors) operation temperature required in paragraphs (6-4, 5- 4.4 to 4.3 - 4.2 to 4) (-40~450 C°)**

**4- Preferably sensors installed the system on the gas stream (Gas duct) and for ease to can be checking maintenance, inspection and monitoring.**

5- Installed sensors belonging to the system (CEMS) and be at the gas stream (Gas duct) link between the chimney and boiler for the two units (2,3) / gas stream schemes available at the beneficiary in the case of the demand by the company implemented

6- linking all control signals in the system with the proposed control unit (2.3) directly

7- provide the beneficiary plans PI diagram schemes installed the system offered by the supplier

8- The payment after completing the monument, examination and operating in the form of payments determined by the beneficiary process

9- Warranty period of one year from the date of initial receipt after 72 hours continuous operation ,

Include all faults workmanship warranty period, and also resulting of bad

construction.

10- The company processed to provide a training program covers all technical and

operational details and maintenance of the monument and the training before

materials processing

11- Dimensions Duct gases before stack (mm 1800 × 5600)

Lower temperature after the Air heater 125 ° C

Furnace pressure of no more than (715 mmH<sub>2</sub>O)

12-

-Supplying period of (120 Day) after LC opening

- Installation period of (40 Day )

-Operation period (3 Days)

## 4.2 GAS ANALYZERS Design & Specifications

| ANALYZERS                                             |                                                                                                                                                                                                                                                                                                                                                                             | Design & Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                          |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1-                                                    | <b>4.2.1 Sulphur Dioxide (SO<sub>2</sub>) Analyzer</b><br>The SO <sub>2</sub> analyzer shall be of fluorescence type and its design must satisfy the specifications presented in Table 4.1, as minimum. The output of the analyzer must include zero and a high level value, which should be between 1.25 to 2 times the maximum potential emission levels (see Table 3.2). | <b>Specifications</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Design Parameters</b>                                                                                                                 |
|                                                       |                                                                                                                                                                                                                                                                                                                                                                             | Lower Detection Limit<br>Interference Rejection (sum total)<br>Analyzer Span*<br><br>Temperature-Responsive Zero Drift<br>Temperature-Responsive Span Drift**<br>Response Time (95%)<br>Cycle Time<br><br>*The analyzer span should be determined based on the expected SO <sub>2</sub> emission based on fuel characteristics in Table 3.2. The span should not be very large to avoid unreasonable uncertainty in measured value.<br>**For every 10 °C change in analyzer operating temperature within the ambient temperature range (in Basra, Iraq). | ≤ 2% of span<br>≤ ± 2% of span<br>≥ 1.5 times of the emission limit<br>≤ ± 4% of span<br>≤ ± 3% of span<br>≤ 200 seconds<br>≤ 15 minutes |
| Table 4.1 – Design Specifications for SO <sub>2</sub> |                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                          |

| 2-                                  | <p><b>4.2.2 Nitrogen Oxide (NO<sub>x</sub>) Analyzer</b></p> <p>The NO<sub>x</sub> analyzer should be of chemiluminescence type and should incorporate a high-vacuum sample chamber to minimize quenching. The output of the analyzer must include zero and a high level value, which should be between 1.25 to 2 times the maximum potential emission levels (see Table 3.2). The design of the NO<sub>x</sub> analyzer must satisfy the specifications presented in Table 4.2, as minimum.</p> | <p><b>Table 4.2 – Design Specifications for NO<sub>x</sub></b></p> <table><tr><th>Design Parameters</th><th>Specifications</th></tr><tr><td>Lower Detection Limit</td><td>≤ 2% of span</td></tr><tr><td>Interference Rejection (sum total)</td><td>≤ ± 4% of span</td></tr><tr><td>Analyzer Span*</td><td>≥ 1.5 times of the license limit</td></tr><tr><td>Temperature-Responsive Zero Drift</td><td>≤ ± 4% of span</td></tr><tr><td>Temperature-Responsive Span Drift**</td><td>≤ ± 4% of span</td></tr><tr><td>Response Time (95%)</td><td>≤ 200 seconds</td></tr><tr><td>Cycle Time</td><td>≤ 15 minutes</td></tr></table> <p>*The analyzer span should be determined based on the expected NO<sub>x</sub> emission presented in Table 3.3. The span should not be very large to avoid unreasonable uncertainty in measured value.</p> <p>**For every 10 °C change in analyzer operating temperature within the ambient temperature range (in Basra, Iraq).</p> | Design Parameters | Specifications | Lower Detection Limit | ≤ 2% of span | Interference Rejection (sum total) | ≤ ± 4% of span | Analyzer Span* | ≥ 1.5 times of the license limit | Temperature-Responsive Zero Drift | ≤ ± 4% of span | Temperature-Responsive Span Drift** | ≤ ± 4% of span | Response Time (95%) | ≤ 200 seconds | Cycle Time | ≤ 15 minutes |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|-----------------------|--------------|------------------------------------|----------------|----------------|----------------------------------|-----------------------------------|----------------|-------------------------------------|----------------|---------------------|---------------|------------|--------------|
| Design Parameters                   | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Lower Detection Limit               | ≤ 2% of span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Interference Rejection (sum total)  | ≤ ± 4% of span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Analyzer Span*                      | ≥ 1.5 times of the license limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Temperature-Responsive Zero Drift   | ≤ ± 4% of span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Temperature-Responsive Span Drift** | ≤ ± 4% of span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Response Time (95%)                 | ≤ 200 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Cycle Time                          | ≤ 15 minutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| 3-                                  | <p><b>4.2.3 Carbon Monoxide (CO) Analyzer</b></p> <p>The CO analyzer shall be of NDIR type using gas filter correlation photometry. The design of the gas analyzer must satisfy the specifications presented in Table 4.3, as minimum.</p> <p><b>Table 4.3 – Design Specifications for CO</b></p>                                                                                                                                                                                                | <p><b>Table 4.3 – Design Specifications for CO</b></p> <table><tr><th>Design Parameters</th><th>Specifications</th></tr><tr><td>Lower Detection Limit</td><td>≤ 2% of span</td></tr><tr><td>Interference Rejection (sum total)</td><td>≤ ± 4% of span</td></tr><tr><td>Analyzer Span*</td><td>≥ 1.5 times of the license limit</td></tr><tr><td>Temperature-Responsive Zero Drift</td><td>≤ ± 4% of span</td></tr><tr><td>Temperature-Responsive Span Drift**</td><td>≤ ± 4% of span</td></tr><tr><td>Response Time (95%)</td><td>≤ 200 seconds</td></tr><tr><td>Cycle Time</td><td>≤ 15 minutes</td></tr></table> <p>*The analyzer span should be determined based on the expected CO emission based on fuel characteristics in Table 3.2. The span should not be very large to avoid unreasonable uncertainty in measured value.</p> <p>**For every 10 °C change in analyzer operating temperature within the ambient temperature range (in Basra, Iraq).</p>     | Design Parameters | Specifications | Lower Detection Limit | ≤ 2% of span | Interference Rejection (sum total) | ≤ ± 4% of span | Analyzer Span* | ≥ 1.5 times of the license limit | Temperature-Responsive Zero Drift | ≤ ± 4% of span | Temperature-Responsive Span Drift** | ≤ ± 4% of span | Response Time (95%) | ≤ 200 seconds | Cycle Time | ≤ 15 minutes |
| Design Parameters                   | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Lower Detection Limit               | ≤ 2% of span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Interference Rejection (sum total)  | ≤ ± 4% of span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Analyzer Span*                      | ≥ 1.5 times of the license limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Temperature-Responsive Zero Drift   | ≤ ± 4% of span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Temperature-Responsive Span Drift** | ≤ ± 4% of span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Response Time (95%)                 | ≤ 200 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |
| Cycle Time                          | ≤ 15 minutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   |                |                       |              |                                    |                |                |                                  |                                   |                |                                     |                |                     |               |            |              |

|    |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4- | <b>4.3 PARTICULATE MATTER (PM) ANALYZER</b><br>The PM monitor principle of operation shall be of light scattering technique and must comply with the following design criteria, as minimum: | <ul style="list-style-type: none"> <li>▪ Sample interface must be capable of delivering a representative sample of the exhaust gas to the instrument. Subsystem to carry out gas conditioning, is found necessary should be considered;</li> <li>▪ System must be capable of performing zero and upscale drift checks;</li> <li>▪ System must be capable of performing automatic diagnostic checks and send measurement signal to DAS;</li> <li>▪ System must be capable of performing automatic measurement range switching depending on the actual concentration measured. It should also allow manual measurement range switching;</li> <li>▪ The response time of the analyzer, which is equivalent to the cycle time, must not be longer than 15 minutes;</li> <li>▪ The sampling time must not be less than 30 percent of the cycle time; and</li> <li>▪ The analyzer output must allow comparison with the relevant emission standard.</li> </ul> <p>detection limit must be = 0~400 mg/m<sup>3</sup></p> |
| 5- | <b>4.4 TOTAL HYDROCARBON (THC) ANALYZER</b>                                                                                                                                                 | The THC analyzer shall be of flame ionization detector (FID) and must comply with the must meet the requirements of 40 CFR Part 60, Appendix B, Performance Specification 8A<br>, detection limit must be = 0~1000 ppm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## 4.5 DILUENTS MONITORS

| Design Parameters | Required Specifications |
|-------------------|-------------------------|
|-------------------|-------------------------|