SAMPLE

Continuous Emissions Monitoring System – Standard Specification
For
Gas Turbine/Boiler Applications

Specification No.

Prepared by:

Prepared for:

Date:

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<tr>
<th>REV</th>
<th>Date</th>
<th>Preparer</th>
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<th>Status</th>
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1.0 GENERAL

Customer issues this Specification to solicit offers to provide a Continuous Emission Monitoring System (CEMS) for the Project Name and Location. The CEMS will be required to monitor emissions from a type facility which will consist of X describe equipment combustion turbine generators or boilers; equipped with describe design of any catalyst and/or Pollution control equipment.

2.0 SCOPE

2.1 GENERAL

2.1.1 This Specification defines the technical and performance requirements for the design, manufacture, delivery, and start-up and certification of a fully assembled, tested, and operational CEMS. The CEMS shall include all related accessories necessary to meet the requirements of the USEPA 40CFR60 and San Joaquin APCD Permit No. and this Specification.

2.1.2 The equipment to be furnished under this Specification shall be engineered, designed, fabricated, tested, and delivered in complete accordance with the requirements stated herein. Any exceptions must be clearly acknowledged and explained in the Bidder’s response. In case of a conflict between specific requirements of this Specification, the more stringent requirement takes precedence.

2.1.3 The Seller shall make all tests necessary to ensure that material, equipment, and workmanship are of the required degree specified herein.

2.2 DOCUMENTATION

Refer to Table 2-1 for the document submittal schedule. All analyzer systems shall be furnished with the following documents:

a. Complete spare parts list for analyzers and other repairable items – Broken down into four categories: Level A (Consumable/Startup spares) to Level D (seldom used parts)

b. Recommended spare parts list with prices for analyzers and other repairable items

c. Erection and Installation Drawings

d. System piping schematic

e. CEMS internal signal, control, & Power wiring diagrams

f. Dimension outline, General arrangement, and elevation view drawings

g. Rack & Panel Layouts

h. Customer Interconnection Diagrams. Location and size of all conduit connections

i. Signal Input/Output List

j. Calibration Gas specifications

k. QA/QC Plan

l. 3rd Party Certification Test Protocol
m. Factory Acceptance Test (FAT) Test Procedure/Results

n. Local Regulatory submittals (describe if applicable)

o. System operating manuals (as applicable) to be prepared by Supplier

2.3 UTILITIES, EQUIPMENT, AND SERVICES TO BE FURNISHED BY THE BUYER OR OWNER

2.3.1 Electrical power will be available at the shelter via interface junction boxes supplied by the Seller and installed on the outside wall of each analyzer shelter as:

a. 120 VAC, 60 Hz, single phase UPS for DAHS, analyzers & PLC or system controller, seller to supply. UPS power rated at 3.1 kva. Optional UPS can be included in CEMS design.

b. 480 VAC, 60 Hz, 3 phase, if transformer and disconnect switch is purchased. Otherwise, 208 VAC, 60 Hz, three phase – 150 Amp.

2.3.2 For each DAHS computer: A dedicated, direct dial, analog, data-quality telephone line capable of minimum baud rates of 28800 will be available for modem communication with the DAHS or internet connection.

2.3.3 Ethernet communication between the PLC and DAHS if DAHS is remote from the CEM/PLC shelter. Ethernet cable should be minimum 100 Mbps with RJ-45 connectors. Please be aware for lengths greater than 100 meters – Fiber optic cabling will be required. Customer is responsible for all hubs, repeaters, fiber modems, and converters as well as cabling and installation.

2.3.4 Serial communication or miscellaneous 4-20 mA/adc analog and digital process signals from the plant DCS will be interface through the Seller’s supplied signal junction box installed on the outside wall of each analyzer shelter.

2.3.5 Miscellaneous discrete alarm signals from the PLC in each analyzer shelter will interface through the Seller’s supplied signal box installed on the outside wall of each analyzer shelter.

2.3.6 The Buyer will provide the following equipment/services:

a. Foundation and condensate drain for CEMS shelter.

b. Location of sample port for CEMS probe for reduce flow stratification and compliance with EPA requirements.

c. Exhaust stack sample ports necessary for mounting the sample extraction probe and test ports. Mating flanges and adapter flanges as necessary to interface the Seller provided probe.

d. Installation and mounting hardware of CEMS heated sample line (HSL) and other as required to connect HSL with CEMS cabinet.

e. Field conduit and wiring beyond the junction boxes on the outside wall of each analyzer shelter.
f. Interconnecting cable via ethernet between the DAHS and system controllers per specifications.

Installation at the plant site shall be provided by the Buyer. Two days installation supervision is provided by Supplier. Start-up assistance to support engineering construction is required.

2.3.8 Buyer will be responsible for performing all tasks associated with construction labor. These tasks shall include:

a. Unloading and storage of all CEMS equipment.

b. Placement and mounting of each CEMS cabinet on a concrete pad or platform.

c. Installing conduit, signal cables, probe, and sample line umbilical beyond Seller’s termination points at each shelter.

d. Installing hardware in the form of scaffolding, ladders, platforms, and all structural components necessary to install and service the CEMS equipment.

e. Installing other associated support equipment as necessary for permanent support and operation of the CEMS.

3.0 SITE CONDITIONS

3.1 The Plant site is located in the City of _____, name of state, (give detailed location of job site).

Plant grade elevation is ___________ above sea level; barometric pressure = __________ psia.

The following annual average climatic conditions may be expected at the site:

<table>
<thead>
<tr>
<th>Ambient Temperature Extremes</th>
<th>(Typical)</th>
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<tbody>
<tr>
<td><strong>Summer</strong></td>
<td></td>
</tr>
<tr>
<td>Dry —bulb</td>
<td>90 °F</td>
</tr>
<tr>
<td>Wet —bulb</td>
<td>75 °F</td>
</tr>
<tr>
<td><strong>Winter</strong></td>
<td></td>
</tr>
<tr>
<td>Dry —bulb</td>
<td>14 °F</td>
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</tbody>
</table>

Precipitation, Wind, and Earthquake:

Average annual rainfall: XX inches

Basic Wind Speed: Per ASCE7, 90 mph, Exposure ‘c’

Imp. Factor 1.15 @ 33 Ft. above ground

Seismic Factor: A~ Aa = 0.09, Seismic Hazard Exposure Group 2, Performance Category B

Frost Penetration: 6 inches

Roof Live Load: Per ABC 20 psf

3.2 EXHAUST GAS CHARACTERISTICS
3.2.1 Normal ambient conditions at the CEMS measurement location within the stack are as follows:

a. Temperature: Min./Max./Normal: __________°F
b. Pressure: __________ H2O
c. Flow Rate: __________ lbs/hr
d. Stack Height above sea level: __________ ft.
e. Base of stack elevation above sea level: __________ ft.
f. Stack Velocity: Min/Max/Normal: __________ ft/sec.
g. Stack Internal diameter: __________ ft.
h. Stack wall thickness: __________ inch

3.2.2 Expected exhaust gas constituent:

**Fuel = Natural Gas**

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<tr>
<th></th>
<th>Normal</th>
<th>Min.</th>
<th>Max.</th>
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<tr>
<td>a. NOx - Normal *</td>
<td>1-3ppm</td>
<td>1ppm</td>
<td>15 ppm</td>
</tr>
<tr>
<td>b. NOx – startup</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. NOx – Controls Off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. CO</td>
<td>5-10ppm</td>
<td>2ppm</td>
<td>20ppm</td>
</tr>
<tr>
<td>e. SO2</td>
<td>0-2ppm</td>
<td>0 ppm</td>
<td>5ppm</td>
</tr>
<tr>
<td>f. VOC</td>
<td>1-5ppm</td>
<td>1ppm</td>
<td>5ppm</td>
</tr>
<tr>
<td>g. H2SO4</td>
<td>.5-3ppm</td>
<td>.5ppm</td>
<td>3ppm</td>
</tr>
<tr>
<td>h. PM10</td>
<td>11 lb/hr</td>
<td></td>
<td></td>
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<tr>
<td>i. Opacity</td>
<td></td>
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<td>5 % (EPA Method 9)</td>
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*For NOx – Specify emissions levels for normal operation, startup and NOx control device out of service

4.0 DESIGN REQUIREMENTS

4.1 SAMPLE EXTRACTION PROBE for stack CEMS

4.1.1 The CEMS shall make its measurements using fully extractive sampling technology.

4.1.2 All probe parts exposed to the flue gas shall be constructed of materials that are corrosion-resistant and chemically inert with respect to the process gases being sampled and temperature condition. CEM must calibrate through the probe per EPA specifications.
4.1.3 Heated Filter shall remove particulate down to 2 micron. Heated Filter is made of ceramic material, plus accessible for ease of maintenance and replacement. Heater designed to maintain sample temperatures up to 400°F.

4.1.4 Probe body constructed of 316 Stainless Steel or Hastelloy (if needed for SCR inlet temperature.

4.1.5 NEMA enclosure and sample line mating boot.

4.1.6 Probe stinger tube – ½” schedule 40 pipe stainless steel designed for stack temperatures up to 1000 Deg. F.

4.1.7 3 or 4 inch, 150 lb. Raised faced mounting flange with bolts and flange gasket. Adapter flanges, associated hardware, and cooling flanges (required for stack temps. > 550 Deg. F) provide by Others.

4.1.8 All control, signal, and power wires for the probe, included in the sample line.

4.2 HEATED SAMPLE LINE (UMBILICAL)

The Seller shall provide pre-insulated and heat-traced sample line bundles connecting the sample extraction probe to the sample conditioning system. The sample line shall contain all necessary tubes and wires to support the probe requirements for power, control and alarm monitoring. Sample line material to be 316 stainless steel for sample transport and calibration and purge lines. Sample line must maintain a temperature above the sample dew point (240 degrees F minimum) at the minimum site ambient with a constant power density heater. A thermocouple is included, located approx. 50 ft. from the power end of the line, used for sample line temperature control and alarming.

The sample line bundle consists of the following:

- 1– 3/8” Heated Sample tubes – 316 stainless steel
- 1 – ¼” unheated calibration tube – 316 stainless steel
- Type K thermocouple located 50 ft. from power end
- Constant power density heat trace – 208 VAC
- Signal and power wires for probe heater and alarms
- FRP black vinyl outer jacket or equivalent

A temperature controller shall be included in the CEMS enclosure designed to control the sample line temperature. A high/low temperature alarm shall be provided to the DAHS PLC for the sample line.

Installation of the sample line is by others.

4.3 SAMPLE CONDITIONING SYSTEM for stack CEMS

The sample conditioning system shall include all necessary tubing, valves, pumps, coolers, drains, filters, etc., required to efficiently condition the raw sample to a state suitable for introduction into the gas analyzers per applicable federal and state regulations. Instrumentation and accessories must be provided to appropriately adjust or control the sample gases for the following:

4.3.1 SAMPLE CONDITIONER/DRYER

An electronic refrigerant or thermoelectric type sample cooler shall be included with
peristaltic pumps to dry sample to below 4°C. The sample shall be dried to a dewpoint below the interference level. Glass impingers shall be provided. Sample residence time with condensate shall be minimized to prevent absorption of the gases to be measured.

A high temperature alarm contact shall be provided, wired back to the CEMS controller for output to the CEM DAHS or plant DCS. For sites located in SCAQMD, or as a maintenance option – An exit gas thermocouple shall be provided with the conditioner and wired back to the DAHS PLC for continuous monitoring and recording of exit gas temperature.

4.3.2 SAMPLE FILTRATION & MOISTURE ALARM

An integral moisture sensor alarm and secondary filter shall be provided downstream of the sample conditioner. The secondary filter shall remove 99.9% of the particles down to 2 microns. Filter material shall not absorb gases of interest. Moisture sensor alarm shall be wired back to the CEMS controller for alarming absorb gases of interest. Moisture sensor alarm shall be wired back to the DAHS PLC for alarming. An automatic relay shall be provided that will shut down the sample vacuum pump in the event of a moisture alarm.

4.3.3 SAMPLE TRANSPORT & ASSOCIATED INSTRUMENTATION

The sample transport system shall be made of chemically inert materials, such as stainless steel, Teflon, glass, etc., that will not corrode, contaminate, or chemically react with the expected sample constituents. All fittings shall be 316 stainless steel Swagelok type. All tubing shall be either PFA Teflon or 316 stainless steel.

The sample transport system shall control pressure and volumetric flow rate of the sample and distribute it to the individual analyzers. Pressure regulators with gauges and flow meters with control valves shall be provided so that flow rates to individual analyzers can be controlled and monitored from the front panel.

4.3.4 SAMPLE PUMP(S)

Diaphragm type vacuum pump(s) shall be provided to draw the sample from the probe down to the analyzers. All wetted surfaces of the pump shall be Teflon lined or stainless steel.

4.3.5 DRAIN & EXHAUST

A 1-1/4” PVC drain and exhaust vent shall be provided to the exterior of the shelter. All condensate shall be sloped to drain outside the shelter. If ambient conditions require, a power outlet shall be provided near the condensate drain for heat tracing to be provided by Others. Piping to site sanitary drain is by Others. Exhaust vent shall include a bug screen.

4.3.6 AMMONIA SCRUBBER (OPTIONAL)

For turbines utilizing ammonia injection for SCR, NOx control systems - NH3 scrubbers must be used before NOx analyzer to prevent ammonia bisulfate salts from accumulating in the analyzer. For applications which have ammonia slip present in the sample ammonia scrubber dessicant shall be provided downstream of the sample conditioner. The ammonia scrubber will remove ammonia slip from the sample gases so as to not contaminate downstream analyzer equipment. The scrubber will be 99% effective for ammonia slip levels up to 20 ppm, without absorbing gases of interest. A moisture drain
shall be provided, plumbed to the shelter drain.

4.3.7 CALIBRATION SYSTEM

An automatic and manual system shall be provided to inject calibration gases at the instruments directly (local cal.) or through the probe (stack cal.). Calibration control and monitoring functions shall be performed by the DAHS PLC. Electronic solenoid valves shall be provided for each separate calibration gas cylinder (daily gases).

Two stage stainless steel calibration gas bottle regulators shall be provided for all daily calibrations. Brackets shall be mounted to the exterior of the shelter for securing the calibration gas cylinders in accordance with OSHA regulations. Calibration gas cylinders shall be located so as to be accessible to plant personnel for replacement. A rain protective hood shall be included above the gas cylinders (optional).

4.4 GAS ANALYZERS

Analyzer detectors shall be tolerant to interfering components. A twofold concentration change of any single or combination of interfering constituents in the sample gas stream shall not affect the analyzer reading and performance. The analyzes shall meet the following specific requirements:

4.4.1 NOx ANALYZER


b. Chemiluminescent method of sample analysis

c. Microprocessor based instrument capable of serial and/or Ethernet communication for diagnostics

d. Stainless steel NO2 converter capable of > 100, 000 ppm-hours life

e. Dual range/dual span with separate, dedicated analog outputs for each range

f. Capable of 20:1 minimum turn down ratio

g. 7 day drift NTE 2.5%, RATA NTE 10%

h. Suitable manufacturers: Thermo Model 42i-LS or TAPI 200 EM/EH

i. Single range for inlet NOx and dual range for stack NOx.

4.4.2 CO ANALYZER

a. Compliant with 40 CFR 60/75, Appendix B, Performance Specification 4

b. Microprocessor based instrument capable of serial and/or Ethernet communication for diagnostics

c. Gas filter correlation method of sample analysis

d. Dual range/dual span with separate, dedicated analog outputs for each range

e. Capable of 100:1 minimum turn down ratio

f. 7 day drift NTE 2.5%, RATA NTE 10%
g. Suitable manufacturers: Thermo Model 48i or TAPI 300EM

4.4.3 O2 ANALYZER

a. Compliant with 40 CFR 60/75, Appendix B, Performance Specification 3
b. Paramagnetic or zirconium oxide method of sample analysis
c. Single range: 0-25%
d. 7 day drift NTE 0.5% O2, RATA NTE 10%
e. Suitable manufacturers: Cemtek model 1010 zirconium oxide, Servomex Model 1440 paramagnetic stand alone or as part of TAPI NOx bench or Ametek

4.5 INSTRUMENT RACK & SAMPLE CONDITIONING MOUNTING

All analyzers shall be housed in a 19” rack design carbon steel frame, suitably bolted to the floor. Rack shall be open on the front and sides to aid in air flow and cooling as well as allow access for maintenance of the equipment. Analyzers shall be mounted on slide rails to facilitate easy removal for maintenance purposes.

Sample conditioning components will be mounted on a wall mounted plate (open panel design) located adjacent to the analyzer cabinet. Mounting of these components will be such to facilitate ease of maintenance and viewing of flowmeters, pressure gauges, and other indicating instruments.

An ambient temperature monitor is included and wired back to the CEMS controller for monitoring & alarming of low & high temperature conditions in the CEMS rack.

4.6 SYSTEM CONTROLLER

4.6.1 The system controller shall be a Allen Bradley Compact Logix, Programmable Logic Controller (PLC) with ethernet communication link, from the PLC to the DAHS computer is required. A minimum of 30 days of local data storage shall be included.

The system controller for each unit will be rack mounted in the CEMS shelter and shall perform the following minimum functions: Housekeeping, Data Collection, monitoring of alarms, control, and Preliminary Calculations.

4.6.1.1 Alarms shall be generated to indicate the following as a minimum:

a. Failure of probe heater.
b. Failure of sample line heater.
c. Sample conditioning system malfunction (excessive moisture in sample).
d. Sample cooler exit temperature too high.
e. Communications failure between the system controller and DAHS.
g. Calibration results outside of tolerance (analyzer out-of-control or calibration failure).
h. System in maintenance condition.

h. Emissions in excess of plant permit limit.

A common trouble alarm and high emissions alarm relay output (dry contact) will be available from the PLC.

4.6.2 The system controller shall incorporate an operator interface panel (OIT) mounted in the instrument rack if the DAHS is not located in the CEM cabinet. The OIT shall allow control of calibrations and entry of bottle targets, as well as data display of CEMS data and alarms. This will be a minimum 4 line, 40 character per line LCD display with keypad. Direct serial or ethernet communication to the PLC shall be provided to allow uninterrupted access to the PLC data when the DAHS is not in operation.

4.6.3 The system controller for each analyzer shelter shall accept isolated, 4-20 mA analog input signals from the DCS via a hard-wired connection to an exterior shelter wall mounted NEMA 4X junction box. In addition, the PLC will provide dry contact status alarms and accept 24 VDC digital input statuses from the DCS via this junction box. Refer to the attached list for a typical I/O list to/from the DCS. As an option, the PLC will provide an Ethernet or serial interface using Modbus RTU protocol to communicate these signals digitally to the DCS.

4.7 DATA ACQUISITION SYSTEM

4.7.1 The Supplier shall integrate a hardware and software product of the DAHS to perform monitoring system control, data acquisition, data storage, and regulatory reporting functions. The DAHS system shall be designed so that in the event of a computer failure, data is backed up in the PLC controller for over 30 days. The Supplier shall configure the PLC and the DAHS recording and reporting functions in accordance with site specific conditions and local regulatory requirements. During installation and start-up of the CEMS, the Supplier shall verify proper operation of the DAHS including real time communication of each PLC to the DAHS.

The data acquisition unit is designed around a central processing unit, which is an IBM compatible, desktop PC computer. The PC computer consists of the following components:

- Pentium IV Processor
- Speed: 2.8 GHz minimum
- RAM: 256 MB RDRAM, 64K cache
- Floppy: 1.44 Meg 3.5 inch floppy disk
- Hard disk: Raid One configuration
- Monitor: 17 inch SVGA color monitor
- Operating System: Windows 2000
- Modem: 56kbps
- Backup Drive: External Hard Drive

4.7.2 The DAHS shall use a Windows 2000, NT, or XP Operating System and perform the following at a minimum:

a. Read and record the full range of gas concentrations in each stack, from zero through full scale.
b. Produce an instantaneous readout of all required emissions and process data.

c. Generate regulatory compliance reports from a menu driven format per 40 CFR 60 and 40 CFR 75 v2.1 guidelines & local SCAQMD regulations.

d. Generate graphical displays, trends, etc., for current and historical data as well as displaying CEMS status.

e. Compute and record monitor calibration error and calibration drift.

f. Automatically check measured values to determine if they are within allowable limits of normal operation, and flag questionable and/or out-of-tolerance data for operator recognition.

g. Generate alarms.

h. Allow system alarms to be viewed and acknowledged by operators.

i. Allow for automatic or manual entry of all required process data and information, including fuel analysis data like heating values and fuel bound sulfur.

j. Be capable of distinguishing periods when the turbines are off-line for reporting purposes.

k. NH3 slip calculation using inlet NOx and stack NOx analyzers and NHe injection rate per EPA guidelines.

4.8 REPORTS

Seller shall provide all software and modifications to fulfill reporting requirements of the EPA, and local regulator agency.

4.9 CEMS Enclosure

4.9.1 Seller shall supply a separate CEMS enclosure to be located at the base of each stack. Each CEMS enclosure shall provide a lighted, climate-controlled indoor workspace to allow for protection and maintenance of the equipment, with a suitable exterior location allocated for gas cylinder storage.

4.9.2 The size of each shelter shall be 8’ w x 10’ l minimum with nominal inside height of 8’.

4.9.3 Shelter construction:

- Interior and exterior prefinished aluminum skins. Heavy duty vinyl floor or aluminum treadplate floor, acrylic roof coating.
- R-15 rigid polystyrene or polyurethane insulation for walls and roof or applicable local codes (especially So CA).
- 4 lifting rings located at the base of the shelter near the corners for off-loading using crane.
- Entrance door – 36”x90” fully gasketed with stainless steel exterior hardware. Crashbar lock and hydraulic door closure inside. 16” square safety glass on the door.
- Feed thru bulkhead plate – Aluminum. Located on the upper wall of the shelter for penetrations of cal. Gas piping, instrument air feed, sample line bundles, customer signals, and DAHS communications.
- Calibration gas bottle mounting – Rain hood (16” deep) and Unistrut mounted to the
wall to accommodate up to 6 cal. Gas bottles. Bottle straps included.

4.9.4 Shelter paint – Aluminum skins prefinished in light tan (off-white) to reduce solar glare.

4.9.5 Electrical requirements for CEMS shelters are addressed in Section 4.11.

4.9.6 Supplier-provided HVAC shall be adequate to maintain the indoor temperature in a range consistent with the recommended operating range of the CEMS equipment given the site ambient conditions in Section 3.2 of this Specification. HVAC will be wall mounted unit including an integral resistance heating coil. Minimum HVAC size of 2 tons cooling, with 5 KW heater. Wall mounted thermostat for temperature control. Redundant HVAC and controllers can be requested if customer desires.

4.9.7 Smoke alarm wired to 120 VAC power with a dry contact alarm wired backed to the CEM controller and a wall mounted fire extinguisher

4.11 SHELTER ELECTRICAL

The shelter shall be provided completely pre-wired and assembled with all necessary appurtenances in accordance with the NEC code. The following is included:

- 150 Amp, 208 VAC electrical service panel with all necessary breakers for equipment provided by Seller
- EMT conduit drops from trough run around the continuous perimeter of the shelter
- Copper ground pad mounted to the frame of the shelter for connection to Customer’s ground grid
- Minimum 12 gauge copper wire
- Duplex outlets located on each wall for customer use
- Quad receptacle for DAHS computer (if mounted in shelter)
- 4 foot, dual tube fluorescent light fixtures (minimum two per shelter) to provide adequate lighting for all equipment
- Exterior low pressure sodium light with photo sensor
- Light switch located near door

Externally mounted (by customer in the field) 480 VAC, 45 KVA transformer with drip shield. Wall mounted (to exterior of shelter), 480 VAC disconnect switch for transformer (wired in the field by Customer).

5.0 SERVICES (Include on-site labor, travel time and expenses additional)

5.1 FACTORY ACCEPTANCE TEST

The Supplier shall provide facilities and technician support for the factory functional checkout of the system prior to shipment. This checkout shall be performed per a written procedure, which shall be developed by the Supplier and submitted to the Buyer for review 30 days prior to the test or earlier. The tests procedure shall include the hardware and software inspection and demonstration. A minimum of 1 day customer witness test at the end of the factory acceptance test.

5.2 INSTALLATION AND START-UP SUPPORT

The Supplier shall furnish the services of a qualified field engineer for installation and start up the CEMS following the field installation of the equipment. Start-up support shall include the following, as a minimum 3 days per CEM:
a. An installation checklist shall be reviewed and a walk-down performed to ensure that all equipment is ready for activation.

b. Power up the system and perform a thorough test of all system functions per a site-specific checklist.

c. Monitor on-line operation and calibration drift over a two-day period.

d. Check DAHS software to ensure proper data reduction, calculations, display, and reporting functions.

5.3 TRAINING

The Supplier shall provide a minimum of three days training program for the Owner’s operating, environmental and maintenance personnel that meets the following minimum requirements:

a. The training program shall consist of classroom as well as hands-on sessions designed to train the Owner’s personnel in proper operation and maintenance of all equipment furnished by the Seller, including equipment provided by sub-vendors.

b. Two days on CEMS hardware and one day on general DAHS operator training.

5.4 SYSTEM CERTIFICATION

5.4.1 The CEMS shall be designed to pass all applicable initial certification tests in 40 CFR Parts 60 and SCAQMD or San Joaquin APCD Regulations.

5.4.2 In the event that the system fails to attain certification, the Supplier shall bear the costs associated with modifying the system as necessary to meet certification requirements and to pay for additional testing.