



# CEMS Application Completion Check

South Coast Air Quality Management District • Source Test Engineering Branch



Before you submit your CEMS Application, did you:

- Identify the type of CEMS to be installed (RECLAIM, non-RECLAIM, single-dedicated CEMS, time-shared CEMS, ACEMS, FSMS)?
- Identify whether this is a new CEMS, or an existing CEMS modification?
- Fully identify the source(s) monitored by the CEMS and pollutants to be monitored, permitted pollutants limits, the AQMD identification (Permit-to-Construct, Permit-to-Operate, Facility ID), and attach a copy of the Permit?
- Describe the process(es) monitored, expected contaminant gas concentrations and attach a drawing of the process?
- Describe the exhaust stack where the CEMS will acquire a gas sample and attach a drawing?
- Describe the components of the CEMS ( analyzers, flow measurements, DAS, PLC, recorders), and attach a schematic drawing and vendors specification sheets?
- Identify how pollutant emissions will be calculated, recorded, and reported, and the programming logic involved to meet compliance with all applicable AQMD rules and permit conditions concerning CEMS monitoring?
- Supplemental sheets concerning other facility sources which will use this CEMS information?
- (*RECLAIM ONLY*): Have you contacted Mr. George Haddad ([ghaddad@aqmd.gov](mailto:ghaddad@aqmd.gov)) concerning your RTU reporting obligations?
- CEMS Quality Assurance Plan (QAP) to be submitted before CEMS Certification can be issued?
- Facility contact information, and signed and dated by a facility representative (not a consultant or a source test lab)?

The completed CEMS Application includes:  Completed *PART 4* of this packet, plus attachments,  Completed CEMS Fee Processing Form *ST-400*, and a check for the appropriate basic processing fee,  and a cover letter briefly describing your CEMS situation.

**DO NOT attach this CEMS Application, Form ST-400, or CEMS fees to any other AQMD correspondence (Permitting submittals, etc.).** CEMS Application and Certification is handled separately from the Permitting process. This submittal must be directed to:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT  
**Monitoring & Analysis Division, Source Test Engineering Branch**  
21865 Copley Drive  
Diamond Bar, CA 91765-4182\*

\*expedited FedEx, UPS, USPS or courier delivery: mark envelope "Hold at Front Desk for Pick-up by Source Testing Staff (ext. 3479)"



# South Coast Air Quality Management District

21865 E. Copley Drive, Diamond Bar, CA 91765-4182

FORM ST-220

Monitoring & Analysis Division, Source Test Engineering Branch (909) 396-3479

## APPLICATION FOR INITIAL CERTIFICATION, OR MODIFICATION, OF RECLAIM AND NON-RECLAIM CONTINUOUS EMISSIONS MONITORING SYSTEMS (CEMS)<sup>1</sup>

### C O N T E N T S

Use this Application for the Initial Certification of your CEMS, or for the modification or recertification of your existing CEMS. Refer to the applicable sections below for your CEMS application completion requirements:

<i>PART 1</i>	Definitions and discussion of terms referred to in the text of the CEMS Application. (Please retain for your own personal information).
<i>PART 2</i>	Instructions for completion of your CEMS Application for Initial Certification, the types of CEMS, the compliance schedule, and obligations. (Please retain for your own personal information).
<i>PART 3</i>	Instructions for completion of your CEMS Application for Modification or Recertification, the types of modifications, and required actions. (Please retain for your own personal information). Includes the following tables or testing matrices:
<i>MATRIX 1</i>	Specific QA/QC CEMS testing requirements (like replacement).
<i>MATRIX 2</i>	Specific QA/QC CEMS testing requirements (unlike replacement).
<i>PART 4</i>	CEMS Application for Initial Certification, Modification, or Recertification (including applicable Appendices), to be completed by you, the applicant, and submitted to the District with the requested information attached:
<i>APPENDIX A</i>	Simplified Process Flow Diagram.
<i>APPENDIX B</i>	Simplified Stack Diagram.
<i>APPENDIX C</i>	Simplified CEMS Diagram ( <i>Non-ACEMS Only</i> .)
<i>APPENDIX CI</i>	Simplified Multi-Point Probe Diagram
<i>APPENDIX D</i>	Determination of Required Monitoring Parameters.
<i>APPENDIX E</i>	Brief Description of Computer Programming Logic.
<i>APPENDIX F</i>	SO <sub>x</sub> Source Equipment Served by an FSMS ( <i>SO<sub>x</sub> CEMS Only</i> ).
<i>APPENDIX G</i>	Supplemental Information for ACEMS ( <i>ACEMS Only</i> ).
<i>ATTACHMENT 1</i>	Attach District applications/permits and other correspondence.
<i>ATTACHMENT 2</i>	Attach manufacturers/vendors CEMS equipment specifications.
<i>ATTACHMENT 3</i>	Attach QAP or summarize content of proposed QAP
<i>ATTACHED FORMS:</i>	ST-300: "CEMS Vendors' List" ST-400: "CEMS Fee Sheet" ST-550: "PCR Checklist"

<sup>1</sup> This application also applies to Semi-Continuous CEMS or SCEMS, Fuel Sulfur Monitoring Systems (FSMS), "Back Calculated" SO<sub>x</sub> CEMS, and Alternative CEMS (ACEMS) such as Predictive Emissions Monitoring Systems (PEMS), allowed under RECLAIM.

## A DISCUSSION OF CEMS AND CEMS-RELATED EQUIPMENT

### INTRODUCTION

Continuous gaseous emissions monitoring requirements at the SCAQMD are basically driven by two different programs:

**RECLAIM (Regional Clean Air Incentives Market)** – A market-based approach to banking surplus NO<sub>x</sub> and SO<sub>x</sub> emissions (emissions credits) and purchasing excess emissions from other RECLAIM facilities, based on current or anticipated demands, on a facility-wide basis. All RECLAIM facilities classified as “Major Sources” (except designated “Super-Compliant<sup>1</sup>” facilities) are required to continuously monitor, record, and electronically report mass NO<sub>x</sub> and/or SO<sub>x</sub> mass emissions for their affected facility sources daily to the AQMD, as a means of partially determining their emission status in RECLAIM. RECLAIM CEMS are regulated by District Rules 2011 and 2012.

**Command-and-Control or “Non-RECLAIM”** – Facilities may be required to continuously monitor and record gaseous emissions from affected facility sources pursuant to individual Rule and/or Permit requirements. Emission records must be periodically forwarded to the AQMD for compliance purposes. CEMS in this category are regulated by District Rules 218 and 218.1, and USEPA 40CFR60, Appendices B and F.

Both of these monitoring programs require periodic Quality Assurance testing to maintain continued emission reporting reliability.

### DEFINITION OF BASIC CEMS COMPONENTS

#### **CEMS or “Continuous Emissions Monitoring System”**

A system comprised of components that continuously measure all parameters necessary to determine NO<sub>x</sub>, SO<sub>x</sub>, CO, and/or other pollutant concentration(s) or pollutant emission rate(s) pursuant to a District rule or regulation (or permit condition). A CEMS includes, but is not limited to, the following analyzers, monitors, components, systems, or equipment:

- Pollutant concentration analyzer(s) (e.g. NO<sub>x</sub>, SO<sub>x</sub>, CO, Total Sulfur). associated ; and
- Diluent gas analyzer (O<sub>2</sub> or CO<sub>2</sub>),
- Sample collection, transport; and conditioning equipment (extractive CEMS only).
- Flow monitor (direct in-stack measurement or indirectly calculated from fuel usage or other process parameters approved by the Executive Officer).
- Supplemental equipment (e.g. moisture monitor/wet O<sub>2</sub> analyzer to correct for moisture, pressure/temperature sensors to correct flows to standard conditions) as required to augment CEMS components and comply with monitoring requirements.
- Data acquisition and logging systems, chart recorders, other recordkeeping devices.

Pursuant to both RECLAIM and non-RECLAIM rules and regulations, a CEMS must acquire and record at least one “valid” measurement per 15-minute operating period.

#### **SCEMS or “Semi-Continuous Emissions Monitoring System”**

A variation of the CEMS described above, this is an extractive system which must still acquire and report a minimum of one valid sample per 15-minute operating interval, but it may not be able to continuously acquire and process a gas sample like a CEMS because of its configuration.

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<sup>1</sup> Super-Compliant RECLAIM Major Source have successfully demonstrated that they comply with year 2003 NO<sub>x</sub>/SO<sub>x</sub> emission limits and are therefore exempted from installing CEMS, pursuant to additional regulations and controls.

## **A DISCUSSION OF CEMS AND CEMS-RELATED EQUIPMENT**

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A gas chromatograph is an example of an SCEMS. A time-shared CEMS is also referred to as an SCEMS under non-RECLAIM rules and regulations.

### **CEM**

The part of the CEMS as described above, comprising only the pollutant or diluent analyzer.

### **Gas Sample Acquisition/Conditioning System (Extractive CEMS Only)**

The part of the CEMS as described above which must acquire a representative gas sample, and “condition” it to dry standard conditions using a combination of filters, flow devices, heat-traced sample probe(s) and sample lines, and an electronic gas chiller to dry the sample; before it is presented to the CEM gas analyzer.

### **PLC or “Programmable Logic Controller”**

The part of the CEMS as described above (may be a stand-alone computer, or part of a mainframe or personal computer), programmed to electronically acquire required emission, flow and process parameters from the source required to be monitored, in a prescribed manner, for processing by the DAS. The PLC also runs programs essential to CEMS operation, reporting requirements, and QA/QC (e.g. daily calibrations). In some CEMS, the PLC and DAS may not be separate entities, and their individual functions may not be clearly discernible. Also, some CEMS components may have DAS/PLC hardware/software built-in (e.g., “smart” flowmeters & “smart” recorders)

### **DAS or “Data Acquisition System”**

The part of the CEMS as described above, typically a mainframe or desktop personal computer and dedicated software, which electronically acquires the raw emission information from the PLC (if there is a separate PLC) and formats the data according to specified District Rules and/or Permit Conditions, performing necessary calculations and corrections, for the purposes of compliance determination, data storage and retrieval, report generation, and RTU (*RECLAIM Major Sources only*) telecommunication of daily emissions to the District.

### **Analog Chart Recorder or “Paperless Electronic Recorder**

RECLAIM Major Sources must also have a supplemental analog chart record<sup>2</sup> of emissions in addition to the DAS record. As an alternative to an analog chart recorder, a “paperless” electronic recorder may also be used as long as it meets the specifications in Rules 2011 and 2012. Non-RECLAIM facilities required to have CEMS can elect to have either an analog chart recorder/paperless recorder or DAS for recordkeeping purposes. Chart recorders/paperless recorders must have a minimum effective chart width or resolution of 10-inches.

### **RTU or “Remote Terminal Unit”**

*(RECLAIM Major Sources and Sources Required  
by District Rule/Permit Conditions Only)*

The RTU is a component responsible for electronically linking with the District via modem or LAN connection and transmitting the properly formatted CEMS emission data from single or multiple CEMS at the same facility, to the District on a daily basis (or other prescribed frequency) as required by District RECLAIM Rules 2011 and 2012 (or other rules/permit conditions). The RTU may share the components or software of the CEMS DAS/PLC, or it may be a separate, stand-alone unit.

For the purpose of this Application, the RTU is not defined as a component of the CEMS, and this CEMS Application does not require RTU information, or approval of the RTU itself as a condition of CEMS certification, but it is still required for compliance with District RECLAIM Rules 2011 and 2012 concerning reporting and telecommunication requirements at RECLAIM Major Sources and other District Rule/Permit requirements.

RTU approval is a separate, but parallel process handled by the District’s Information Management Division (IM), and questions concerning RTU specifications and approval should be directed to Mr. George

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<sup>2</sup> For RECLAIM reporting purposes, the supplemental analog chart recorder cannot be used as a backup if the DAS is inoperative.

Haddad at (909) 396-2650 (e-mail: [ghaddad@aqmd.gov](mailto:ghaddad@aqmd.gov)), at the same time you are completing this Application.

## A GENERAL DISCUSSION OF CEMS

### **Representative Sampling Locations and Representative Gas Samples**

The ultimate goal of a CEMS is to reliably and repeatedly characterize gaseous emissions as measured at the stack discharge point to the atmosphere. We refer to this as “representative sampling” and it concerns the selection of the appropriate sample point(s) as well as the selection of CEMS components. It would not make much sense to have a properly configured CEMS if the sampling location were not also considered representative, or vice versa.. The degree of success in achieving representative sampling is based on the following criteria:

- Selection of CEMS analyzer ranges which will yield valid measurements and satisfy Rule/Permit requirements. When selecting CEMS gas analyzer ranges it is important to know the anticipated gas concentrations which will be encountered in the stack, and the Rule/Permitted concentration limits concerning these measurements because the CEMS must be able to successfully monitor both of these conditions. Both RECLAIM and non-RECLAIM rules concerning CEMS data reporting requirements address the “valid” range of measurement of the CEMS analyzer as being “10-95%<sup>3</sup> of the analyzer full-scale range” or FSR. This means that if an analyzer range of 0-100 ppm is selected, the valid range of measurement is from 10-95 ppm. Keeping this in mind, it will be necessary to monitor gas measurements within this boundary while still demonstrating that the gas monitored does not exceed a compliance concentration limit that is possibly outside this monitoring window<sup>4</sup>. Of course, it may be possible to select an instrument range which is complementary to both monitoring requirements, but it is also possible to select, certify, and use multiple ranges for the same analyzer as long as the analyzer can auto-range without human intervention.
- Selection of a representative gas and flow sampling location. Care must be given to the selection of a representative gas sampling location in the process stack or duct. It is also necessary to assure that the monitored location accurately reflects the total emissions for that one process alone which is required to be monitored, and that no other emission streams from adjacent processes are included, nor are there any other emission points besides the location that is to be monitored. Ideally, a representative gas and flow monitoring location should be positioned at least 8-stack diameters downstream and 2-stack diameters upstream from any flow disturbances (bends, transitions, control equipment, confluent streams, etc.) within the stack or duct proposed to be monitored. Realizing that this goal is not always possible to meet, alternative sampling locations may be proposed as long as they can meet Quality Assurance testing for “gaseous stratification”, “cyclonic flow”, and “pulsating flow” (reference AQMD Source Testing Manual, Method 1.1 and Chapter X).
- Selection of a representative gas monitoring location free of “gaseous concentration stratification”. This term refers to the difference in stack gas concentration, as measured within a cross-sectional plane perpendicular to flow (also known as a concentration profile). Arithmetically, it is expressed as a percent of the maximum difference in the gas concentration profile, divided by the average gas concentration. If the difference exceeds 10%, or is greater than 1 ppm, then the proposed CEMS gas sampling location is not considered representative or acceptable, and site modification may be possible (static mixers, etc.), or an alternate monitoring site must be proposed. Another remediation which is gaining in acceptance, particularly in low NO<sub>x</sub>, CO, and SO<sub>x</sub> (less than 5 ppm) monitoring applications, is the introduction of a “multiple-point” probe in place of the traditional single-point gas sampling probe.

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<sup>3</sup> It is possible to report valid gas measurements <10% FSR, but more extensive certification testing is required.

<sup>4</sup> Requirements for demonstrating compliance concentration limit hinge on selecting an instrument range which can successfully measure 120-200% of that limit.

## A DISCUSSION OF CEMS AND CEMS-RELATED EQUIPMENT

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- Selection of a representative flow monitoring location free of “cyclonic flow”, and “pulsating flow”. Normally, where emission flow measurement is a CEMS monitoring requirement, the flow monitoring location should be located as close to “undisturbed flow<sup>5</sup>” as possible, again, to characterize flow to the atmosphere. A sampling location selected according to the criteria described above should be acceptable. An exception to this guideline would be the existence of “cyclonic flow”, which refers to a gas stream characteristic generally caused by a process emission flow tangentially intersecting the process exhaust stack and causing a vortex flow out the stack. This characteristic may not disappear, regardless of the distance downstream from the source, unless the stack is physically modified (flow straighteners, baffles, etc.).

Similarly, “pulsating flow”, a characteristic exhibited by reciprocating internal combustion engines (ICEs), is a “pressure stratified” flow consisting of high and low pressure nodes or pulses traveling parallel to flow within a fairly small diameter stack or duct. Pulsating flow is usually reduced by existing restrictive devices such as mufflers or resonators, and NO<sub>x</sub> catalysts, but it can be further controlled by expansion transitions further downstream where monitoring would take place.

While these conditions don’t generally affect gas concentration monitoring, they do compromise representative flow measurement at any point where it may be classified as an unacceptable cyclonic or pulsating flow profile and gaseous mass emission rates would be questionable. An acceptable alternative to directly monitoring in-stack flow in these cases would be to calculate equivalent stack flow based on fuel usage to the monitored process, using a standard fuel F-Factor calculation. There are also some new stack flow monitoring technologies which can accurately accommodate less than ideal flow monitoring sites.

- Selection of CEMS components which can accurately process gas samples without sample losses or other biases. When selecting the individual components of a CEMS, it is important that all components are optimized to work together. For instance, the sample acquisition and conditioning system should be properly configured to optimize conditioning and to minimize residency, so that sample losses are minimized. This is particularly true where water soluble species of SO<sub>x</sub> (SO<sub>2</sub>) and NO<sub>x</sub> (NO<sub>2</sub>) are present – even more so when they exist in low concentrations. Gas analyzers must be specified according to their ability to distinguish the sample in question and to reject other constituents present in the sample stream, such as moisture, ammonia, organics, CO<sub>2</sub>, etc.
- Synchronization of CEMS Components to Correct for Temporal Errors. When configuring a CEMS, it is important that all of the components necessary to acquire, condition, analyze, and process a single emission data point, be synchronized with respect to time. We refer to this characteristic as the “sample response time”, or the time required for an individual CEMS component to indicate 95% of a predictable change in sensor response. For the most part, not all CEMS components will have the same response times because some components may sense directly in-stack, while others must extract sample and sense remotely. The object is to get all response times as close as possible so that they all acquire their respective information at the same point in time – particularly when the outcome of a variable is dependent on two or more simultaneous instrument readings. Thus, when the individual information is processed into a valid data emission point, it will accurately represent what happened in the stack during that time interval, and not some circumstance that preceded it shortly before or after.

### **“Back-up” or Redundant CEMS**

Some RECLAIM CEMS facilities are electing to install duplicate or redundant NO<sub>x</sub> analyzers as an economic incentive to minimize or prevent periods of “missing data” due to primary analyzer failure or malfunction. Any facility required to have a CEMS may elect to have redundant CEMS components, either initially or as a modification to a currently installed CEMS. The back-up component must be certified, operated, and maintained as any other CEMS component. Once certified, it becomes a dedicated component of that particular CEMS, subject to daily calibrations, and it cannot be used as a back-up for any other system, without re-certification. The DAS/PLC programming software programming logic must also

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<sup>5</sup> True laminar flow doesn’t exist within stacks or ducts because of frictional drag on contacting surfaces. An “undisturbed” velocity or flow profile would peak at the center and drop off equally in any cross-sectional plane perpendicular to flow, outward to the stack or duct wall.

be modified to evaluate data from both units and take the appropriate action automatically concerning use of data and compliance determination without human intervention.

### **Low Gas Concentration Monitoring**

This is a subject which is receiving a great deal of attention these days. NO<sub>x</sub> and CO Permitted compliance limits are in the single digits now, and some processes are regulated to 2.5 ppm or less. To achieve this continuous monitoring goal, it is necessary to specify low NO<sub>x</sub> and/or low CO analyzers (typically 0-5 ppm for NO<sub>x</sub>, 0-20 ppm for CO). Even so, some of these CEMS may not be able to successfully pass certification testing without the implementation of additional testing known as “spiking tests”<sup>6</sup>. At these monitoring levels, interfering substances in the gas stream, gaseous stratification, even moisture, can bias gas readings, and it may be necessary to implement additional Quality Assurance (QA) testing to assure sample integrity. Many CEMS vendors and source test firms are familiar with the additional problems encountered with such systems, and they can advise you what components are suited to your monitoring requirements. Because additional testing and planning may be required, allow ample time for CEMS certification in these instances.

### **Single-Point Gas Sampling Probe vs. Multi-Point Gas Sampling Probe**

A main aspect of any CEMS is to acquire a “representative” gas sample from a flue or duct using a single-point probe. Gaseous stratification, as discussed above, can preclude this requirement if it exists at the point of sample acquisition, particularly at lower gas monitoring levels. Alternatives include selection of a more suitable sampling point, or modification of the stack or flue. However, temporal variations combined with low gas monitoring levels (typically <10 ppm) may be more easily resolved by the introduction of a “multi-point probe”. As the name suggests, a multi-point probe has more than one point configured to simultaneously acquire equally-spaced and weighted gas samples across a stack or flue cross-section, to substantially reduce or eliminate gaseous stratification. The probe must be custom designed to the dimensions of the proposed stack sampling location, and it must be successfully “bench-tested” according to AQMD Source Testing *Form 511: “Multi-Point Probe Acceptance and Quality Assurance Standards, for Use in Conjunction with EPA/EMTIC Guidance Document (GD)-031”*, before installation. A benefit of this probe, if it is optimally configured according to District Method 1.1 sample point criteria, is that it can double as both the facility CEMS sample probe and the reference method probe when performing the Final Certification RATA and subsequent periodic QA RATAs. Initially, the price of this probe will be substantially more than a standard, single-point probe, and must undergo continuing QA maintenance to assure continued accuracy.

### **Extractive CEMS vs. “In-Situ” or In-Stack CEMS**

The extractive CEMS, as the name implies, extracts a representative gas sample from the process exhaust stack or duct, via a sample pump, conditions the sample to dry standard conditions, and presents it to the gas analyzer or analyzers. This is the most commonly used type of CEMS, because the electronics can be mounted remotely in a more accessible location and in an environmentally-controlled enclosure.

The in-situ or in-stack CEMS has its gas, flow, or other parameter monitoring sensors mounted directly in the process exhaust stack or duct. The advantage of this system is that gas readings do not need to be conditioned or standardized (no sample conditioning system), but this also means that the CEMS electronics must be mounted up on the stack or duct, possibly in hard-to-reach locations and dirtier environments.

### **Dedicated CEMS vs. Time-Shared CEMS**

A dedicated CEMS monitors only the emissions of a single, “dedicated” process exhaust stack or duct. This is the preferred and most commonly used CEMS monitoring configuration.

A time-shared CEMS (or SCEMS) can sequentially monitor the emissions of two or more process exhaust sources, with limitations:

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<sup>6</sup> Introducing a known quantity of a high concentration gas or a “spike” to the sampled gas in question, thus increasing the concentration to a measurable or predictable level (e.g., the reading minus the spike equals the actual concentration).

## A DISCUSSION OF CEMS AND CEMS-RELATED EQUIPMENT

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- The proposed CEMS (or SCEMS) shall acquire and report one “valid data point” for each monitored source per 15-minute sampling period. Because time is a limiting factor for the successful certification and continued compliance of a time-shared CEMS (or SCEMS):
- All sources should be physically close to one another and be approximately equidistant from the proposed CEMS (or SCEMS).
- All sources should be similarly configured and sized, and have similar exhaust gas compositions and emissions.
- All monitored sources shall have similar permitting requirements and gaseous emission compliance limits, allowing mutually compatible CEMS (or SCEMS) gas analyzer monitoring ranges.
- Each monitored source must have a data-reading period equal to at least three times the longest response time<sup>7</sup> of the system. After sample switchover, data may not be collected again until a period equivalent to one sample response time, as defined above, passes.
- The proposed CEMS (or SCEMS) must be capable of being calibrated (zeroed and spanned) on a daily basis on each monitored source, be capable of successfully passing all required performance testing while actively sequencing between monitored sources, and be able to clearly display this information on its DAS and/or stripchart readout.

**NOTE:** The apparent cost-savings realized by proposing a time-shared CEMS (or SCEMS), instead of two or more dedicated CEMS, may fall short of expectations when you consider the additional initial and periodic QA testing required and the additional maintenance required to assure continued data reliability. (Often, the only part of the time-shared CEMS or SCEMS which is shared are the analyzers themselves, because it has been determined that separate sample acquisition/conditioning systems are necessary to meet the monitoring “time window” for each cycle). Also, keep in mind that a failure of this CEMS, or any CEMS for that matter, to produce valid emission data will result in non-compliance for all affected sources monitored by this CEMS (or SCEMS). If you are considering a time-shared CEMS (or SCEMS), please request *Form 540*: “Time-Shared CEMS Compliance Assurance Worksheet”.

### **Analog vs. Electronic “Paperless” Strip Chart Recorder**

RECLAIM CEMS are required to have a DAS as the principle data acquisition and computational device for officially formatting, disseminating and storing emission information, but they must also have a supplemental<sup>8</sup> recordkeeping device such as an analog stripchart recorder or a recently adopted alternative known as a “paperless” electronic recorder. Both of these units must have the ability to acquire and display multiple channels of raw emission information, as well as computational and formatting abilities. The analog recorder must have a minimum chart width of at least 10-inches. The paperless recorder, which is really a DAS with a monitor or LCD display which emulates an analog chart, must also be able to acquire at least the same frequency of points as the DAS, have a tamperproof, secure storage media, and have a non-volatile data back up storage. Like a DAS, a paperless recorder is adaptable to other functions such as PLC, telecommunications, etc. From a maintenance standpoint, the paperless recorder has no moving parts or expendable supplies such as inks and paper to replace, like the stripchart recorder.

Non-RECLAIM CEMS are not required to have supplemental recordkeeping equipment, so applicants can elect to use the DAS or a stripchart recorder as the official reporting and compliance device. Although not specified yet in Rule 218, a paperless recorder may be an elective, subject to the specifications listed above.

**NOTE:** A paperless recorder may require proprietary software to view recorded data, and it is a requirement to provide the AQMD with a free copy of the software as a condition of acceptance of such a device at the time of CEMS Certification.

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<sup>7</sup> System response is the time required for any gas analyzer to detect 95% of a known calibration gas standard, introduced at the input of the CEMS sample probe. This test is performed three times and averaged on each CEMS analyzer, for each source monitored. The longest time recorded becomes the point-of-reference for determining the cycling interval for shared sources.

<sup>8</sup> Supplemental recordkeeping devices may not be used as back-ups for compliance purposes, if the DAS fails or malfunctions.



**Monitoring, Reporting, and Recordkeeping Requirements**

RECLAIM and non-RECLAIM CEMS must generally demonstrate through continuous monitoring, that they are in compliance with permitted concentration limits for one or more contaminants. RECLAIM CEMS must also automatically report mass emissions for one or more contaminants, daily to the AQMD. In addition to recording this data, the CEMS must have the capability to automatically announce or signal exceedances of permitted limits, breakdowns, out-of-control periods, etc.; to facility personnel so that appropriate action can be taken, and to automatically make the necessary calculations or modifications to data records. In instances where the process which the CEMS monitors is located remotely or is otherwise unmanned, it is also necessary to establish some form of communication with a central “manned” facility which can handle this responsibility. **It is the responsibility of the facility to implement corrective action or to notify AQMD personnel within the specified periods when the CEMS signals conditions of non-attainment or other specified conditions such as equipment and/or process outages, out-of-control periods, etc.** It is also the responsibility of the facility to initiate required periodic CEMS RATA testing, and to submit semiannual CEMS records to the AQMD when required.

ALTERNATIVES TO DIRECTLY MONITORING SOURCES

**Equivalent Stack Flowrate Derived from Fuel Usage**

A popular alternative to directly monitoring stack or duct flowrate is to monitor the fuel utilized by the affected source using a standard Fuel F-Factor Calculation specified in USEPA 40CFR60, Method 19, or AQMD RECLAIM Rules 2011 and 2012, Chapter 2, using an approved fuel meter. This alternative is most applicable when burning natural gas exclusively, although variable fuels such as refinery or landfill gases may be acceptable if additional fuel information is continuously furnished.

**FSMS or “Fuel Sulfur Monitoring System”**

A *total sulfur (TS)* monitoring system which is configured similar to the CEMS (or SCEMS) described above but, as an alternative to directly monitoring SO<sub>x</sub> emissions at sources required to have SO<sub>x</sub> CEMS (at the same facility), SO<sub>x</sub> emission information at each affected source is determined “indirectly” by monitoring the sulfur content of the fuel gas supply firing the affected sources.

A variation of an FSMS uses a stack-mounted SO<sub>x</sub> CEMS, instead of a *TS* monitor, to directly monitor SO<sub>x</sub> concentration, which is then “back-calculated” to the equivalent sulfur content of the fuel gas to that source. As above, SO<sub>x</sub> emission information at each affected source served by the same fuel supply can then be determined.

**ACEMS or “Alternative Continuous Emissions Monitoring System**

Also known as a “Predictive or Parametric Emissions Monitoring Systems”, or PEMS, an ACEMS may be used as an alternative to a CEMS pollutant monitoring requirement, subject to District Rules and Regulations, and the approval of the Executive Officer. Instead of directly monitoring the pollutant emissions at a source required to have a CEMS as described above, emission information is “predicted” by the ACEMS or PEMS by monitoring key equipment operating parameters (e.g. temperature, pressure, etc.) at the affected source, irrespective of exhaust gas or fuel gas supply analysis. An ACEMS is not generally applicable to a single source, but rather to multiple, identical sources at a facility because of the high initial cost. For this and other reasons, the ACEMS certification procedure is addressed on a “case-by-case” basis. Please contact the AQMD c/o Mr. Steven Marinoff at (909) 396-2243 (e-mail: [smarinoff@aqmd.gov](mailto:smarinoff@aqmd.gov)) for more information..

**APPLICATION FOR INITIAL CERTIFICATION  
OF RECLAIM AND NON-RECLAIM  
CONTINUOUS EMISSIONS MONITORING SYSTEMS (CEMS)**

The information to be provided in the following sections is designed to allow the SCAQMD to determine if your proposed CEMS will adequately meet all specified rule and permit requirements, and to identify potential problems before they become costly to you. Please provide all pertinent information, to the best of your knowledge. Complete one CEMS Application for each CEMS location, and only complete those sections of the Application, pertinent to your specific CEMS. Before proceeding with the certification process, familiarize yourself with the District Rules, Regulations, and Permit Conditions pertaining to your process and CEMS requirements (**RECLAIM CEMS Applicants**: Review RECLAIM Rules 2011 & 2012, **Non-RECLAIM CEMS Applicants**: Review District Rules 218 & 218.1<sup>1</sup>, and EPA 40CFR, Part 60, Appendices B & F).

The steps to Certification for all applicants are:

1. Your submittal and approval of RECLAIM CEMS Plan (Facilities new to RECLAIM, and other facilities required by District Rules/Permit Conditions to file CEMS Plan)
2. Your submittal of CEMS Application and Quality Assurance Plan (QAP)<sup>2</sup> for approval by SCAQMD.
3. SCAQMD “Initial Approval” of your CEMS Application. (Allows you to purchase and install CEMS, if not done so already, and contract CEMS certification source testing firm).
4. Your submittal of CEMS certification source test protocol for review by SCAQMD.
5. SCAQMD approval of your CEMS source test protocol. (Allows your contractor to proceed with the CEMS certification source testing).
6. Your submittal of CEMS certification source test report for review by SCAQMD.
7. SCAQMD approval of CEMS source test report, or “Certification” means your CEMS fully complies with all SCAQMD rule and permit requirements as an official data reporting instrument.
8. Your certified CEMS is now subject to requirements regarding scheduled and unscheduled maintenance and outage, major and minor modifications, records reporting and retention, and QA/QA (periodic testing or “RATAs”); to assure continued reliable data reporting. Please refer to District Rules 218, 2011 and 2012, regarding your obligations for these on-going programs.

Please mail or deliver your completed CEMS Application(s) to the South Coast Air Quality Management District, c/o the address and Division shown at the end of *PART 3*. A basic or initial application fee is due with each CEMS Application (Reference: *District Rule 301(i)(5)*, please complete attached Form *ST-400 “RECLAIM & Non-RECLAIM CEMS Plan, Application Fee Processing Form”*). A copy of this application is also available on disk, formatted for MS WORD XP. To obtain this form, please check the AQMD Website at [www.aqmd.gov](http://www.aqmd.gov), or contact us at (909) 396-3479 (e-mail: [pberes@aqmd.gov](mailto:pberes@aqmd.gov)).

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<sup>1</sup> District Rule 218 was amended on May 14, 1999. Much of the rule has been modified, along with the addition of a corollary Rule 218.1, concerning CEMS performance specifications; and Non-RECLAIM CEMS applicants have the option of certifying or modifying their existing CEMS pursuant to District Rule 218.1 or EPA 40CFR60, Appendices B&F. It is particularly important that you become familiar with these changes, so that all testing/certification/post certification requirements are met.

<sup>2</sup> A “QAP” is required to be submitted for approval before CEMS Final Certification can be granted. This now applies to both RECLAIM and Non-RECLAIM CEMS applicants.

**APPLICATION FOR MODIFICATION (AND RECERTIFICATION) OF RECLAIM AND NON-RECLAIM CONTINUOUS EMISSIONS MONITORING SYSTEMS (CEMS)**

The SCAQMD congratulates you on the successful certification of your RECLAIM or Non-RECLAIM CEMS. Realizing that any CEMS, no matter how well planned or maintained, may, in time require modification, we have developed the following explanation of CEMS modifications and actions required, to assist you in determining how to best deal with your individual CEMS related modification problems. First, it is necessary to identify which CEMS components or parts of CEMS components, require Quality Assurance (QA) testing following replacement or modification, and which components can be routinely replaced. There are basically two types of CEMS components or parts of CEMS components classified as:

- **Major** - “Major” parts are defined as those components or parts of CEMS components whose replacement or modification will directly or indirectly affect the quality of CEMS data. *Examples of major components are:* gas analyzers, gas conditioning system, fuel and flow meters, Data Acquisition Systems (DAS), Program Logic Controllers (PLC), Remote Terminal Units (RTU). *Examples of major parts are:* analyzer detectors, NOx converter, gas chiller, electronic circuit boards, software programming logic.
- **Minor** - “Minor” parts are defined as those components or parts of CEMS components whose replacement or modification will not directly or indirectly affect the quality of CEMS data (CEMS data quality will only be affected if they are not replaced when defective). *Examples of minor components and parts are:* connective tubing and wiring, probes, heated line, pumps, switches, panel lights or indicators, valves.

Keeping the above definitions in mind, refer to the following explanation of CEMS modifications:

**1. Replacement for Periodic or Preventive Maintenance**

Provides for the “routine” or “non-routine” replacement of minor parts of CEMS, as required, to assure continued CEMS reliability according to the following:

**a) Routine (Periodic) Replacement**

*Minor* CEMS components or parts of CEMS components in this category are limited generally to expendable parts “routinely” required to be replaced for QA, as provided by the CEMS component vendor or manufacturer (Example: periodic replacement of a particulate filter). Replacements of this nature do not require quality assurance (QA) testing, and may be replaced, as needed, without District notification (These preventive maintenance procedures must be included in the facility Quality Assurance Plan or QAP).

**b) Non-Routine Replacement**

*Minor* CEMS components or parts of CEMS components in this category, while not routinely replaced as above, must be replaced as needed whenever they fail or their performance deteriorates. This type of CEMS modification does not normally require District notification as long as component(s) are replaced with ones of the *same* design and the system is configured as before.

**2. Significant Replacement or Modification**

Replacement of CEMS components in this category concern *major* CEMS components and *major* parts of CEMS components. Components in this category are generally replaced because of malfunction, but may be replaced due to parts availability, or because the monitoring specifications of the component need to be changed, due to process alterations, or other circumstances. Replacement may entail complete major component changeout such as an analyzer, or the changeout of a major part of a component such as the change out of a card of an analyzer. Replacement or Modification may be one of the following:

**a) Replacement with Like Components (Direct Replacement):**

A *major* CEMS component or part of a CEMS component is replaced with an exact replacement provided by the original vendor or manufacturer. (An analyzer, for instance, must be of the same make, model, range and output, and replacement of parts of any component must be the same part number for that make and model of component, as provided by the vendor or manufacturer). CEMS component replacement of this nature requires some

QA testing, depending upon the type and degree of replacement (see “*Matrix 1: Like Replacements Only*”, for complete details of what is required).

**b) Replacement or Modification with Unlike Components**

A *major* CEMS component or part of a CEMS component is replaced or modified with a similar component or part of a component which may or may not be from the same manufacturer or vendor, and not necessarily of the same specifications, such as instrument range or method of detection. (An analyzer, for instance, is replaced with one of a different range to accommodate changes in process operating parameters, or a stack flow meter is installed to replace a fuel meter for flow monitoring purposes. A DAS or PLC is replaced with a unit from another vendor because of parts availability, or the software programming is modified to include more variables). A CEMS component replacement or modification of this type requires District notification, in the form of this application for modification, and some QA testing which may include partial or full CEMS recertification, depending upon the type and degree of the modification (see “*Matrix 2: Unlike Replacements Only*”, for complete details of what is required).

**3. Modification by Addition of New Component(s)**

CEMS in this category must have new *major and minor* components added to accommodate new rule or permit requirements, to provide more accurate information, or to correct design problems. For instance, a moisture analyzer may be required to more accurately correct emission rates to standard conditions, a flow monitoring component must be added to meet a permitting requirement to report emission rate. Similarly, a new process heater requiring SO<sub>x</sub> monitoring, is added to an existing FSMS and the fuel usage meter dedicated to the new process heater is regarded as a new component of the FSMS. CEMS in this category, because of the addition of new component(s), are required to undergo full or partial recertification depending upon the extent of the addition, and District notification, in the form of this application for modification.

After reading the above explanations of modifications, if you have any doubts about your proposed CEMS modification, please contact the District before the initiating the modification, if possible. If your CEMS modification does require completion of this application, please submit the following items:

- Complete the first two pages of the attached CEMS application.
- Complete only the remaining parts of the attached CEMS application pertaining to the actual modification (attach old copies of the existing CEMS application, for comparison).
- Include a cover letter briefly outlining the type(s) and reason(s) for modification, the impact on your facility and the District by such a modification, and any other information which you consider useful.
- Be sure to modify your QAP for this unit, if required.

**APPLICATION FOR MODIFICATION OF RECLAIM AND NON-RECLAIM CEMS**

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**NOTE:** The CEMS Certification and the Facility Permit-to-Construct processes are parallel, but separate projects. **Do not send your CEMS Applications, CEMS Fees, or other CEMS related documents to Permit Processing.** This will only lengthen the review process. Please mail or deliver directly to:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT  
21865 Copley Drive  
Diamond Bar, CA 91765-4182

c/o: Mr. Rudy Eden, Manager,  
Source Test Engineering Branch,  
Monitoring & Analysis Division

A basic or initial application fee is due with each CEMS Application (Reference: *District Rule 301(i)(5)*, please complete attached Form *ST-400 "RECLAIM & Non-RECLAIM CEMS Plan, Application Fee Processing Form"*). A copy of this application is also available on disk, formatted for MS WORD XP or ADOBE ACROBAT. To obtain this form, please check the AQMD Website at [www.aqmd.gov](http://www.aqmd.gov), or contact us at (909) 396-3479 (e-mail: [pberes@aqmd.gov](mailto:pberes@aqmd.gov)).

Remember to plan scheduled CEMS replacements or modifications in advance, if possible, to coincide with periodic assessments (RECLAIM only) or periodic test requirements if the proposed modification requires this type of testing anyway.

Prolonged CEMS outages due to unscheduled or scheduled maintenance or modification, are subject to missing data (RECLAIM only) and may require variance protection, depending on the nature and extent of your outage. Also, familiarize yourself with equipment and/or CEMS start-up QA/QC procedures after prolonged outage or shutdown.

**MATRIX 1: Like Replacements Only** (All Replacements are for like in all aspects; i.e. OEM, model, temperature settings)

**RECLAIM / NON-RECLAIM CONTINUOUS EMISSION MONITORING SYSTEM  
QUALITY ASSESSMENT TESTS FOLLOWING QUALITY CONTROL ACTIVITIES<sup>(1)</sup>**

Quality Assessment ⇒ Quality Control ↓	CEMS Calibration <sup>(2)</sup>	Manual Transmitter Calibration	Linearity Test <sup>(3)</sup>	Interference (as applicable) <sup>(4)</sup>	NO <sub>2</sub> Converter Efficiency <sup>(5)</sup>	Sample System Bias <sup>(6)</sup>	Analytical RATA <sup>(7)</sup>	Stack Flow Rate RATA <sup>(7)</sup>	Response Time
<b>Sample System Components:</b>									
Probe replacement	✓								
Probe filter replacement	✓								
Heated sample line replacement	✓					✓			✓
Condenser replacement	✓					✓			✓
Sample pump repair/replacement	✓								
Sample filter replacement	✓								
<b>Hardware/Software Components:</b>									
CEM controller components replacement	✓								
DAHS hardware replacement <sup>(9)</sup>									
DAHS software reloading	✓								
<b>Fuel Flow Metering System:</b>									
Primary element replacement <sup>(9)</sup>									
Transmitter replacement		✓							
<b>In-Stack Flow Monitor:</b>									
Sensor Recalibration <sup>(9)</sup>									
Sensor Replacement <sup>(9)</sup>									
Probe Replacement <sup>(9)</sup>									
Transmitter Recalibration		✓							
Transmitter Replacement		✓							
<b>NO<sub>x</sub> Analyzer:</b> <sup>(10)</sup>									
NO <sub>2</sub> Converter replacement	✓				✓				
Photomultiplier tube replacement	✓								
Photomultiplier tube cleaning	✓								
Analyzer replacement	✓		✓	✓	✓		✓		✓
Pre-certified analyzer	✓								
Analyzer vacuum pump repair/replacement	✓								
Analyzer filter replacement	✓								
Ozone generator replacement	✓								
PC Board Replacement	✓								
Thermo-electric temp cont. board	✓								
Optics cleaning/replacement	✓								
Chopper belt/motor replacement	✓								
Capillary replacement	✓								

**MATRIX I: Like Replacements Only** (All Replacements are for like in all aspects; i.e. OEM, model, temperature settings)

**RECLAIM / NON-RECLAIM CONTINUOUS EMISSION MONITORING SYSTEM  
QUALITY ASSESSMENT TESTS FOLLOWING QUALITY CONTROL ACTIVITIES<sup>(1)</sup>**

Quality Assessment =>	CEMS Calibration <sup>(2)</sup>	Manual Transmitter Calibration	Linearity Test <sup>(3)</sup>	Interference (as applicable) <sup>(4)</sup>	NO <sub>2</sub> Converter Efficiency <sup>(5)</sup>	Sample System Bias <sup>(6)</sup>	Analytical RATA <sup>(7)</sup>	Stack Flow Rate RATA <sup>(7)</sup>	Response Time
Quality Control ↓									
<b>SO<sub>2</sub>, CO, CO<sub>2</sub> Analyzer:</b> <sup>(10)</sup>									
Analyzer Replacement	✓		✓	✓			✓		✓
Pre-certified analyzer	✓								
Bulb/Lamp Replacement	✓								
PC Board Replacement	✓								
Analog Output Trim	✓								
Optics Cleaning/Replacement	✓								
Optical Bench Alignment	✓								
Electro-optic Heater Replacement	✓								
Detector Repair/Replacement	✓								
Chopper Motor Replacement	✓								
Chopper Bandpass Filter(s) Replacement	✓								
<b>O<sub>2</sub> Analyzer:</b> <sup>(10)</sup>									
Analyzer replacement	✓		✓				✓	✓ <sup>(8)</sup>	✓
Pre-certified analyzer	✓								
Linearizer circuit replacement	✓		✓						
ZrO <sub>2</sub> cell replacement	✓								
PC board replacement/adjustment	✓								
Source lamp replacement	✓								
Photocell replacement	✓								
Detector replacement	✓								
Oven temp. adj. or replacement	✓								

- (1) Satisfactory completion of the indicated quality assessment activity will be sufficient demonstration of the CEMS ability to generate valid data. A change of any component listed on the original CEMS application by specific model and/or serial number of for which specific details such as materials of construction or design are included requires formal notification to the District and will result in a response from the District.
- (2) CEMS Calibration: A calibration performed in normal operating mode to confirm proper operation and establish new calibration correction factors or valid data generation.
- (3) Linearity test consists of conducting a cylinder gas audit (CGA) as described in 40 CFR 60, Appendix F, 40 CFR 75, or as defined in an SCAQMD approved QAP for the facility.
- (4) Applicable to systems where ammonia is present.
- (5) Can use any NIST traceable gas
- (6) May not be applicable to dilution probe systems; consult SCAQMD
- (7) As defined in 40 CFR 60, Appendix F
- (8) If analyzer is used for EPA 'F'-factor calculation of stack flow rate (as described in EPA Method 19)
- (9) Refer to applicable sections of facility approved QAP or consult SCAQMD for additional specific guidance
- (10) 168-hour "burn-in" test is required for complete analyzer changeout

Matrix 2: **UnLike Replacements Only** (All replacements are of different manufacturer, model or specification)

**RECLAIM / NON-RECLAIM CONTINUOUS EMISSION MONITORING SYSTEM  
QUALITY ASSESSMENT TESTS FOLLOWING QUALITY CONTROL ACTIVITIES<sup>(1)</sup>**

Quality Assessment ⇒ Quality Control ⇓	CEMS Calibration ( <sup>2</sup> )	Manual Transmitter Calibration	Linearity Test ( <sup>3</sup> )	Interference (as applicable) ( <sup>4</sup> )	NO <sub>2</sub> Converter Efficiency ( <sup>5</sup> )	Sample System Bias ( <sup>6</sup> )	Analytical RATA ( <sup>7</sup> )	Stack Flow Rate RATA ( <sup>7</sup> )	Response Time
<b>Sample System Component:</b>									
Probe Relocation	✓					✓	✓ <sup>(8)</sup>		✓
Probe replacement	✓					✓			✓
Probe filter replacement	✓					✓			✓
Heated sample line replacement	✓					✓			✓
Condenser replacement	✓					✓			✓
Sample pump replacement	✓					✓			✓
Sample filter replacement	✓					✓			✓
<b>Hardware/Software Components:</b>									
CEM controller components replacement	✓								
DAHS hardware replacement	✓								
DAHS software change	✓								
<b>Fuel Flow Metering System:</b>									
Flow Computer								✓	
Primary Element Replacement								✓	
Transmitter replacement		✓							
<b>In-Stack Flow Monitor:</b>									
Sensor Replacement		✓						✓	
Transmitter Replacement		✓							
<b>NO<sub>x</sub> Analyzer:</b> <sup>(10)</sup>									
NO <sub>2</sub> Converter replacement	✓			✓	✓				
Photomultiplier tube replacement	✓		✓						
Analyzer replacement	✓		✓	✓	✓	✓	✓		✓
Analyzer vacuum pump repair/replacement	✓								
Analyzer filter replacement	✓								
Ozone generator replacement	✓								
Critical Orifice / Capillary replacement	✓								
PC Board Replacement	✓								
Thermo-electric temp cont. board	✓								
Optics replacement	✓			✓					
Chopper belt/motor replacement									



**Matrix 2: UnLike Replacements Only (All replacements are of different manufacturer, model or specification)**

**RECLAIM / NON-RECLAIM CONTINUOUS EMISSION MONITORING SYSTEM  
QUALITY ASSESSMENT TESTS FOLLOWING QUALITY CONTROL ACTIVITIES<sup>(1)</sup>**

Quality Assessment ⇒ Quality Control ↓	CEMS Calibration <sup>(2)</sup>	Manual Transmitter Calibration	Linearity Test <sup>(3)</sup>	Interference (as applicable) <sup>(4)</sup>	NO <sub>2</sub> Converter Efficiency <sup>(5)</sup>	Sample System Bias <sup>(6)</sup>	Analytical RATA <sup>(7)</sup>	Stack Flow Rate RATA <sup>(7)</sup>	Response Time
<b>SO<sub>2</sub>, CO, CO<sub>2</sub> Analyzer:</b> <sup>(10)</sup>									
Analyzer Replacement	✓		✓				✓		✓
Bulb/Lamp Replacement	✓								
PC Board Replacement	✓								
Analog Output Trim Replacement	✓		✓						
Replace Optical Bench	✓		✓				✓		
Optics Replacement	✓		✓						
Electro-optic Heater Replacement	✓								
Detector Replacement	✓		✓						
Chopper Motor Replacement	✓								
Chopper Bandpass Filter(s) Replacement	✓								
<b>O<sub>2</sub> Analyzer</b> <sup>(10)</sup>									
Analyzer replacement	✓		✓				✓	✓ <sup>(9)</sup>	✓
Replace Linearizer Circuit	✓		✓						
Cell replacement	✓		✓						
PC board replacement	✓								
Source lamp replacement	✓								
Photocell replacement	✓								
Detector replacement	✓								
Oven temp. replacement	✓								

- (1) Satisfactory completion of the indicated quality assessment activity will be sufficient demonstration of the CEMS ability to generate valid data. A change of any component listed on the original CEMS application by specific model and/or serial number of for which specific details such as materials of construction or design are included requires formal notification to the District and will result in a response from the District.
- (2) CEMS Calibration: A calibration performed in normal operating mode to confirm proper operation and establish new calibration correction factors or valid data generation.
- (3) Linearity test consists of conducting a cylinder gas audit (CGA) as described in 40 CFR 60, Appendix F, 40 CFR 75, or as defined in an SCAQMD approved QAP for the facility.
- (4) Applicable to systems where ammonia is present.
- (5) Can use any NIST traceable gas
- (6) May not be applicable to dilution probe systems; consult SCAQMD
- (7) As defined in 40 CFR 60, Appendix F
- (8) Stratification test must be done
- (9) If analyzer is used for EPA 'F'-factor calculation of stack flow rate (as described in EPA Method 19)
- (10) 168-hour "burn-in" test is required for complete analyzer changeout



# South Coast Air Quality Management District

FORM ST-220AP

21865 E. Copley Drive, Diamond Bar, CA 91765-4182

Monitoring & Analysis Division, Source Test Engineering Branch (909) 396-3479

## APPLICATION FOR INITIAL CERTIFICATION, OR MODIFICATION, OF RECLAIM AND NON-RECLAIM CONTINUOUS EMISSIONS MONITORING SYSTEMS (CEMS)

<i>Applicant: Please check all that are applicable regarding your submittal:</i>						
<b>Present Status:</b>	<input type="checkbox"/> Currently	or	<input type="checkbox"/> Previously Certified	<input type="checkbox"/> New Source	<input type="checkbox"/> RECLAIM	<input type="checkbox"/> Non-RECLAIM
	(certification no. _____ date _____) <sup>1</sup>					
<b>Type Application:</b>	<input type="checkbox"/> Initial Certification	<input type="checkbox"/> Modification / Recertification due to:				
		<input type="checkbox"/> Process Modification	<input type="checkbox"/> CEMS Modification	<input type="checkbox"/> Rule/Permit Change		
<b>Source(s) Monitored:</b>	<input type="checkbox"/> One (Dedicated)	<input type="checkbox"/> More than one (time-shared, SCEMS)	<div style="border: 1px solid black; width: 100px; height: 20px; display: inline-block;"></div> <i>(specify number)</i>			
	<input type="checkbox"/> More than one SO <sub>x</sub> source (FSMS only):					
<b>Type(s) of CEMS:</b>	<input type="checkbox"/> NO <sub>x</sub>	<input type="checkbox"/> CO	<input type="checkbox"/> O <sub>2</sub>	<input type="checkbox"/> Time-Shared	<input type="checkbox"/> FSMS	<input type="checkbox"/> ACEMS
	<input type="checkbox"/> SO <sub>x</sub>	<input type="checkbox"/> Fuel	<input type="checkbox"/> Flow		<input type="checkbox"/> SCEMS	<input type="checkbox"/> _____

Please fill out the requested information below, as completely as possible, and return it to the District c/o Source Test Engineering Branch. If additional space is required, attach supplementary pages to the end of this form.

### 1. APPLICANT, COMPANY, CONTACT INFORMATION

Facility ID No : \_\_\_\_\_

Facility Permit Holder : \_\_\_\_\_

Mailing Address : \_\_\_\_\_

Equipment Location : \_\_\_\_\_

*(Also include Company Name if different from Business License Name listed above)*

Company Contacts : \_\_\_\_\_ Name \_\_\_\_\_ Phone \_\_\_\_\_

\_\_\_\_\_ Title \_\_\_\_\_ E-mail Address \_\_\_\_\_

: \_\_\_\_\_ Name \_\_\_\_\_ Phone \_\_\_\_\_

\_\_\_\_\_ Title \_\_\_\_\_ E-mail Address \_\_\_\_\_

<sup>1</sup> Be sure to attach a copy of your most recent CEMS Certification to this Application.

**2. CEMS HISTORY AND REPORTING REQUIREMENTS** Please provide some background concerning your CEMS proposal so that we can better determine if you are fulfilling (or over-fulfilling) your CEMS monitoring obligations

**a. SOURCE (OR SOURCES) MONITORED BY THIS CEMS**

SOx CEMS Applicants Only: If this CEMS is an FSMS, also complete Appendix F.

**EQUIPMENT 1:**

AQMD Application/Permit No. or RECLAIM Device I.D.

Description : \_\_\_\_\_  
 (from Application or Permit, including control equipment) \_\_\_\_\_  
 \_\_\_\_\_

Operating Rate (incl units) : \_\_\_\_\_  
*Design*      *Normal*      *Minimum*

Process Characteristic :  Continuous       Batch: \_\_\_\_\_ (hrs/batch)  
 Intermittent<sup>2</sup>: \_\_\_\_\_ (hrs/day) or ( / )

**EQUIPMENT 2:**

AQMD Application/Permit No. or RECLAIM Device I.D.

Description : \_\_\_\_\_  
 (from Application or Permit, including control equipment) \_\_\_\_\_  
 \_\_\_\_\_

Operating Rate (incl units) : \_\_\_\_\_  
*Design*      *Normal*      *Minimum*

Process Characteristic :  Continuous       Batch: \_\_\_\_\_ (hrs/batch)  
 Intermittent<sup>2</sup>: \_\_\_\_\_ (hrs/day) or ( / )

**EQUIPMENT 3:**

AQMD Application/Permit No. or RECLAIM Device I.D.

Description : \_\_\_\_\_  
 (from Application or Permit, including control equipment) \_\_\_\_\_  
 \_\_\_\_\_

Operating Rate (incl units) : \_\_\_\_\_  
*Design*      *Normal*      *Minimum*

Process Characteristic :  Continuous       Batch: \_\_\_\_\_ (hrs/batch)  
 Intermittent<sup>2</sup>: \_\_\_\_\_ (hrs/day) or ( / )

<sup>2</sup> Equipment operates on-demand, is supplemental, or is a back-up to another piece of equipment.

**b. PRESENT CEMS STATUS**

- CEMS not installed (approx:  order  install date: \_\_\_\_\_ )  
 CEMS installed  CEMS installed & Operating (date: \_\_\_\_\_ )

**c. CEMS REPORTING REQUIREMENTS**

Briefly describe what necessitated this CEMS proposal (District Rules, Permit Conditions, or self-elected) and attach a copy of the applicable part of the AQMD Facility Permit, Permit-to-Construct, or Permit-to-Operate in *Attachment 1*. (It is recommended that you thoroughly discuss your continuous monitoring requirements with your assigned AQMD Permitting Engineer to assure that you have fulfilled all of your monitoring obligations, and also to assure that you are not proposing to monitor a contaminant<sup>3</sup> that is not required to be continuously monitored):

<u>Contaminant Monitored</u>	<u>Applicable Rule or Permit Condition or "Self Elected"</u>	<u>Continuous Monitoring Requirement</u>
<input type="checkbox"/> NOx	_____	<input type="checkbox"/> Concentration Limit: _____ ppm (corrected to: <input type="checkbox"/> 3% <input type="checkbox"/> 15% O <sub>2</sub> ) <input type="checkbox"/> Mass Emission (unit): _____ ( _____ )
<input type="checkbox"/> SOx	_____	<input type="checkbox"/> Concentration Limit: _____ ppm (corrected to: <input type="checkbox"/> 3% <input type="checkbox"/> 15% O <sub>2</sub> ) <input type="checkbox"/> Mass Emission (unit): _____ ( _____ )
<input type="checkbox"/> CO	_____	<input type="checkbox"/> Concentration Limit: _____ ppm (corrected to: <input type="checkbox"/> 3% <input type="checkbox"/> 15% O <sub>2</sub> ) <input type="checkbox"/> Mass Emission (unit): _____ ( _____ )
<input type="checkbox"/> other: _____	_____	<input type="checkbox"/> Concentration Limit: _____ ppm (corrected to: <input type="checkbox"/> 3% <input type="checkbox"/> 15% O <sub>2</sub> ) <input type="checkbox"/> Mass Emission (unit): _____ ( _____ )

Comments concerning above requirements: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**d. AQMD CONTACTS**

Permitting Engineer: \_\_\_\_\_ (name) \_\_\_\_\_ (phone ext)  
 Inspector: \_\_\_\_\_ (name) \_\_\_\_\_ (phone ext)  
 Source Testing Engineer: \_\_\_\_\_ (name) \_\_\_\_\_ (phone ext)

<sup>3</sup> There is a distinction between contaminants which require continuous monitoring (CEMS), and contaminants which are required to be monitored periodically or non-continuously, such as annual CO and NOx monitoring for Permit Compliance. These distinctions aren't always clearly explained in the Permit Conditions. Be sure to contact an AQMD Permitting Engineer for clarification on what is - and what is not required before proceeding with a CEMS Application.

**3. PROCESS DESCRIPTION**

Briefly describe manufacturing and control processes in the space below, and include a simplified process flow diagram in *Appendix A*.

---

**4. FUEL AND FLUE GAS INFORMATION**

Please include a simplified stack diagram in Appendix B. **ACEMS Applicants:** Complete specified sections only. **Time-Shared CEMS Applicants:** Make copies of this page and list information based on individual sampling locations.

**a. STACK SAMPLING DIMENSIONS**

(ACEMS Applicants: note specific requirements)

	Diameter or Length	Width
Stack dimensions	: _____ ft. in.	_____ ft. in.
Overall stack height	: _____ ft. in.	
CEMS probe tip distance in stack from stack wall (ACEMS Applicants: does not apply, leave blank)	: _____ ft. in.	
CEMS probe distance downstream from disturbance (ACEMS Applicants: this is the Reference Method CEMS probe distance)	: _____ ft. in.	
CEMS probe distance upstream from disturbance (ACEMS Applicants: this is the Reference Method CEMS probe distance)	: _____ ft. in.	
Reference sample port distance from CEMS probe (ACEMS Applicants: does not apply, leave blank)	: _____ ft. in.	<input type="checkbox"/> Upstream <input type="checkbox"/> Downstream <i>(check)</i>

**b. ANTICIPATED FLUE OR STACK PARAMETERS**

Contaminant Gas : NO<sub>x</sub> : \_\_\_\_\_ to \_\_\_\_\_ ppm SO<sub>x</sub> : \_\_\_\_\_ to \_\_\_\_\_ ppm  
CO : \_\_\_\_\_ to \_\_\_\_\_ ppm ( ): \_\_\_\_\_ to \_\_\_\_\_ ppm  
(Other gas) ( ): \_\_\_\_\_ to \_\_\_\_\_ ppm ( ): \_\_\_\_\_ to \_\_\_\_\_ ppm

Diluent Gas : CO<sub>2</sub> : \_\_\_\_\_ to \_\_\_\_\_ % O<sub>2</sub> : \_\_\_\_\_ to \_\_\_\_\_ %  
(Other gas) ( ): \_\_\_\_\_ to \_\_\_\_\_ % ( ): \_\_\_\_\_ to \_\_\_\_\_ %

Temperature: \_\_\_\_\_ to \_\_\_\_\_ °F Static Pres: \_\_\_\_\_ to \_\_\_\_\_ " H<sub>2</sub>O  
Moisture: \_\_\_\_\_ to \_\_\_\_\_ % Flowrate: \_\_\_\_\_ to \_\_\_\_\_ dscfm  
Particulate Matter : \_\_\_\_\_ to \_\_\_\_\_ gr/dscf

**c. ANTICIPATED FUEL PARAMETERS**

Fuel Type :  Natural Gas  (specify) \_\_\_\_\_  
Sulfur Content<sup>4</sup> : \_\_\_\_\_ to \_\_\_\_\_ ppm  
CO<sub>2</sub><sup>4</sup>: \_\_\_\_\_ to \_\_\_\_\_ % Usage Rate: \_\_\_\_\_ to \_\_\_\_\_ dscfm  
Moisture<sup>4</sup>: \_\_\_\_\_ to \_\_\_\_\_ % Meter Pres: \_\_\_\_\_ to \_\_\_\_\_ psig

<sup>4</sup> Only applies for fuel other than natural gas.

5. **CEMS DESCRIPTION** Please include a simplified CEMS diagram in *Appendix C* and attach manufacturer's specification sheets. **ACEMS Applicants:** Complete only *Sections 5.c. & e.* and *Appendix G*, instead of *Appendix C*. **Time-Shared CEMS Applicants:** Indicate which CEMS components are shared.

**a. PRINCIPLE GAS ANALYZER**

Gas Monitored	Make	Model	Method of Detection (NDIR, etc.)	Proposed Range(s)	(check) <sup>5</sup> dry wet
					<input type="checkbox"/> <input type="checkbox"/>
					<input type="checkbox"/> <input type="checkbox"/>
					<input type="checkbox"/> <input type="checkbox"/>
					<input type="checkbox"/> <input type="checkbox"/>

**b. PRINCIPLE FLOW MONITOR**

Type: fuel flow	Make	Model	Principle (Orifice, Pitot, etc.) Description or Purpose	Proposed Range	(check) <sup>6</sup> cor unc
<input type="checkbox"/> <input type="checkbox"/>					<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/>					<input type="checkbox"/> <input type="checkbox"/>

**c. SUPPLEMENTAL COMPONENTS<sup>7</sup> / PRINCIPLE ACEMS COMPONENTS**

Parameter	Make	Model	Description or Purpose

**d. SAMPLE ACQUISITION & CONDITIONING SYSTEM** (*probe, chiller, etc.*)

Make	Model	Description
		( <input type="checkbox"/> Single-Point <input type="checkbox"/> Multiple <sup>8</sup> -Point Probe):
		(Conditioning System / Chiller):

**e. DATA ACQUISITION & REPORTING EQUIPMENT** (*Computer, DAS, PLC, Chart Recorder etc. non-RECLAIM only; indicate which component will be official record*).

Make	Model	Description
		(DAS):
		(PLC):
		(Software):
		(Recorder):

<sup>5</sup> Specify whether reported raw gas reading will be to "dry" or "wet" conditions, excluding external corrections (If any readings are "wet", be sure to detail how they will be corrected to dry standard conditions in *Appendix D*).

<sup>6</sup> Specify whether reported raw fuel or flue reading will be corrected "unc" or uncorrected "cor" to dry standard conditions, excluding external corrections (If readings will be "unc", be sure to detail how they will be corrected to dry standard conditions in *Appendix D*).

<sup>7</sup> Components used to augment the performance of the principle gas and flow components listed in *a. & b.* (temperature, pressure, and moisture correction devices, for instance).

<sup>8</sup> Be sure to complete *Appendix C1*. You must successfully bench-test this probe before CEMS Initial Approval can be granted.

**6. CEMS EXPENDITURE**

Equipment & Materials Total System as Installed

Estimated Cost of Equipment : \$ \_\_\_\_\_ \$ \_\_\_\_\_

CEMS Contractor : \_\_\_\_\_

Address : \_\_\_\_\_

Phone : \_\_\_\_\_

**7. DETERMINATION OF REQUIRED MONITORING PARAMETERS**

Check below how you propose to meet applicable rule and permit condition monitoring requirements for each monitored pollutant of this CEMS. Detail, step by step in *Appendix D*, how these parameters will be applied to the final monitoring requirement by use of equations, assumptions, and calculations. (Be sure to detail how corrections will be made to dry, standard conditions, or conditions imposed by rules or permits.). Constants, factors, and/or coefficients not used in commonly accepted equations; or non-standard equations, must be submitted with full explanation and supporting documentation (historical data, etc.). Check all that apply for your particular monitoring situation:

<u>Gas</u>	<u>Concentration Based On:</u>	<u>Flowrate Based On:</u>	<u>Emission Rate Based On:</u>
NOx:	<input type="checkbox"/> Direct Gas Measurement <input type="checkbox"/> Predicted (ACEMS/PEMS) <input type="checkbox"/> + O <sub>2</sub> Correction (O <sub>2</sub> Analyzer) <input type="checkbox"/> _____	<input type="checkbox"/> Direct Stack Flow Meas. <input type="checkbox"/> Predicted ACEMS/PEMS <input type="checkbox"/> Standard Fuel F-Factor <input type="checkbox"/> _____	<input type="checkbox"/> Direct (conc x stack flow) <input type="checkbox"/> Predicted (ACEMS/PEMS) <input type="checkbox"/> Standard Fuel F-Factor <input type="checkbox"/> _____
SOx:	<input type="checkbox"/> Direct Measurement <input type="checkbox"/> Predicted (ACEMS/PEMS) <input type="checkbox"/> Fuel Sulfur Content (FSMS) <input type="checkbox"/> + O <sub>2</sub> Correction (O <sub>2</sub> Analyzer) <input type="checkbox"/> _____	<input type="checkbox"/> Direct Measurement <input type="checkbox"/> Predicted ACEMS/PEMS <input type="checkbox"/> Fuel Usage <input type="checkbox"/> Standard Fuel F-Factor <input type="checkbox"/> _____	<input type="checkbox"/> Direct (conc x flowrate) <input type="checkbox"/> Predicted (ACEMS/PEMS) <input type="checkbox"/> Fuel Sulfur Content (FSMS) <input type="checkbox"/> Fuel F-Factor <input type="checkbox"/> _____
CO:	<input type="checkbox"/> Direct Gas Measurement <input type="checkbox"/> Predicted (ACEMS/PEMS) <input type="checkbox"/> + O <sub>2</sub> Correction (O <sub>2</sub> Analyzer) <input type="checkbox"/> _____	<input type="checkbox"/> Direct Stack Flow Meas. <input type="checkbox"/> Predicted ACEMS/PEMS <input type="checkbox"/> Standard Fuel F-Factor <input type="checkbox"/> _____	<input type="checkbox"/> Direct (conc x stack flow) <input type="checkbox"/> Predicted (ACEMS/PEMS) <input type="checkbox"/> Standard Fuel F-Factor <input type="checkbox"/> _____
____:	<input type="checkbox"/> Direct Gas Measurement <input type="checkbox"/> Predicted (ACEMS/PEMS) <input type="checkbox"/> + O <sub>2</sub> Correction (O <sub>2</sub> Analyzer) <input type="checkbox"/> _____	<input type="checkbox"/> Direct Stack Flow Meas. <input type="checkbox"/> Predicted ACEMS/PEMS <input type="checkbox"/> Standard Fuel F-Factor <input type="checkbox"/> _____	<input type="checkbox"/> Direct (conc x stack flow) <input type="checkbox"/> Predicted (ACEMS/PEMS) <input type="checkbox"/> Standard Fuel F-Factor <input type="checkbox"/> _____



**8. COMPUTER PROGRAMMING LOGIC FOR THE PARAMETERS IN SEC. 7**

Briefly describe in *Appendix E* how these parameters will be programmed into the data reduction and recording units. Use block diagrams, or a copy of recorded data if needed, to show the location in the program where constants, variables and other parameters are entered. Indicate DAS polling frequency. ACEMS Applicants must also discuss redundancy and/or remediation for primary parameter error or failure.

**9. APPLICABLE PERMITS AND PERMIT CONDITIONS**

Please attach applicable permits and permit conditions related to all basic and control equipment which will be monitored by the CEMS (Label as “Attachment 1”, or attach to sheet provided).

**10. MANUFACTURER’S OR VENDOR’S CEMS SPECIFICATIONS**

Please attach manufacturer’s or vendor’s specification sheets for all equipment or devices which relate to the CEMS (Label as “Attachment 2”, or attach to sheet provided).

**11. QA/QC PROCEDURES**

All CEMS applicants<sup>9</sup> shall submit a complete Quality Assurance Plan (QAP) according to RECLAIM Regulation XX and Rule 218. In this Plan, you must address the on-going maintenance and contingencies necessary to assure the continued reliability of emission information. Discuss scheduled and unscheduled maintenance, contingencies for equipment/CEMS outages and modifications, recordkeeping and reporting, periodic testing, personnel responsible for assuring implementation of this Plan, etc. If you have already prepared a QAP for this CEMS, please include a copy with this Application, and label it as “Attachment 3”. If the QAP is not yet completed, briefly describe or outline its content, and include it as “Attachment 3”. **NOTE TO ALL APPLICANTS:** The completed QAP must be submitted, and approved before CEMS “Final Certification can be granted.

**12. REMOTE TERMINAL UNIT (RTU) (RECLAIM CEMS Applicants Only)**

Although not technically classified as a part of the CEMS which you have described in this Application, an approved RTU is required, pursuant to District RECLAIM RULES 2011 and 2012, to electronically report CEMS emission information to the District on a daily basis (or at an interval specified by other rules or permit conditions). Please contact Mr. George Haddad in the District’s Information Management Division (IM), at (909) 396-2650 (e-mail: [ghaddad@aqmd.gov](mailto:ghaddad@aqmd.gov)) for more information regarding RTU specifications, capabilities, and approval. For our records, please indicate present RTU status:

- This proposed CEMS will use an existing RTU which is capable of connecting to the District (serves previously certified CEMS or CEMS undergoing certification, at this facility).
- There is presently no RTU installed at this facility. Part of this CEMS proposal includes RTU specifications which will be forwarded to the person listed above.
- New RTU is installed and is capable of connecting to the AQMD.

<sup>9</sup> Effective May 14, 1999, Non-RECLAIM CEMS applicants must also prepare a QAP. ACEMS applicants shall submit a QAP for each parameter measured.

**13. CEMS INSTRUMENT ENCLOSURE** *(Please indicate below):*

- CEMS will be enclosed in an environmentally-controlled shelter with:
- Temperature alarm or record of exceedances of manufacturer's specified operating range.
  - No provisions for temperature alarm or record *(Additional QA certification testing required)*.
- CEMS shelter will not be environmentally-controlled *(Additional QA certification testing shall be required)*.

**14. NON-RECLAIM CEMS CERTIFICATION OPTIONS** *(Non-RECLAIM CEMS Applicants Only)*

Non-RECLAIM or "Command-and-Control CEMS Applicants must indicate before Final CEMS Certification, by checking the appropriate box below, how they will certify, and maintain this CEMS (be sure to read both of these documents before deciding):

- CEMS is to be reviewed and certified according to the performance specifications of Rule 218.1, and will be subject to Rule 218.1 Quality Assurance requirements.
- CEMS is to be reviewed and certified according to the applicable performance specifications of 40CFR60, Appendix B, and will be subject to the Quality Assurance requirements of 40CFR60, Appendix F.

**15. MULTI-POINT PROBE REQUIREMENTS** *(Multi-Point Probe Applicants Only)*

- I have read and understand the procedures for "pre-certifying" the multiple-point probe for my CEMS, and the continued QA measures as described in AQMD Source Testing *Form 511: "Multi-Point Probe Acceptance and Quality Assurance Standards, for Use in Conjunction with EPA/EMTIC Guidance Document (GD)-031"*. I understand that the completed probe bench-test report must be submitted to the AQMD for formal approval before the probe may be installed in the stack sampling location, and that issuance of CEMS Initial Approval will be contingent upon the successful completion of this task.

**16. EXPEDITED REVIEW REQUESTED** *(Read Below, Carefully, Before Requesting)*

I have read District Rule 301(y)(3) regarding the provisions for an expedited CEMS certification review, and I understand that it entails paying additional fees upon completion of this project, and that the decision to grant expedited review will be at the discretion of the Manager of the Source Testing Branch of the AQMD. I also understand the limitations concerning CEMS expedited review: The only processes involving CEMS Certification which can be expedited concern AQMD's responsibility to provide a prompt review and approval of complete CEMS Application, CEMS Test Protocol and Report, and CEMS Final Certification when these documents are submitted in a timely manner. Submittal of incomplete documentation for review, and on-site scheduling problems will still delay the review process – expedited, or not. Expedited or "fast track" CEMS review will not provide relief from meeting mandated Permitting and Compliance deadlines, nor will it directly affect issuance of Permit-to Operate.

- I am requesting an expedited CEMS review *(Please explain briefly the time constraints or reasons for expedited request, to aid in our assessment of your request):*

**17. CONFIDENTIALITY OF INFORMATION IN THIS SUBMITTAL**

Do you regard any of the information included in this application as confidential?

YES  NO  
*(check one)*

- If yes, please specify below (use additional pages, if necessary):

---

*By signing below, I certify that all of the information in this CEMS Application is accurate to the best of my knowledge, and that I have read the Non-RECLAIM certification options (if applicable) and the confidentiality of information statement, and that I concur with them.*

<b>SIGNATURE OF COMPANY REPRESENTATIVE</b>			
SIGNATURE: _____	DATE: _____		
_____ (NAME)	_____ (TITLE)	_____ (PHONE)	_____ (DATE)

**NOTE:** The CEMS Certification and the Facility Permit-to-Construct processes are parallel, but separate projects. **Do not send your CEMS Applications, CEMS Fees, or other related documents to Permit Processing.** This will only lengthen the review process. Please mail or deliver your completed CEMS Application(s)/Fee(s) to:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT  
21865 Copley Drive  
Diamond Bar, CA 91765-4182

C/O: Mr. Rudy Eden, Manager,  
Source Test Engineering Branch,  
Monitoring & Analysis Division

A basic or initial application fee is due with each CEMS Application (Reference: *District Rule 301(i)(5)*, please complete attached Form *ST-400 "RECLAIM & Non-RECLAIM CEMS Plan, Application Fee Processing Form"*). A copy of this application is also available on disk, formatted for MS WORD XP or ADOBE ACROBAT. To obtain this form, please check the AQMD Website at [www.aqmd.gov](http://www.aqmd.gov), or contact us at (909) 396-3479 (e-mail: [pberes@aqmd.gov](mailto:pberes@aqmd.gov)).

**APPENDIX A**

**SIMPLIFIED PROCESS FLOW DIAGRAM (*Reference Section 3*)**

Show simple flow/block diagram with basic and control equipment including the exhaust stack where the CEMS will be mounted. Be sure to include by-pass ducts, emergency venting stacks, blanked-off stacks, recirculated flows and influent or effluent flow to or from related processes.

---

## APPENDIX B

### SIMPLIFIED STACK DIAGRAM (*Reference Section 4*)

Show the CEMS sampling probe and reference sample port locations (top/cross-section and side views) in the exhaust stack with respect to the upstream and downstream flow disturbances (fans, dampers, transitions, change in stack cross-sectional areas, etc.). Indicate distances and dimensions for the above information. **ACEMS applicants** must show dimensionally, the location of all parametric sensors or monitors with respect to the process equipment, influent and exhaust flows, and reference method sampling locations.

---

**APPENDIX C**

*(Non-ACEMS Applicants Only<sup>10</sup>)*

**SIMPLIFIED CEMS DIAGRAM (Reference Section 5)**

Show a flow diagram indicating the routing of sample and calibration gases through the sample acquisition, transport, and conditioning units. This diagram shall include the components of the CEMS (probe, filter, heat traced line, NO<sub>x</sub> converter, conditioning system, sample pumps, flow meters, analyzers, recorders, calibration systems, connecting lines, valves, flow and pressure regulators.) including by-pass vents. Indicate temperature, pressure, and moisture at key points.

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<sup>10</sup> ACEMS Applicants: Complete APPENDIX G Instead

**APPENDIX C1**

*(Multiple-Point Probe Applicants Only)*

**SIMPLIFIED MULTI-POINT PROBE DIAGRAM** *(Reference Section 5)*

Show a dimensional drawing of the proposed multiple-point probe indicating hole bore, hole spacing with respect to inside stack wall, port flange offset, and center-of-stack. Also include sample routing diagram showing audit port (required), vacuum or differential pressure gage (required), flowmeter/rotometer (required), high-volume pump, heated instrument box (if applicable), and connective tubing/valves. Remember, the multiple-point probe must be successfully bench tested according to AQMD Source Testing *Form 511*: “Multi-Point Probe Acceptance and Quality Assurance Standards, for Use in Conjunction with EPA/EMTIC Guidance Document (GD)-031” before it may be installed on the stack or duct.

**Total Points:** \_\_\_\_\_ (No. Probes: \_\_\_\_\_ Pts/Probe: \_\_\_\_\_ Bore: \_\_\_\_\_)

**Pump Specs<sup>11</sup>:** Make/Mdl: \_\_\_\_\_ Flowrate: \_\_\_\_\_

**Sample Audit Port (required):**  Yes  No

**Flow meter<sup>12</sup> (required):**  Rotometer  Other Type: \_\_\_\_\_

**Vacuum/differential pressure gage<sup>12</sup> (required):**  Vacuum  Diff Press

**Probe Blowback capability (recommended):**  Yes  No

---

<sup>11</sup> Pump flowrate must be included and be accurate because the probe assembly will be bench-tested and pre-certified at that flowrate. Use of a lower flow pump when the probe is installed on the stack will invalidate the pre-certification.

<sup>12</sup> The probe assembly will be bench-tested exactly as it would be configured on the stack (except for the pump as long as a similar one is used) with the vacuum/ $\Delta p$  and flow devices attached. Vacuum/ $\Delta p$  and flow measurements are a part of the required parameters to be recorded and documented for pre-certification, and they will be used for on-going QA demonstration.

## APPENDIX D

### DETERMINATION OF REQUIRED MONITORING PARAMETERS

*(Reference Section 6)*

Detail, step by step, how the parameters checked in *Section 6* will be applied to the final monitoring requirement by use of equations, assumptions, and calculations. (Be sure to detail how corrections will be made to dry, standard conditions, or conditions imposed by rules or permits). **ACEMS applicants** must include a model of the parametric monitoring system describing the relationship of each monitoring parameter, its operating range, and redundancy; the operational limit of the process monitored; and equations, algorithms, factors, and coefficients for determining the final monitoring requirement. An electronic copy of the parametric model may also be submitted.

---



## **APPENDIX E**

### **BRIEF DESCRIPTION OF COMPUTER PROGRAMMING LOGIC**

*(Reference Section 7)*

Briefly describe how the parameters you described in *Section 6* will be programmed into the data reduction and recording units. Use block diagrams, or a copy of recorded data if needed, to show the location in the program where constants, variables and other parameters are entered. Also include the frequency that each monitoring parameter is polled by the DAS/PLC.

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**APPENDIX F**

*(SOx CEMS Applicants Only)*

**DESCRIPTION OF SO<sub>x</sub> SOURCE EQUIPMENT SERVED BY A  
FUEL SULFUR MONITORING SYSTEM (FSMS)**

*(Reference Sections 2 and 5b.)*

Supply the required information. Attach additional copies if required. If the piece of equipment is also a RECLAIM NO<sub>x</sub> Major Source, be sure to complete a separate CEMS application.

**CEMS Designation:**

**CEMS Description:**

**Indicate the type of FSMS:**

**Total Sulfur Monitor**

**SO<sub>x</sub> CEMS**

Equipment Information			Fuel Meter Information		
Equipment	Device I.D., Application, Permit No.	NO <sub>x</sub> (LGE or MAJ) <sup>13</sup>	Make & Model	Principle (orifice,etc.)	Proposed Range

<sup>13</sup> Applicable to RECLAIM sources only.

**APPENDIX G**

*(ACEMS Applicants Only)*

**SUPPLEMENTAL INFORMATION FOR “ACEMS”**

*(Reference Sections 2 and 5)*

**ACEMS INFORMATION** This appendix supplements *Section 2*, and replaces Sections 5.a. and 5.b. If you require more space for completion, make additional copies of this section and attach information. Please attach manufacturer's specification sheets in *Attachment 2*

**1. OPERATIONAL LIMIT OF BASIC EQUIPMENT MONITORED** Specify below, the upper and lower operating limit of the BASIC EQUIPMENT (as described in *Section 2*), which the ACEMS parametric model will incorporate, and for which valid data will be produced by the ACEMS (**Note:** Following Final Certification, data falling outside these limits will be regarded as “MISSING DATA”, so plan accordingly).

A. LOWER OPERATIONAL LIMIT: \_\_\_\_\_ (units)                      B. UPPER OPERATIONAL LIMIT: \_\_\_\_\_ (units)

**2. PARAMETRIC MONITORING INFORMATION** *(serial numbers shall be submitted when installation is completed)*

Monitoring Parameter (be specific: manifold vacuum, stack temperature, etc.)	Type Sensor (e.g., thermal anemometer)	Make	Model	Monitoring Range (include units)	Monitoring Hierarchy	
					Primary	Secondary
					<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>



**ATTACHMENT 1**

**DISTRICT PERMITS AND CORRESPONDENCE**

*(Reference Sections 2 and 8)*

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*Please attach the following information related to the basic and control equipment to be monitored, to this sheet, and label them as “Attachment 1”:*

- *Applicable permits*
- *Other pertinent District correspondence*

**ATTACHMENT 2**

**MANUFACTURER'S AND/OR VENDOR'S SPECIFICATIONS**

*(Reference Section 9)*

---

*Please attach the following information related to the CEMS (analyzers, components, monitors, data acquisition and recording systems, program logic controllers, etc.), to this sheet, and label them as "Attachment 2":*

- *Manufacturer's and/or vendor's technical specification sheets*
- *Other pertinent CEMS information*

## ATTACHMENT 3

### QUALITY ASSURANCE PLAN (QAP) (Reference Section 10)

---

*Please attach the following information related to the CEMS QA/QC, and label it as “Attachment 3”:*

- *Copy of complete Quality Assurance Plan (QAP) for this CEMS, or reference to Facility-wide CEMS QAP with specific QA/QC section for this CEMS attached*
- *If copy of QAP is unfinished/incomplete, provide brief description or outline of QAP*

**NOTE TO ALL APPLICANTS:** *The complete QAP must be submitted, and approved before CEMS “Final Certification can be granted.*

## ATTACHED FORMS

*The following forms should be attached:*

- FORM ST-300, “CEMS Vendors List”  
*A representative list (not a complete list) of possible CEMS vendors.*
- FORM ST-400, “CEMS Fee Sheet”  
*Please complete the requested information, determine the basic fee charged for the CEMS Certification, Modification, or Change-of-Ownership at your facility; and attach to this submittal along with a check for the required amount.*

*If either of these forms are missing, you may obtain them at:*

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT  
21865 Copley Drive  
Diamond Bar, CA 91765-4182

Source Test Engineering Branch,  
Monitoring & Analysis Division

**(909) 396-3479**





## INSTRUCTIONS FOR COMPLETION OF FEE PROCESSING FORM

Complete all of the information requested in Sections 1 and 2, Company and Facility Information. Be sure to include the Facility I.D. No. (from Facility Permit to Operate). If your facility has “major” equipment at more than one location and/or listed under more than one Facility I.D. No., complete one of these forms for each Facility I.D. No., listing the applicable equipment information for each Facility I.D.-based location.

Refer to the TABLE below when completing Section 3, CEMS Equipment Information. The *Basic or Minimum Fee* below is the appropriate filing fee for each *Project* on this form (NOTE: Expedited projects must have AQMD approval before filing). It is an initial accounting, and you may be billed at the completion of the project for additional expenses if any CEMS Project has more components, or utilizes more evaluation time than allocated by that basic fee. Be sure to include the equipment Device I.D., Application or Permit No. (where applicable) from the Facility Permit to Operate. You may include more than one type of fee on a single form, as long as they are clearly marked as to *Project and Equipment*. Use additional sheets to list equipment, if needed, and total results.

### *District Rule 301 and 306 Applicable CEMS Processing Fees (Amended May 2, 2008)* (Fees Effective for all CEMS submittals beginning July 1, 2008)

District Rule	CEMS Project Description	Evaluation Fee			
		Basic or Minimum		Maximum	
		Normal	Expedited <sup>1</sup>	Normal	Expedited <sup>1</sup>
301(i)(5)(A) TABLE IIC, and 301(u)(3)	<u>CEMS Initial Certification</u> or <u>CEMS Modification with Additional Components</u> , according to the following schedule <sup>2</sup> :				
	a. 1-2 components, any combination pollutant, diluent, flow:	\$ 3,221.17	\$ 3,221.17	\$ 5,767.36	\$ 9870.51
	b. 3-4 components, any combination pollutant, diluent, flow:	\$ 3,878.59	\$ 3,878.59	\$ 10,613.17	\$ 18,280.11
	c. Each additional component, beyond 4 components, add to “b.” above:	+ \$ 0.00	+ \$ 0.00	+ \$ 2,621.66	+ \$ 3,981.56
	d. <u>Time-Shared CEMS</u> (add to applicable CEMS fee determined above):	+ \$ 0.00	+ \$ 0.00	+ \$ 2,621.66	+ \$ 3,981.56
301(i)(5)(A) TABLE IIC, and 301(u)(3)	<u>ACEMS Initial Certification</u> (excluding modifications)	\$ 3,221.17 <sup>3</sup>	\$ 3,221.17	\$ 10,613.17	\$ 18,280.11
301(i)(5)(B)(C) (D), and 301(u)(3)	<u>CEMS Modification</u> (excluding additional components) or CEMS monitored equipment, CEMS Periodic Assessment Evaluation	\$ 715.57 <sup>4</sup>	\$ 715.57	\$ 4,473.88	\$ 7,118.98
301(i)(5)(E)	<u>CEMS Change of Ownership</u> to facility document files according to the following schedule:				
	a. First CEMS	\$ 213.32			
	b. Each additional CEMS	+ \$ 42.55			

Please return this form (signed and dated), along with the appropriate CEMS Application, Plan, Protocol, Report, Modification, or Change-of-Ownership requiring evaluation; and a check for the total fees. (You may include a single check for the total amount of all submitted fee processing forms):

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT  
**Monitoring & Analysis Division, Source Test Engineering Branch**  
21865 Copley Drive  
Diamond Bar, CA 91765-4182

If you require help, or more forms, please contact your assigned CEMS representative, or phone (909) 396-3479.

<sup>1</sup> Requests for expedited evaluations must be approved by AQMD staff before filing, since expedited review is contingent upon availability of qualified staff over and above regular review scheduling. Expedited reviews shall be billed at the hourly premium of \$ 69.56 / hr in addition to normal hourly fees shown below, and as reflected in the expedited “Basic or Minimum Fee”, payable at time of filing, and the “Maximum Fee”.

<sup>2</sup> Covers up to 40 hours of evaluation time for the first two components, an additional 20 hours for the first four components, and an additional 12 hours per component beyond four. Excess time will be billed at the hourly rate of \$ 134.10 / hr, up to the maximum allowable fee.

<sup>3</sup> Covers up to 40 hours of evaluation time. Excess time will be billed at the hourly rate of \$ 134.10 / hr, up to the maximum allowable fee.

<sup>4</sup> Covers up to 10 hours of evaluation time. Excess time will be billed at the hourly rate of \$ 134.10 / hr, up to the maximum allowable fee.

**CONTINUOUS EMISSIONS MONITORING SYSTEM (CEMS) VENDORS**

This list is based on a cursory search of this industry, and it is by no means complete. Please consult your local resources for more complete and current listings (other facilities requiring similar testing, industrial organizations & memberships, technical magazines, Internet, yellow pages, vendors' literature, etc.).

The SCAQMD does not rate or endorse the products or services of the vendors represented on this list, nor does the exclusion of vendors from this list infer sub-standard products or performance.

**Company Name & Address****Contact Person & Phone No.**

ABB Process Analytic  
P.O. Box 831  
843 North Jefferson Street  
Lewisburg, West Virginia 24901

Monte Hyler  
(304) 647-4358

Advanced Pollution Instrumentations, Inc.  
6565 Nancy Ridge Drive  
San Diego, CA 92121

Troy Thayer  
Sales Engineer  
(858) 657-9800

Air Instruments & Measurements, Inc.  
3579 E. Foothill Blvd.  
Pasadena, CA 91107

Harry D. Lord  
(626) 791-1912

Ametek Process Instruments  
455 Corporate Blvd.  
Newark, DE 19702

Scott Benson  
Marketing Director  
(302) 456-4400

Ametek Western Research  
10200 Richmond, Suite #150  
Houston, TX 77042

(281) 463-2820

Anarad, Inc.  
3405 Wiley Post Road  
Carrollton, TX 75006

(972) 458-6100

Applied Automation  
22 San Carlos  
Rancho Santa Margarita, CA 92688

Bruce Muir  
Western Regional Manager  
(949) 589-6827

**Company Name & Address****Contact Person & Phone No.**

California Analytical Instruments, Inc.  
1238 West Grove Avenue  
Orange, CA 92865

(714) 921-2531

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CEMTEK  
2121 South Yale Street  
Santa Ana, CA 92704

Joanne Randall  
(714) 437-7100

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Clean Air Engineering  
P.O. Box 242  
40 Sandhill Road  
Nottingham, PA 19632

(610) 932-6952

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Custom Instrumentation Services Corp.  
(CiSCO)  
7325 S. Revere Parkway  
Englewood, CO 80112

Len Richter  
(303) 790-1000

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Dasibi Environmental Corp.  
506 Paula Avenue  
Glendale, CA 91201

Anthony Reneau  
Sales Manager  
(818) 247-7601

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Datatest, Inc.  
6850 Hibbs Lane  
Levittown, PA 19057

Lee Cotler  
(215) 943-0660

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Environment USA  
570 Higuera Street  
Suite #25  
San Luis Obispo, CA 93401

(805) 782-9002

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Enviroplan, Inc.  
3 Becker Farm Rd.  
Roseland, NJ 07068

Bob Mallowney  
(305) 892-1504

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Horiba Instruments, Inc.  
17671 Armstrong Ave.  
Irvine, CA 92714

Tim Scott  
(714) 671-0660

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**Company Name & Address****Contact Person & Phone No.**

Land Combustion, Inc.  
2525-B Pearl Buck Rd.  
Bristol, PA 19007

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(215) 781-0810

Link Associates, Inc.  
P.O. Box 3268  
Mission Viejo, CA 92690

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Mike Hayzer  
(949) 348-1196

Mangan, Inc.  
990 E. 233<sup>rd</sup> St.  
P.O. Box 5389  
Carson, CA 90749-5389

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Amin Solehjou  
(310) 835-8080

Measurement Technologies  
3485 Sacramento Dr., Suite #F  
San Luis Obispo, CA 93401

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Dwight Gordy  
President  
(805) 549-0595

Monitor Labs  
76 Inverness Drive East  
Englewood, CO 80112

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(303) 792-3300

MSA Instrument Division  
P.O. Box 427  
Pittsburgh, PA 15230

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(212) 776-8600

North American Mfg. Co.  
P.O. Box 6037  
Santa Barbara, CA 93160

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(805) 681-7323

Nova Analytical Systems, Inc.  
1925 Pine Avenue  
Niagara Falls, NY 14301

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(800) 295-3771

Pace Environmental Products  
5240 West Coplay Road  
Whitehall, PA 18052

(800) 303-4532

**Company Name & Address****Contact Person & Phone No.**

ROK Environmental, Inc.  
32545 B Golden Lantern  
Suite 299  
Dana Point CA 92629

David R. Harvick  
(949) 487-0887

Response Rentals  
18207 McDermott West  
Suite G  
Irvine, CA 92614

(949) 955-3930

Rosemount Analytical, Inc.  
2400 Barranca Parkway  
Irvine, CA 92606

Jim Smith  
Marketing Specialist  
(949) 863-1181

Thermo Environmental Instruments, Inc.  
325 E. Arrow Hwy., Suite #506  
San Dimas, CA 91773

(909) 394-2373

Thermox  
150 Freeport Road  
Pittsburgh, PA 15238

(412) 828-9040

VIM Technologies, Inc.  
7464 New Ridge Road, Suite 2  
Hanover, MD 21076

Matthew Radigan  
(410) 859-5455 x301  
(410) 859-5457 (fax)

You can aid us in keeping this list up-to-date. Please contact us with your suggestions at:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT  
**Monitoring & Analysis Division, Source Test Engineering Branch**  
21865 Copley Drive  
Diamond Bar, CA 91765-4182

**(909) 396-3479**

Source Test Engineering  
Paperless Chart Recorder Check List

As of March, 2001, a RECLAIM rule amendment has allowed facilities to use paperless chart recorders in place of a 10-inch paper strip chart recorder. Below is a checklist written to guide facilities in the selection and implementation of a paperless recorder.

1. The paperless chart recorder (PCR) record data at the same or greater frequency as the DAS takes in raw data from the analyzer or monitor, if that frequency is greater than once per minute, then the PCR shall record data at once every minute.
2. The PCR shall be installed in the same configuration as the original paper chart recorder. (not applicable to new applications)
3. The PCR shall continuously archive the data on either directly to a "write once-read many" medium (e.g. CD-R), or in encrypted format to non-volatile data storage. Encrypted means that the data cannot be read except by the use of decryption software. Non-volatile data storage means that the data will not be lost if a power outage occurs.
4. Encrypted files shall be such that they cannot be changed without destroying the files or leaving signs of tampering.
5. Decryption software shall be a commercially available product, not a custom software written only for this application.
6. The decryption software shall be provided (at no cost) to the AQMD. Decryption software enables the user to view the data on a PC as if it were a strip chart and to print the chart (equivalent to a paper strip chart) to a standard PC printer.
7. Conversion software shall be provided (at not cost) to the AQMD. Conversion software enables the user to convert the graphical data to numeric data in a standard output, such as ASCII or Excel, to facilitate calculations.
8. The data shall be viewable on the PCR in the same manner as if it were a paper strip chart recorder (i.e. it must have a screen w/ reasonable resolution).
9. The PCR shall have an integrated real-time clock accurate to within one minute, and each data point shall include a "date and time stamp" and any printout of a chart shall include time stamps periodically, including the month, day, year and time of day (hr, min, sec) in local time.
10. The facility shall be able create a chart printout, an encrypted file, or a converted file (Excel, ASCII, etc..) of any past data, up to and including data collected for the current day upon request without more than 30 minute wait.
11. Any printout of a chart shall include (and identify) the parameters on the chart.
12. Archived digital data shall be stored and protected in a manner at least equivalent to paper chart storage, and shall store in an environment compatible with the archival storage medium chosen.

13. The PCR shall record all configuration changes and when they occurred.
14. The facility shall have set protocol that must be approved by District of how & when to archive to media from internal memory, and if removable media is used for archiving, how staff is alerted to replace media when it is full.
15. The PCR shall have chart annotation capability and all annotations shall be recorded in the archived data files and displayed when data files are viewed as charts.
16. The PCR shall have auto-recovery from power failures (no need to re-boot) without loss of data, and automatically log the time and length of power failure.
17. The facility personnel shall be able to print both the chart image and minute data from any period within the last two years during the site visit from SCAQMD Compliance staff.