

# Continuous Opacity and Continuous Emission Monitoring Systems

*This guidance document was developed to assist Michigan businesses with the planning, installation, certification, testing, and reporting requirements for Continuous Emission and Opacity Monitoring Systems.*

## INTRODUCTION

**Continuous Emission Monitoring Systems (CEMS) and Continuous Opacity Monitoring Systems (COMS)** involve the installation of monitoring equipment which accumulates data on a pre-determined time schedule in a stack or duct. Many of the principles of stack testing also apply to continuous monitoring systems. The difference is that the stack test is for a relatively short time period (hours), while the CEM/COM covers longer periods of time such as months or years.

Regulatory agencies rely on continuous monitoring techniques that require emission **sources** to be self-reporting when permit limits are exceeded. The application of continuous monitoring systems serve many purposes including:

- Indicators of control equipment performance;
- Compliance monitoring;
- **Emission Inventory (EI)** applications; and
- As an enforcement and public relations tool to address public concerns over stack emissions.

Continuous measurements provide data under all facility operating conditions. These data can be used both by the facility and by regulatory agencies and can be accessed by the public. The regulatory uses of continuous monitoring data provide so many advantages to environmental control agencies that federal and state continuous monitoring requirements have been steadily increasing since the 1970s. Public awareness of environmental pollution, especially the release of toxic pollutants, is increasing. Continuous monitoring systems are used to provide assurance that a facility is not emitting pollutants in excess of its standards. CEMS and COMS that

For more information, contact the  
 Compliance Support Unit  
 Air Quality Division  
 Michigan Department of Environmental Quality  
 PO Box 30260  
 Lansing, MI 48909-7760  
**517-241-7621**  
**February 1998**  
 Printing Authority: PA 451 of 1994  
 Total Cost: \$126.45 Total Copies: 150  
 Cost Each: \$0.84




## Guidance For Continuous Opacity and Emission Monitoring Systems

---

are required on a given source are the best and quite often the only way for the facility and the regulatory agency to determine compliance with emission limits.

This guidance document explains who is subject to the COMS/CEMS requirements, a general description of what the requirements are, and when compliance must be achieved. The guidance document is to be used as a guide and not a substitute for reading and understanding the final rule. Many of the rules governing compliance with continuous opacity (COMS) and continuous emission (CEMS) systems can be found in Title 40, Part 60 of the *Code of Federal Regulations* (40 CFR 60). Reference has been made throughout the fact sheet to certain terms that are frequently used. These items appear in **boldface** print and are defined on pages 13-16.

### APPLICABILITY

Both federal and state air quality regulations may require continuous emissions monitoring systems. For example, a facility can be required to monitor according to provisions found in:

- Part 11 of the **Michigan Administrative Rules for Air Pollution Control**;
- A specific permit condition (in the **Permit to Install**);
- The **State Implementation Plan (SIP)** for Michigan in 40 CFR Part 51;
- **New Source Performance Standards (NSPS)** in 40 CFR Part 60;
- **Prevention of Significant Deterioration (PSD)** in 40 CFR Part 52 and Part D of the Clean Air Act;
- **Acid Rain** regulations in 40 CFR Part 75; and
- **Title V** (Renewable Operating Permit) Periodic and Compliance Assurance Monitoring Regulations, Clean Air Act Amendments, 1990.

Some other regulations that require continuous monitoring systems are the **Boiler and Industrial Furnace (BIF)** regulations of the **Resource Conservation and Recovery Act (RCRA)** that regulate facilities that burn hazardous waste and the Part 503 regulations of the **Clean Water Act** for sewage sludge incinerators.

### PLANNING A SYSTEM

The U.S. Environmental Protection Agency (**EPA**) has established **performance specifications (PS)** which specify the design and certification criteria for the continuous monitoring systems. During the planning process, the monitoring system is first checked

---

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

to verify that the design specifications are met. The monitoring system is then installed, calibrated, and operated for a specific length of time. During this time period, the system is evaluated to determine conformance with the established performance specifications.

As of October, 1997 there were approximately 70 companies in Michigan with over 100 processes and over 250 single monitors that were being tracked by a database at the **Michigan Department of Environmental Quality (MDEQ), Air Quality Division (AQD)**. Items that are logged into the database include the facility name, plant contacts, source specific information, permit numbers and limits, monitor type, and monitor location. Also included in the database is information on each monitor, such as whether performance specification testing has been submitted, if monitors have been formally certified, if and when periodic audits are performed, and whether monthly or quarterly **Excess Emission Reports (EERs)** have been submitted. The database serves as the basis for both the Air Quality Division's COMS and CEMS programs, and has the capability of tracking a facility's emission exceedences.

### **CONTINUOUS OPACITY MONITORING SYSTEMS (COMS)**

Title 40, Part 60, Appendix B, Performance Specification 1 (PS-1), of the *Code of Federal Regulations* (40 CFR 60) lists the minimum reporting requirements as well as detailed information on installation and certification of a COMS. The federal performance specification (PS) requires the following steps for COM installation and certification of an emission source:

1. Select a monitoring location for the emission source and the type and model of monitor.

 **NOTE: There are two types of monitors: single pass and double pass (“pass” delineates the number of times the measurement light beam passes across the flue). Of these two types, the single pass has historically had difficulty passing the necessary certification performance testing.**

2. After selecting a monitor, it is necessary to select a **Data Acquisition System (DAS)** which quantifies what the monitor sees. A DAS can range from strip charts to systems capable of generating detailed reports depending on individual applications. It is critical that the DAS be as flexible as needed depending on the reporting requirements and able to report in units of the applicable standard (i.e., **mmbtu**, **ppm**, etc.).

3. At least 30 days prior to installation, a **monitoring plan** or pre-installation information should be submitted to the appropriate MDEQ, AQD district office. This is an opportunity to clarify or uncover problems that can occur with a COMS involving the locations of probes or monitors, the types of monitors, what the DAS should be capable of producing, the monitor's span and instrument range, and when the COMS will be installed and tested.

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

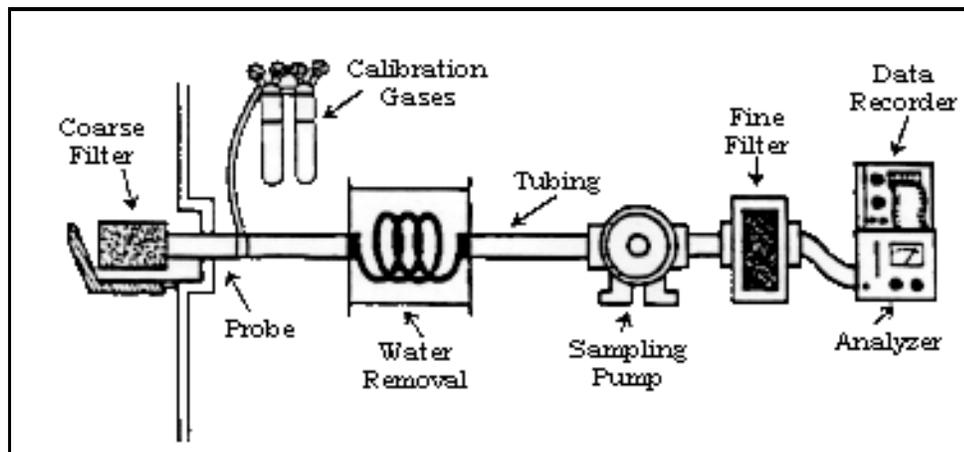
A COMS monitoring plan should contain (but not be limited to):

- Information and drawings with regard to monitor specifications;
- Monitoring locations;
- Descriptions of other parts of the system including the DAS; and
- A schedule of testing regarding the certification of the system.

All monitoring plans are submitted once for each system and reviewed by the Compliance Support Unit of MDEQ's AQD. A sample monitoring plan can be found in *Attachment 1*.

### CONTINUOUS EMISSION MONITORING SYSTEMS (CEMS)

Title 40, Part 60, Appendix B of the *Code of Federal Regulations* [40 CFR 60, Performance Specifications (2-15)] contains performance specifications for most types of required monitors. As with the COMS, these performance specifications detail installation and certification procedures for CEMS. CEMS are comprised of a number of components that collectively quantify and record pollutant levels in an exhaust stream. After selection of a monitoring location, the different parts of a CEMS must be selected. The following is a description of the most common type of CEM: **the extractive system**.



#### 1. The **probe**

The probe is located at the end of the extractive system in the flue.



**NOTE: It is important to know the materials that the probe is made from and its ability to withstand flue conditions. Companies should seek vendor assistance to select the type of probe needed.**

### 2. The **Umbilical Assembly**

This is essentially an insulated, heated sample line that transports flue gas to the gas conditioner. It also contains thermocouples for monitoring temperature, calibration gas lines, and lines that are used to keep the probe free of dirt. This assembly heats the sample line to 250°F to assure that no moisture condenses in the line which could scrub out the target pollutant.

### 3. The **Gas Conditioner**

This is generally a condensing unit capable of dropping all water out of the sample without scrubbing out any pollutants.

### 4. The **Monitor**

The monitor measures the pollutant level in the dry sample gas.



**NOTE: In the selection of a monitor, the range of detection is very important. Some of the subparts of 40 CFR 60 list the range a monitor must have (i.e. 0-500 ppm). If this does not apply, the monitor range should be as close as possible to twice the applicable limit.**

**For example:** If an emission source has a limit on Sulfur Dioxide of 300 parts per million (ppm), then a monitor with a range of 0-600 ppm should be selected.

### 5. The **Data Acquisition System (DAS)**

It is critical that the DAS be flexible enough to provide data in a manner useful to the **Quality Assurance (QA)** testing described below. Also, the DAS must be able to report in units of the applicable limit(s) for the source.

**For example:** If a source's limits for SO<sub>2</sub> are in parts per million and pounds per million BTU, the DAS must be programmed to perform and report these calculations

Like the COMS, a CEMS **monitoring plan** should also be submitted at least 30 days prior to installation to the appropriate MDEQ, AQD district office. Again, this is an opportunity to clarify or uncover problems that can occur with the installation and testing of a CEMS. A CEMS monitoring plan should contain, but not be limited to:

- Information and drawings with regard to monitor specifications;
- Monitoring locations at the facility;

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

- Descriptions of other parts of the system including the DAS; and
- A schedule of testing regarding the certification of the system.

These plans are submitted once for each system and reviewed by the AQD. A sample monitoring plan is located in *Attachment 1*.

It is important that the monitoring plan be submitted prior to performance testing. On site, the AQD will use the monitoring plan to review the probe locations, specific monitor information (e.g., model/make, serial number), DAS, how the data are being downloaded for testing, and the operating load on the unit during testing. A checklist of the minimum requirements for a complete monitoring plan submittal is provided in *Attachment 2*.

### **CERTIFYING A SYSTEM**

Monitor certification is the actual initial testing of the monitor to ensure that it is installed and operating properly. Certifications are based on the type of monitor: opacity (COMS) and gaseous (CEMS).

#### **CONTINUOUS OPACITY MONITORING SYSTEMS (COMS)**

The first step to opacity monitor certification is a design specification test performed by the manufacturer. At the manufacturer, the monitor's optics and electronics are bench tested and a report of the results is shipped with the instrument.

The second part of the certification process is performed at the facility. Upon installation, the monitor goes through a conditioning period and a number of strict performance tests. The performance tests are to be completed within 30 days after the source has begun operation. COMS certification reports are submitted once for each system to the appropriate MDEQ, AQD district office and the AQD Compliance Support Unit in Lansing within 60 days after the performance testing is completed. Each report should contain all pertinent data regarding any laboratory (e.g., manufacturer's) and in-house performance testing. Sample data reporting formats for certain tests can be found in 40 CFR 60, Appendix B (Performance Specification 1).

Testing ensures that the instrument is operating to specification before it is installed on the emission source. The performance tests can consist of a **Calibration Error Test, Response Time Determination, and Zero and Upscale Calibration Drift Determination**. The actual criteria for COMS certification are found in 40 CFR 60, Appendix B, Performance Specification 1 (PS 1).

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

### CONTINUOUS EMISSION MONITORING SYSTEMS (CEMS)

Certification of gaseous monitors consists only of performance tests on *installed* monitors. When the monitor is properly installed, it is put through a strict

series of performance tests such as the Zero and Upscale Calibration Drift Determination and the Relative Accuracy Test Audit (RATA).

All performance tests must be completed within 30 days after the emission source has begun operation. CEMS certification reports are submitted once for each system within 60 days after the performance testing is completed to the appropriate MDEQ, AQD district office and the AQD Compliance Support Unit in Lansing. These reports should contain all pertinent data regarding performance testing. More information regarding the certification criteria and sample data reporting formats for certain tests for gaseous monitors can be found in 40 CFR 60, Appendix B, under the appropriate performance specification (2-15).

### CONTINUING QUALITY ASSURANCE (QA) TESTING FOR CEMS

After planning, installing, and certifying a CEMS, there is some QA testing that needs to be performed periodically to ensure the system is being maintained and operated properly. In most cases, COMS equipment is not installed without the use of a CEMS or other periodic monitoring equipment. Where QA testing verifies the accurate operation of CEMS equipment, the only QA testing required for a COMS is the Zero and Upscale Calibration Drift Determination test. This section gives a description of each test, the frequency of performing the test, and the reporting requirements after it has been performed. Submission of a complete report is important; the MDEQ, AQD will verify that the Performance Specification stated in the protocol is being followed. Monitors are then “certified” by written letter from a federal, state, or local regulatory agency.

- **RELATIVE ACCURACY TEST AUDITS (RATAS)**

Regulatory Citation:

- Testing criteria are found in 40 CFR 60, Appendix B (use the applicable performance specification).
- Description of the appropriate certification **reference method** is found in 40 CFR 60, Appendix A.

Description: Use of an outside consultant and non-facility CEMS, certified by the appropriate reference method, in which a “head-to-head” test is run with the facility’s CEMS. Since RATAS test the performance of an emission source’s entire monitoring system, this is the most important test performed on a CEMS.

Frequency: RATAs are performed annually and submitted to the appropriate MDEQ, AQD district office and AQD’s Compliance Support Unit in Lansing.

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

- **CYLINDER GAS AUDITS (CGAs)**

Regulatory Citation: Audit procedure located in 40 CFR 60, Appendix F.

Description: EPA protocol certified gas is sent through the monitoring system and the concentration reading on the system is compared to that of the value on the gas bottle. The audits are usually performed by the facility's staff.

Frequency: CGAs are performed and submitted quarterly.



**Note: When a RATA is performed during a quarter, a CGA is not required.**

- **EXCESS EMISSION REPORTS (EERs)**

There are uses for CEM data beyond permit provisions. Excess Emission Reports track the events when monitored emissions exceed the emission standards. EER reports can be used for several purposes. EERs can indicate if the facility is using good operating and maintenance practices on its process and control equipment to minimize emissions. EERs also provide the MDEQ, AQD with data on upset conditions or trend data indicating degradation of control equipment performance and a continuous record of the facility's ability to comply with standards. This information can be used as a screening tool in inspections to target facilities for non-compliance.

Regulatory Citation: Reporting criteria are found in 40 CFR 60.7.

Description: A facility's emission limits are set either by permit or by federal/state rules. EERs give values for excess emissions and excess monitoring system down time as a percentage function of total process operating time for the quarter.

Frequency: Facilities are required to submit EERs whether or not an emission exceedence occurs. EERs are submitted quarterly and sometimes monthly if the facility is required to do so by a permit or some type of enforcement action. All EERs are reviewed by the MDEQ, AQD's Compliance Support Unit and entered into the MDEQ, AQD CEM database. The database is submitted to EPA quarterly.

After monitors are certified, it is expected that a facility will perform continuing quality assurance (QA) on the CEMS. This includes daily calibrations and periodic preventive maintenance as well as quarterly Cylinder Gas Audits (CGAs) and a Relative Accuracy Test Audit (RATA) for gaseous monitors. A log must be maintained for all measurements, including all CEMS downtime, repairs, adjustments, maintenance, calibrations, audits, and testing in a permanent form. This information must be made available to the AQD upon request. If the facility is subject to the acid rain CEMS rules, the more stringent guidelines in Appendix B of 40 CFR 75 will apply. A checklist of the minimum reporting requirements for completing performance specification testing is provided in *Attachment 2*.

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

A maintenance program for all continuous monitoring systems should be part of a plantwide quality assurance program for instrument systems. A quality assurance program is essentially a management system organized to ensure that quality control activities are performed for these instruments. Quality control activities are those activities performed to ensure that data generated from the monitoring system is both accurate and precise. Preventive and corrective maintenance activities are actually just two of the many quality control procedures that can be used for this purpose.

Important quality assurance principles include, but are not limited to the following:

- Responsibility - Plant management should make a clear and direct assignment as to who is responsible for the upkeep of the COM/CEM. There are five common methods of providing maintenance service for continuous monitoring systems:
  - Assigning a dedicated, full-time, trained person;
  - Forming a centralized department responsible for all CEMS at the facility;
  - Purchasing a full-system maintenance agreement with the vendor;
  - Purchasing system maintenance from an independent contractor; or
  - Purchasing an emergency service agreement.
- Training - Most vendors of COM and CEM systems offer training programs for their specific systems. There are two types - start-up training at the monitor site and classroom instruction at the vendor's facility.
- Communication - When the calibration, operational checks, data handling, and corrective action procedures are not handled by one individual, it is important that these functions be clearly defined. Management should provide clear lines of communication for a well functioning quality assurance program.

A facility-specific quality assurance manual should be developed, keeping in mind that this is a "living document." The manual should provide more than the installation and maintenance information that normally accompanies the analyzers. *Table 1* provides suggestions for the content of a CEM and COM system quality assurance manual.

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

Table 1 **OUTLINE FOR A CEM OR COM SYSTEM QUALITY ASSURANCE MANUAL**

<b>Section 1- Document the following items:</b>
<ul style="list-style-type: none"><li>• The facility's quality assurance policy and objectives</li><li>• Control system(s)</li><li>• COMS/CEMS regulatory mandates and COM/CEM system descriptions</li><li>• The facility's organization and departmental responsibilities</li><li>• All facilities, equipment and spare parts inventory related to the process</li><li>• Methods and procedures for analysis and data acquisition</li><li>• Calibration and quality control checks</li><li>• Preventive maintenance</li><li>• System audits</li><li>• Performance audits</li><li>• Corrective action program(s)</li><li>• All references</li><li>• Reports generated</li></ul>
<b>Section 2 - Document the following items:</b>
<ul style="list-style-type: none"><li>• Start-up and operation of the process</li><li>• Daily COM/CEM system inspection and all preventive maintenance</li><li>• Calibration procedures</li><li>• Preventive maintenance procedures</li><li>• Corrective maintenance procedures</li><li>• Audit procedure 1-Cylinder Gas Audits</li><li>• Audit procedure 2- Relative Accuracy Test Audit</li><li>• System(s) audit procedures</li><li>• Data backup procedures</li><li>• Training procedures</li><li>• COM/CEM system security</li><li>• Data reporting procedures</li></ul>
<b>Appendices should include:</b>
<ul style="list-style-type: none"><li>• The facility's installation and operating permit(s)</li><li>• COM/CEM specifications and rules</li><li>• Reference test methods</li><li>• Blank forms</li></ul>

Source: *Continuous Emission Monitoring*; James A. Jahnke, Ph.D.; Copyright 1993

### WHY SHOULD FACILITIES COMPLY?

#### ENFORCEMENT

The Clean Air Act Amendments (**CAAA**), Section 113 and Public Act 451, Part 55 of 1994 include some strong enforcement provisions with both civil and criminal sanctions for businesses that are in violation of the law. Examples of common violations include monitor certification failure, RATA failure, failure to submit reports, violations of emissions, and excess monitor down time. From a regulatory standpoint, any of these examples could prompt the MDEQ, AQD to issue a **Letter of Violation (LOV)** or to pursue further enforcement action for the violations.

#### GENERAL DUTY

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

Owners/operators of facilities with continuous emission or opacity monitors have a general duty to “at all times, including periods of startup, shutdown and malfunction... to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution practice for minimizing emissions” [40 CFR 60.11 (d)]. Compliance with COMS and CEMS requirements will ultimately reduce the public’s and worker’s exposure to pollutants such as sulfur dioxide (SO<sub>2</sub>), carbon dioxide (CO<sub>2</sub>), and nitrogen oxides (NO<sub>x</sub>), and will keep facilities with sources of air pollution operating within the law.

### ADDITIONAL COMPLIANCE RESOURCES

#### FREQUENTLY ASKED QUESTIONS ABOUT COMS AND CEMS

- **Question: Is there any QA testing the facility can do to save on contractor costs?**

Answer: The only testing that the facility could *not* do is the RATA. Most facilities perform their own Cylinder Gas Audits and submit them with the EERs.

- **Question: If I install a different monitor or move one to a new sampling location, what do I have to do?**

Answer: The monitoring system must repeat the certification procedures per the appropriate Performance Specification. However, if an opacity monitor is moved to a different location, only the performance part of the certification needs to be repeated.

- **Question: What if I just replace a component of the system (i.e., new probe, gas conditioner, etc.)?**

Answer: Contact the MDEQ, AQD, Compliance Support Unit for guidance. Typically, if the change will have no effect on the data being collected by the system, no action other than notification that it was completed need be taken. If the replacement could change the data in some way, the monitoring system must repeat the certification procedures as per the appropriate Performance Specification.

- **Question: How will the testing of this equipment affect my business?**

Answer: For a CEMS RATA, the process must operate at a level no less than that specified in the applicable subpart of 40 CFR 60. If the emission source is not subject to 40 CFR 60 or the level is not specified, then the emission source must operate at a level greater than 50% of normal load. Other testing is not load specific and, therefore, should have no effect.

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

- **Question: How long will testing take?**

Answer: For COMS, there is a seven day conditioning period and a seven day test period. For CEMS, the RATA takes a minimum of five hours. The Calibration Drift test takes place over the course of seven days.

- **Question: What can a CEMS do for me?**

Answer: The data that these systems provide can be beneficial to a facility. Some examples include fine tuning of a combustion or other process to maximize efficiency and evaluate the performance and efficiency of pollution control equipment.

### WHERE TO GO FOR ADDITIONAL INFORMATION

The *Code of Federal Regulations* may be purchased from:

Superintendent of Documents  
Government Printing Office  
Washington, D.C. 20402  
Telephone (202) 783-3238

The Technology Transfer Network (TTN) Web is a computer system administered by the Office of Air Quality Planning and Standards (OAQPS), U.S. EPA consisting of a collection of related Web sites. The various sites contain bulletins, regulatory information, technical guidance documents, etc. The TTN Web is a primary communication and outreach vehicle of OAQPS. The TTN can be accessed directly from the Internet via the World Wide Web. The web address is:

<http://www.epa.gov/ttn>

Questions regarding state and federal requirements can be referred to the following Air Quality Division contacts:

KIMBERLEY ARMBRUSTER COMPLIANCE SUPPORT UNIT COMPLIANCE AND ENFORCEMENT SECTION AIR QUALITY DIVISION MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY PO Box 30260 LANSING, MI 48909-7760 (517) 335-4852
---

JON WILFORD COMPLIANCE SUPPORT UNIT COMPLIANCE AND ENFORCEMENT SECTION AIR QUALITY DIVISION MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY PO Box 30260 LANSING, MI 48909-7760 (517) 335-4866
--

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

### GLOSSARY

The following terms are used frequently throughout this fact sheet and are found in boldface print:

**Acid Rain:** An acid air pollutant comprised of sulfuric and/or nitric acid which when released and mixed with air, becomes part of the atmosphere's rain, snow, or fog. Acid rain is caused mainly by pollutants from large coal-burning sources such as large electric utilities. Regulations governing acid rain can be found in 40 CFR 65.

**Boiler and Industrial Furnace (BIF):** Federal waste fuel regulations (40 CFR Parts 260, 261, 264, 266, 270, and 271) for large combustion sources that may use flammable hazardous wastes as fuel for a process.

**Calibration Error Test:** Part of the certification test for opacity monitors during which three different calibrated neutral density filters are placed in the light path of a monitor. The difference between the value of the COMS and the value of the filter is the calibration error.

**Clean Water Act:** A federal law originally enacted by Congress in 1972 to restore the chemical, physical, and biological integrity of the nation's surface and ground waters. The law was most recently amended in 1987.

**Continuous Emission Monitoring System (CEMS):** Equipment used to sample and condition, analyze, and provide permanent record of emissions or process parameters.

**Continuous Opacity Monitoring System (COMS):** Equipment used to sample and condition, analyze, and provide permanent record of emissions or process parameters that reduce the transmission of light and obscure the view of a background object.

**Cylinder Gas Audit (CGA):** A procedure during which the CEMS is challenged with audit gases of two different concentrations. The difference between the value obtained by the CEMS and the value of the gases from the cylinder is the audit calculation.

**Data Acquisition System (DAS):** Equipment that records and reports the data produced by the analyzer in a COMS or CEMS.

**Emission Inventory System (EI):** A database system which tracks, by source category, the amount of air pollutants discarded to the atmosphere.

**Excess Emission Report (EER):** A report that must be submitted periodically by a facility in order to provide data on its compliance with stated emission limits and operating parameters and on the performance of its monitoring systems.

**Extractive System:** Removes a sample of gas from the stack and transports it to an analyzer outside the stack.

**Gas Conditioner:** Removes moisture from the gas sample and cools the gas to a consistent temperature before sending it to the analyzer.

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

**Letter of Violation (LOV):** A letter from the MDEQ, AQD indicating that a facility is in violation of one or more applicable regulations. LOVs usually request follow-up documentation from the facility as to how the violation will be resolved.

**Michigan Administrative Rules for Air Pollution Control:** The rules governing air pollution control in the State of Michigan. Also known as Public Act 451 of 1994.

**Mmbtu:** Millions of Btu (British Thermal Units - the quantity of heat required to raise the temperature of 1 lb. of water from 63° F to 64° F).

**Monitor:** Equipment required under the Monitoring of Operations sections in applicable subparts of 40 CFR 60 which is used to measure and record emission process parameters.

**Monitoring Plan:** Plan submitted prior to actual installation of a CEMS or COMS that delineates such things as sampling location and instrument specifications.

**National Ambient Air Quality Standards (NAAQS):** Standards (primary and secondary) which, in the judgment of the Administrator of EPA, must be attained and maintained in order to protect the public health, with allowance for an adequate margin of safety. Primary standards are designed to protect human health. Secondary standards are designed to protect public welfare. Both standards are defined in Section 109 of the Clean Air Act.

**New Source Performance Standards (NSPS):** Uniform, national standards for emission of air pollutants from new, modified, or reconstructed stationary (emission) sources which reflect the degree of emission limitation achievable through the application of the best system of emission reduction.

**Performance Specifications (PS):** A set of standards found in 40 CFR 60, Appendix B that outlines procedures for the selection, installation, and certification of CEMS and COMS.

**Permit to Install:** A basic air permit, as mandated by *Michigan's Air Pollution Control Rules*, that outlines standards of operation for a facility's ability to emit contaminants to the air. The Permit to Install is also called a New Source Review permit.

**Ppm:** Parts per million.

**Prevention of Significant Deterioration (PSD):** Regulations requiring preconstruction review of major new sources and major modifications located in attainment or unclassified areas (clean air areas). PSD regulations are found in 40 CFR 52.21, 40 CFR 51.24, and Part D of the Clean Air Act.

**Probe:** The portion of the CEMS extractive system that is inside the stack. Probes are generally equipped with a filter to prevent damage to the monitor and a blowback system to keep the probe from clogging.

## Guidance For Continuous Opacity and Emission Monitoring Systems

---

**Quality Assurance (QA) Testing:** Testing that ensures the system is not only in good working order but also has been maintained and calibrated properly.

**Reference Method:** Any method of sampling and analyzing for an air pollutant as specified in the applicable standard.

**Relative Accuracy Test Audit (RATA):** A quality assurance procedure during which a consultant equipped with a CEMS, certified by methods found in 40 CFR 60, Appendix A, runs the certified CEMS “head-to-head” with the facility’s CEMS. The relative accuracy, based on that consultant’s data, is the standard.

**Resource Conservation and Recovery Act (RCRA):** A federal law that controls all solid waste disposal (e.g., by combustion sources fueled by flammable hazardous waste) and encourages waste recycling and alternative energy sources.

**Response Time Determination:** A quality assurance test which focuses on the time lapse between when a sample is taken and when the sample data is obtained.

**Renewable Operating Permit:** A facility-wide permit to emit air contaminants as mandated under the Clean Air Act Amendments of 1990 for major stationary sources, “affected sources,” and sources defined by the EPA. The Renewable Operating Permit is sometimes referred to as a “Title V” permit and is renewed every five years.

**Source (Stationary):** A fixed, non-moving producer of pollution consisting mainly of power plants, manufacturing facilities, refineries, and other facilities that emit air pollutants.

**State Implementation Plan (SIP):** Requirements for each state by Section 110 of the Clean Air Act Amendments to submit a plan to the EPA Administrator which provides for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards.

**Title V:** The portion of the Clean Air Act Amendments of 1990 that refers to the Renewable Operating Permit Program.

**Umbilical Assembly:** A heated sample line that transports an air sample to the gas conditioner in an extractive system.

**Zero and Upscale Calibration Drift Determination:** A quality assurance test for COMS during which the monitor is “zeroed” (operated for 24 hours without adjustment) and then checked to see how far it has drifted from the zero point.

**ACRONYMS**

<b>AQD</b>	.....	<b>Air Quality Division of MDEQ</b>
<b>BIF</b>	.....	<b>Boiler and Industrial Furnace</b>
<b>CAA</b>	.....	<b>Clean Air Act</b>
<b>CAAA</b>	.....	<b>Clean Air Act Amendments of 1990</b>
<b>CEMS</b>	.....	<b>Continuous Emission Monitor</b>
<b>CFR</b>	.....	<b>Code of Federal Regulations</b>
<b>CGA</b>	.....	<b>Cylinder Gas Audit</b>
<b>COMS</b>	.....	<b>Continuous Opacity Monitor</b>
<b>DAS</b>	.....	<b>Data Acquisition System</b>
<b>EER</b>	.....	<b>Excess Emission Report</b>
<b>EI</b>	.....	<b>Emission Inventory System</b>
<b>EPA</b>	.....	<b>Environmental Protection Agency</b>
<b>HAPs</b>	.....	<b>Hazardous Air Pollutants</b>
<b>LOV</b>	.....	<b>Letter of Violation</b>
<b>MDEQ</b>	.....	<b>Michigan Department of Environmental Quality</b>
<b>NESHAP</b>	.....	<b>National Emission Standards for Hazardous Air Pollutants</b>
<b>NSPS</b>	.....	<b>New Source Performance Standards</b>
<b>PS</b>	.....	<b>Performance Specification</b>
<b>PSD</b>	.....	<b>Prevention of Significant Deterioration</b>
<b>QA</b>	.....	<b>Quality Assurance</b>
<b>RATA</b>	.....	<b>Relative Accuracy Test Audit</b>
<b>RCRA</b>	.....	<b>Resource Conservation and Recovery Act</b>
<b>SIP</b>	.....	<b>State Implementation Plan</b>