

## LEHDER Environmental Services

## Are Your Facility CEMS in Compliance?

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### Introduction

A large number of industrial facilities utilize Continuous Emissions Monitoring Systems (CEMS) to measure the emissions from various sources. Facilities such as natural gas and coal fired power plants, refineries, cement plants and smelters typically use CEMS. CEMS are installed to meet the facility Ministry of Environment Certificate of Approval (C of A) emission monitoring requirements, but many facilities also use CEMS to monitor process gas streams.

Oxygen, Carbon Dioxide, Carbon Monoxide, Nitric Oxide, Sulphur Dioxide and Flow CEMS are the most common analyzers installed. The Certificate of Approval usually refers to the Environment Canada Report EPS 1/PG/7 December 2005 document entitled "**Protocol and Performance Specifications for Continuous Monitoring of Gaseous Emissions from Thermal Power Generation.**" In order to be in compliance the CEMS must be operated in accordance with this protocol.

There are a number of items that must be completed to ensure the CEMS are installed correctly and output valid data. This is imperative if using the data for reporting or trading purposes. The results of the various tests and audits are compared to either the facility C of A Criteria or the EPS 1/PG/7 criteria.

Some of the major items are:

- CEMS Certification
- Semi-Annual RATA and Bias Tests
- Annual Availability
- Quarterly Tests
- Quarterly QA Reporting
- Daily Calibration Drift Tests
- Quality Assurance and Quality Control Manual (QA/QC Manual)
- Annual Independent Inspection
- Emissions Reporting
- Future Forecasts

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## **CEMS Certification**

Once the CEMS have been installed, their operation must be verified by completing a CEMS Certification. During the certification the CEMS should operate normally for seven days – this is called the Operational Test Period (OTP). A Seven Day Drift Test must be performed where a low, mid and high gas is introduced to each analyzer (3 times) at 24 hour intervals. A Response Time Test must also be performed by introducing a low and high level gas (3 times) and determining the time for a 90% response to the gas.

After the OTP a Relative Accuracy (RATA) and Bias Test are performed. This is essentially a comparison of the facility CEMS data (concentrations and emissions) to an acceptable Reference Method. A minimum of nine 30 minute tests or maximum of twelve 30 minute tests are conducted. The results of the CEMS Certification tests are compared to either the facility C of A criteria or the EPS 1/PG/7 criteria to determine if the CEMS passes.

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## **Semi-Annual RATA and Bias Tests**

At six month intervals after the initial CEMS Certification, the first RATA and Bias tests are conducted to verify that the CEMS is still operating in accordance with the facility C of A or the EPS 1/PG/7 Protocol. After the first year of operation the semi annual tests may be waived if the exemption criteria of the EPS 1/PG/7 Protocol are met.

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## **Annual Availability**

CEMS availability is determined by comparing the number of hours that valid data was generated (while the facility burned fuel) to the total number of hours that fuel was burned during the year. For the first year it must be >90% and thereafter it must be 95%. Peaking units only need to achieve 80%.

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## **Quarterly Tests**

Cylinder Gas Audits (CGAs) which check the linearity of the analyzers are a major component of the Quarterly Performance Tests. The test involves introducing a low, mid and high gas to each gas analyzer (3 times) or a stack gas flow test (if using flow monitors). Systems that use F-Factors (factors used to calculate pollutant emission rates) and fuel flow rates must also be audited quarterly by evaluating heat to output quarterly data, performance of abbreviated heat to output data or evaluation of hourly heat input to billing.

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## **Quarterly QA Reporting**

Each quarter the facility must prepare a report describing the results of all the applicable performance evaluations carried out in that quarter.

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### **Daily Calibration Drift Tests**

Daily automated calibration drift tests are conducted on each analyzer to ensure quality data is being generated at all times. At 24 hr intervals, low and high level gases are introduced to the CEMS. The results of the daily drift tests are compared to the C of A or EPS 1/PG/7 criteria to determine if the CEMS passes.

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### **Quality Assurance and Quality Control Manual (QA/QC Manual)**

The facility must have a CEMS QA/QC Manual which covers the operation of each CEMS at the facility.

In general the document must contain all policies and procedures to ensure quality information is being generated and reported from the CEMS.

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### **Annual Independent Inspection**

The facility CEMS System and the CEMS QA/QC program must be audited once per year by an independent inspector.

The auditor will determine if the QA/QC policies and procedures are being followed and determine if any major changes were made to the CEMS. A report containing the findings is typically submitted to facility management.

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### **Emissions Reporting**

In order to use your CEMS data for Canada’s National Pollutant Release Inventory (NPRI), the facility CEMS must be operated in compliance with the EPS 1/PG/7 Protocol.

Many state of the art CEMS data acquisition systems are set up to create simple reports which contain the information required for NPRI reporting.

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### **Future Forecasts**

With all of the recent media exposure of Greenhouse Gases, the need for accurate emissions monitoring has never been more important.

It is likely that in the near future many facilities will require Carbon Dioxide (CO<sub>2</sub>) analyzers if they do not already have them installed. Real time on-line emissions data that would be accessible to regulatory authorities is also a realistic possibility.

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### How can LEHDER assist?

LEHDER currently assists numerous facilities throughout Ontario with CEMS related issues. Our expertise includes supplying the following services:

- CEMS Certification RATA and Bias tests
- Semi-Annual CEMS RATA and Bias tests
- Performance and Guarantee Testing for facility start ups
- Emissions monitoring tests during turbine tuning programs
- Emissions monitoring tests during incinerator tuning programs
- Compliance emissions testing
- Pollution control efficiency testing
- Annual CEMS QA/QC Manual Audits
- CiSCO CEMS Service Provider
- Assisting with NPRI Reporting
- Greenhouse Gases Reporting (Federal and O.Reg. 452)
- Emissions Trading Reporting (O. Reg. 397)

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### Helpful Web Link:

[EPS 1/PG/7 Protocol to follow for CEMS](#)

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### Questions?

For further information or questions please contact:

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### About LEHDER

LEHDER Environmental Services is an environmental consulting company focused on providing Excellence in Industrial Air Quality Services. Formed in 1995, LEHDER is now one of the largest Air Quality Management companies in Canada. Visit our web pages at: [www.lehder.com](http://www.lehder.com)

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