

Continuous Particulate Mass Monitors Field Evaluation



Wet flue gas desulphurization (FGD) stack

Operators of many coal-fired boilers in the U.S. have committed to add selective catalytic reduction (SCR) and flue gas desulphurization (FGD) technologies to meet stricter SO_2 and NO_x emission limits. But the addition of wet FGD technologies has eliminated the use of opacity monitors as quality indicators of particulate matter (PM) control equipment performance, and many state and local environmental control enforcement agencies are requiring the addition of PM continuous emissions monitoring systems (PM-CEMS).

The principle technical difficulty with PM-CEMS is that the various technologies available rely on indirect techniques, which can be compromised by variations in particulate characteristics and size distributions. The calibration approach for these instruments has been to follow EPA's Performance Specification 11 (PS-11). But some utilities have had difficulty in achieving the mid- and high-range data points required, and have resorted to the alternative approach of using the normal operating point and a zero point. This

- Improve performance of available continuous particulate matter (PM) monitoring technologies
- Reduce costs and expand range of PM calibration
- Demonstrate alternative QA/QC methodologies for PM monitors

typically results in a very limited data range. There is a need for a better calibration approach which will provide a sufficient data range for reasonable compliance assessments.

EPRI has funded an initial evaluation of a Quantitative Aerosol Generator (QAG) developed by Cooper Environmental Services (CES). This device shows promise for providing an expanded calibration of PM-CEMS.

Value

EPRI will solicit developing PM-CEMS and commercially available instruments and conduct a field evaluation/development effort, with the goal of improving the state-of-the-art of PM-CEMS. EPRI intends to evaluate the QAG technology with the different PM-CEMS technologies evaluated in this field program.

Drivers and Trends

To date, at least eight utility organizations have entered into consent decrees with the U.S. to settle claims related to various aspects of the Environmental Protection Agency's (EPA's) Prevention of Significant Deterioration (PSD) regulations. Among other actions, these utility organizations have agreed to install, calibrate and operate PM-CEMS.

There currently are only two PM monitoring technologies suitable for wet stack applications – Beta attenuation (three commercial vendors), and extractive light scattering (two commercial vendors). There is at least one new vendor developing prototype equipment for wet stack operation.

It is extremely difficult to verify the calibration of a PM monitoring system in a manner that directly relates to the stack PM levels. To overcome this challenge, EPRI is working with CES to expand the capabilities of the QAG equipment as an alternative to current PM calibration approaches.

Project Summary

The project will provide a “test bed” for PM monitoring technologies and include the installation of three to four PM monitors in a wet stack environment (i.e., following a wet FGD). The systems will be certified following PS-11. The instruments then will be run for 6 to 12 months to allow the system suppliers to continue technology development. The objectives are to improve system performance and to establish quality control procedures and criteria that provide simple, robust calibration curves which accurately reflect the PM emissions.

Major project milestones include:

- Host site selection
- Installation of candidate PM-CEMS
- Initial PS-11 certification campaign
- Mid-term QAG evaluation and testing event
- Long-term PS-11 verification and QAG testing
- Final project report

Deliverables

- Periodic status reports will be provided that describe the PM-CEMS performance during the testing.
- A final report will include the field measurements, coal analysis during testing, and status of QAG development.

Price of Project

The estimated cost to provide one year of testing is \$500,000. The cost to participate is \$50,000. Companies which fund any EPRI program can use Tailored Collaboration (TC) funds for up to half their contribution..

Project Status and Schedule

Host site selection criteria have been determined, along with a potential list of desirable locations. The QAG development is underway. Potential PM-CEMS technologies have been identified,

Who Should Join

Companies faced with implementing PM monitoring requirements on wet stacks will benefit from the lower cost and more accurate calibration approach Developed by this project.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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