

# Continuous Emissions Monitoring Systems (CEMS) vs Performance Testing

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## Summary

This guidance discusses Continuous Emissions Monitoring Systems (CEMS) and performance testing applications with a specific focus placed on expected requirements in Nebraska Department of Environment and Energy (NDEE or the Department) air quality permits.

## Background

### Continuous Emissions Monitoring Systems

A CEMS is the total equipment system necessary for the determination of a pollutant emission rate using analyzer measurements and a conversion equation, graph, or computer program to produce results in units of the applicable emission limitation or standard.<sup>1</sup> These systems continuously monitor and record the concentration and quantity of a pollutant from an associated emission point (such as a stack at an industrial facility). In general, operating “continuously” means that the CEMS completes at least one cycle of data sampling, analyzing, and recording every 15 minutes.<sup>2</sup>

### Performance Testing

Performance testing is the measurement of emissions or other procedures used for the purpose of determining

compliance with a standard of performance conducted in accordance with approved test procedures.<sup>3</sup>

The Department requires performance testing in some construction and operating permits to extract a sample that is representative of emissions from a stack or emission point during typical operating conditions at the facility. For compliance determinations, representative conditions should include a worst-case scenario that will allow the facility to demonstrate compliance at all times of operation.<sup>4</sup>

The Department also has authority<sup>5</sup> to order any person responsible for operating an emission source to test that emission source if:

- There is reason to believe, based on available emission rate estimates, that existing emissions could exceed regulatory pollutant limits;
- Visible emission determinations suggest emissions could exceed regulatory pollutant limits; and/or
- New control equipment is installed and its efficiency needs to be verified

<sup>1</sup> Some discussions will draw distinction between the terms “Continuous Emissions Monitoring System” (CEMS) and “Continuous Emission Rate Monitors” (CERMS), where a CEMS measures pollutants on a concentration basis (e.g. parts per million of exhaust air) while a CERMS incorporates an exhaust gas flow monitor and measures pollutant emissions on a mass per unit time basis (e.g. pounds per hour). This discussion focuses solely on systems capable of recording mass per unit time emissions, but uses the term “CEMS” as the

term is more commonly used in EPA guidance and Department communications.

<sup>2</sup> See 40 CFR § 75.10(d)(1)

<sup>3</sup> 129 Neb. Admin. Code §§ 1-105.

<sup>4</sup> Discussed in more detail within the guidance “Air Quality Stack Test Guidelines” which is accessible on the Department website (<http://dee.ne.gov>)

<sup>5</sup> 129 Neb. Admin. Code §§ 34-001.

## Compliance Approaches

### CEMS Approach

Facilities utilizing a CEMS approach may be subject to fewer operational and monitoring permit requirements than they would if utilizing a mass balance approach or short-term (e.g. pounds per hour) emissions limitations. This is because a CEMS provides a continuous measurement of emissions with supporting conditions providing practical enforceability, so it is not necessary to place certain other operational conditions (e.g., limiting throughput), or monitoring conditions (e.g., such as those ensuring that control equipment is functioning at the same level as prior performance testing.)<sup>6</sup> Further, a facility that is minor for the Prevention of Significant Deterioration (PSD) program and that utilizes a CEMS can reduce the regulatory review and potential performance testing required when conducting “modifications”<sup>7</sup> at the facility, such as utilizing a different feedstock, incorporating new biological species, changing operating conditions, or adjusting control equipment parameters.

### What requirements can I expect with a permit specifying a CEMS?

To constitute federally enforceable (e.g. legally and practically enforceable) limitations, a permit specifying a CEMS requires several parts:

- A requirement that the facility install and operate equipment capable of continuously monitoring and recording pollutant concentration and exhaust gas flow rate;
- A requirement that the facility follows a specified procedure (performance specification) to ensure proper installation, configuration, and calibration of the CEMS;
- A requirement that the facility utilizes appropriate quality assurance procedures to validate the data reported by the CEMS;
- A requirement that specifies reporting and recordkeeping requirements for the CEMS

<sup>6</sup> This statement solely applies to limitations placed for the purposes of restricting PTE. If equipment at a facility is subject to certain regulatory programs, such as PSD BACT, it may be necessary to apply operational and monitoring restrictions to meet the separate requirements of these programs.

<sup>7</sup> Defined at 129 Neb. Admin. Code §§1-089. In part, “any physical change in, or change in method of operation of, an affected facility which increases the amount of any air pollutant...” 129 Neb. Admin. Code §§17-001 places a

### Performance Testing Approach

As identified in the Department’s guidance document ‘Air Quality Stack Test Guidelines (AQSTG)’, the Clean Air Act (CAA) requires that facilities comply with emissions limitations and emission standards on a continuous basis. The CAA defines the terms “emissions limitation” and “emission standard” in Section 302(k), 42 U.S.C. § 7602(k), as meaning “a requirement established by the state or the Administrator which limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis . . . .” (emphasis added). The statute also authorizes penalties for multiple days of violations and establishes a presumption of continuing violations if certain conditions are met. CAA Section 113(e)(1) and (2), 42 U.S.C. §§ 7413(e)(1) and (2).

EPA has consistently, in rulemaking and policy statements over many years, taken the position that the CAA requires continuous compliance with emissions limits except where compliance is explicitly excused. See, e.g., Guidance entitled “Definition of ‘Continuous Compliance’ and Enforcement of O&M Violations,” (June 24, 1982) (“In the strict legal sense, sources are required to meet, without interruption, all applicable emissions limitations and other control requirements, unless such limitations specifically provide otherwise.”); Credible Evidence Rulemaking, 62 FR 8314, 8323, 8324, 8326 8314 (Feb. 24, 1997) (emissions limits require continuous compliance [consistent with any averaging times] except during periods when compliance is specifically excused).

Since the CAA requires continuous compliance with emissions limits except where explicitly excused, EPA interprets applicable regulations to require that any stack test that is conducted within the scope of the AQSTG must demonstrate that a facility is capable of complying with the applicable emissions standards at all times.

requirement on facilities that a construction permit must be obtained prior to making any modification that results in an increase in potential emissions over a specified threshold. When an emission unit is equipped with a CEMS and subject to a limit on PTE, a modification does not result in a change in potential emissions from that unit for the specific pollutant(s) measured by the CEMS.

## Performance testing frequency

Depending on the variability of emissions from the affected emission points, initial or recurring performance testing may be required in order to yield reliable data from the relevant time period that are representative of the source's compliance with a permit.<sup>8</sup>

## If performance testing is required in my permit, what requirements can I expect?

Department construction and operating permits contain a standardized permit term that specifies the performance testing requirements (if required and unless otherwise provided for in the Specific Conditions of the permit).

The current standardized permit term is Standard Condition I.(M)<sup>9</sup> and specifies the following requirements:

### Notification Requirements:

- Facilities are required to notify the Department in writing at least thirty (30) days prior to testing so NDEE can have an observer present. (The NDEE may, in writing, approve a notice of less than 30 days; if the testing is pursuant to an underlying requirement in a federal rule, the notice provisions of the underlying requirement apply)
- Notifications must include the identifying information specified in Condition I.(M)(1)(b).

### Performance Test Methods and Procedures (as applicable) per Title 129, Chapter 34, Section 002; or other NDEE approved methodologies

- 40 CFR Part 51, Appendix M
- 40 CFR Part 60, Appendices A,B,C,F
- 40 CFR Part 61, Appendix B
- 40 CFR Part 63, Appendix A
- 40 CFR Part 266, Appendix IX
- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846 (3rd Edition) (November 1986) and its Updates I. II. IIA. IIB. III. IIIA. IIIB. IVA and IVB

### Testing must be performed under representative (normal) conditions that:

- Represent the range of combined process and control measure conditions under which the facility expects to operate (regardless of the frequency); and
- Are likely to most challenge the emissions control measures of the facility with regard to meeting the applicable emission standards, but without creating an unsafe condition.

### Testing run-time:

- Testing must be conducted for a minimum of three (3) one-hour runs (unless another run-time is specified by the applicable Subpart or as deemed appropriate by the NDEE).

### Operating Parameter monitoring requirements:

- Operating parameters for process and control equipment during the performance testing must be monitored and recorded

### Testing Results Submittal Requirements:

- A certified written copy of results, signed by the tester must be provided to the Department within 60 days of completion (unless a different time period is specified elsewhere);
- Must include a description of the operating parameters during testing (ex: production rates, process throughputs, firing rates of combustion equipment, or fuel usage);
- Must include a description of the operating parameters for the control equipment (ex: baghouse fan speeds, scrubber liquid flow rates, or pressure drop across the control device);
- Must include the data sheets from the test runs;
- The submittal of results must include an explanation of erroneous data or unusual circumstance(s) and the cause;
- The copy of results must include a final conclusion section describing the outcome of testing.

The above requirements are subject to change and may be expanded on in other sections of the permit. Facilities are responsible for reading and understanding these and other requirements as specified in their issued permit(s).

<sup>8</sup> 129 Neb. Admin. Code §§ 8-004, 8-015, and 34-001.

<sup>9</sup> Refer to "Air Quality Standard and General Permit Conditions" accessible on accessible on the Department website (<http://dee.ne.gov>)