

MEMORANDUM

TO: Chapter 6, Section 3 Operating Permit Applicants

FROM: Steven A. Dietrich, Administrator, Air Quality Division *SAD*
Lori N. Bocchino, Operating Permit Program Manager *LNB*

SUBJECT: Operating Permit Program Guidance for Periodic Monitoring
(Replaces the periodic monitoring guidance documents issued February 26, 1996, October 25, 1996, March 26, 1998, and July 1, 2003)

DATE: October 4, 2010

Chapter 6, Section 3(c)(ii)(A)(IX) of the Wyoming Air Quality Standards and Regulations (WAQSR) requires operating permit applications to contain information regarding compliance certification. Compliance is determined by the use of testing, monitoring, recordkeeping, and/or reporting. In drafting the operating permit for a facility, the Division must incorporate monitoring for all applicable requirements whether this monitoring currently exists or not. Ch 6, Sec 3(h)(i)(C)(1)(2) further clarifies what is required in the operating permit.

The Division originally published guidance for periodic monitoring in the following documents:

- February 26, 1996 – Periodic NO_x Monitoring for Combustion Sources and Compressors
- October 25, 1996 – Guidance for Periodic Monitoring Requirements of the Operating Permit Program
- March 26, 1998 – Periodic Monitoring of Particulate, Opacity, and NO_x Emissions from Fuel-Fired Sources for Trona Industry Section 30 Operating Permits
- July 1, 2003 – Guidance for Periodic Monitoring Requirements of the Operating Permit Program

We are issuing this revised guidance (which will supersede the above documents) to clarify current Air Quality Division expectations and to facilitate development of consistent monitoring requirements among major sources in the state.

Periodic monitoring for an emissions unit is typically proposed by a source in their Ch 6, Sec 3 operating permit application. The Division will consider any reasonable periodic monitoring proposal which can be related to actual emissions from the source. Adequate information describing what and how monitoring will occur must be provided so, once approved, the monitoring can be incorporated into the operating permit. Any monitoring required by a Ch 6, Sec 2 construction permit or waiver must carry over into the operating permit, unless periodic monitoring in the operating permit is clearly more stringent or monitoring changes are approved in a modification to the construction permit/waiver.

When listed as an acceptable form of periodic monitoring in this guidance, the following shall mean:

- Continuous Emissions Monitoring (CEM). The use of a certified continuous emissions monitor is an acceptable form of periodic monitoring.
- Reference Method Testing. Emissions testing using the appropriate EPA Reference Method(s) is an acceptable form of periodic monitoring. Testing frequency should depend on how close actual emissions are to the emission limit, the compliance history of the source, and the source's size.
- Portable Emissions Analyzer. Emissions sampling with a portable analyzer may be an acceptable form of periodic monitoring. The permittee shall follow the Division's portable analyzer

monitoring protocol, or provide an equivalent protocol for other pollutants. Sampling frequency should depend on how close emissions are to the emission limit, the compliance history of the source, and the source's size.

- **Parameter Monitoring.** Monitoring of a unit operating parameter or a control device operating parameter may be acceptable. The permittee must:
 - demonstrate a relationship between emissions and the parameter(s) being monitored,
 - indicate the acceptable range of operation for each parameter,
 - indicate how frequently monitoring will occur, and
 - obtain the prior approval of the Air Quality Division.

If control device operating parameter monitoring is proposed, compliance must be demonstrated while the control device is in operation.

All sources and periodic monitoring proposals will be reviewed on a case-by-case basis. This guidance will be used as a starting point for developing periodic monitoring plans. Specific emissions units with actual emissions typically near limits, and/or with a history of compliance issues, may be required to do more rigorous monitoring.

For purposes of this guidance document, allowable emissions shall mean the amount of a pollutant in TPY that an emissions unit is allowed to emit considering all applicable permit limits and standards. If an emissions unit does not have an applicable requirement for a particular pollutant, then periodic monitoring is not required for that pollutant.

CAM Applicability

Compliance Assurance Monitoring (CAM) applies to a pollutant specific emissions unit; each pollutant is addressed separately. In order for CAM to apply to a pollutant specific emissions unit, it must:

- 1) Be located at a major source which is required to have a Ch 6, Sec 3 operating permit;
- 2) Have an emission limit or standard for a regulated air pollutant;
- 3) Use an add-on control device to achieve compliance with the emission limit or standard; and
- 4) Have "potential pre-control device emissions" equal to or greater than the amount required for a source to be classified as a major source in the operating permit program. Typically this means uncontrolled emissions would exceed 100 tons per year for a criteria pollutant, or exceed 10 tons per year for a hazardous air pollutant.

It should be stressed that the applicability determination is made on a pollutant-by-pollutant basis for each emission unit and that most units emit more than one pollutant. If a unit is subject to the requirements of CAM, an approved CAM plan will satisfy all periodic monitoring requirements *for that pollutant*. For source specific guidance see CAM guidance available at <http://deq.state.wy.us/aqd/>, under "Forms and Guidance Documents", then "Operating Permits."

CO Emissions

(See also Figure 2 on page 12 of this guidance.)

Sources **without** CO Control Equipment

For each emission unit having allowable emissions of less than 30 tons per year of CO emissions, the Division will typically not require monitoring unless otherwise mandated by an applicable requirement.

For an emission unit having allowable emissions greater than 30 tons per year, but less than 100 tons per year, the following are generally acceptable forms of periodic monitoring:

- Reference Methods 1-4 & 10 testing once every five years
- Portable Emissions Analyzer once every five years

For a RICE (Reciprocating Internal Combustion Engine) emissions unit having allowable emissions of 100 tons per year or more, the following are generally acceptable forms of periodic monitoring:

- Continuous Emissions Monitoring (CEM)
- Quarterly Portable Emissions Analyzer or Reference Methods 1-4 & 10 testing; a less frequent testing schedule may also be proposed

For any other type of combustion emissions unit having allowable emissions of 100 tons per year or more, the following are generally acceptable forms of periodic monitoring:

- Continuous Emissions Monitoring (CEM)
- Semiannual Reference Methods 1-4 & 10 testing; a less frequent testing schedule may also be proposed
- Semiannual Portable Emissions Analyzer; a less frequent testing schedule may also be proposed
- Periodic Parameter Monitoring

Sources **with** CO Control Equipment

or

CO Emissions used as Surrogates for Formaldehyde

If CO emissions from the emission unit are controlled (for example, using a catalyst) or CO emission limits are used as surrogates to indicate the control of formaldehyde emissions, the following methods may satisfy periodic monitoring requirements:

- Continuous Emissions Monitoring (CEM)
- Semiannual Reference Methods 1-4 & 10 testing; a less frequent testing schedule may also be proposed
- Semiannual (Quarterly if quarterly NO_x testing is required for the same unit) Portable Emissions Analyzer; a less frequent testing schedule may also be proposed
- Periodic Parameter Monitoring

SO₂ Emissions

In general, the primary cause for periodic monitoring of SO₂ emissions will be an emission limit established in a construction permit, or a limit specified under WAQSR Ch 3, Sec 4. There may be cases where SO₂ emission limits are specified by permit condition, but periodic monitoring is not justifiable. The Division will consider the need for periodic monitoring for minor SO₂ emission limits on a case-by-case basis.

For SO₂ emission units which are required to conduct periodic monitoring, the following methods are generally acceptable:

- Continuous Emissions Monitoring (CEM)
- Periodic Reference Methods 1-4 & 6 testing
- Periodic Parameter Monitoring

Example: Monitoring the pressure drop over a scrubber and pH of the recirculation liquid can indicate a scrubber is operating properly assuring adequate reductions of SO₂ emissions.

- Mass Balance; periodic measurement of sulfur content of fuel gas, fuel oil, coal or other inputs may be used to estimate SO₂ emissions by mass balance. Frequency of monitoring will depend on the variability of the sulfur content of the fuel or other feed. The permittee must provide the method for determining sulfur content of the fuel or feed, sample mass balance calculations, and the frequency of fuel or feed monitoring.

Particulate Emissions and Opacity

In the WAQSR, there are separate requirements for opacity and particulate emissions. All emission units have an opacity limit under Ch 3, Sec 2. Some emission units also have particulate emission limits either under Ch 3, Sec 2 or under a Ch 6, Sec 2 permit. **Opacity and particulate emission limits need to be addressed separately.** In some cases, opacity may be correlated with particulate emissions, but this is strictly on a source by source basis. Additionally, compliance with an opacity limit does not necessarily ensure compliance with a particulate emission limit, and vice versa. Correlations between opacity and particulate emission rates may be developed from simultaneous EPA Reference Method testing for particulate emissions and Continuous Opacity Monitor (COM) data or Method 9 observations for opacity.

Opacity

For emission units firing only natural gas, the permittee need only verify natural gas was the sole fuel source for the unit. Generally, units firing natural gas do not have visible emissions.

For other emission units (not limited to fired sources), the following methods may satisfy periodic monitoring requirements for opacity:

- Continuous Opacity Monitor (COM)
- Periodic Reference Method 9 Testing
- Periodic Parameter Monitoring; documentation of the relationship between the parameters and actual emissions must be provided
- Alternative Monitoring for Sources Typically with No Visible Emissions. For emission sources for which no visible emissions are expected during normal operations, periodic visual observation of the stack for visible emissions by an uncertified, but qualified, observer may be an acceptable monitoring method. The presence of any visible emissions (opacity greater than zero, not emissions approaching the 20 or 40 percent opacity limit) would trigger maintenance and corrective action.

Particulate Emissions

A periodic monitoring method will be required for each emission unit which has a particulate control device and an emission limit specified by permit condition or established in WAQSR Ch 3, Sec 2. Uncontrolled allowable particulate emission rates may also be specified by permit condition; the Division will evaluate periodic monitoring for such sources on a case-by-case basis.

For particulate emission units which are required to conduct periodic monitoring, the following methods are generally acceptable:

- Periodic Reference Methods 1-4 & 5 Testing
- Correlation with Opacity. As previously discussed, correlation of particulate emission rates with opacity may be acceptable; however, this correlation must be made on a source by source basis. Compliance with an opacity limit does not ensure compliance with a particulate emission limit,

and vice versa. Correlations between opacity and particulate emission rates may be drawn from simultaneous EPA Reference Method testing for particulate emissions and continuous opacity monitor (COM) data or Method 9 observations for opacity. The use of the source's opacity limit (generally either 20 or 40 percent) is not acceptable unless that correlation can be documented through testing.

➤ Periodic Parameter Monitoring

Example: Pressure drop and liquor recirculation rate for a scrubber, or pressure drop across a baghouse, can indicate the control device is operating properly, assuring adequate reduction of particulate emissions.

NO_x Emissions

(See also Figure 1 on page 11 of this guidance.)

Due to inherent differences between types of emission units, NO_x emission monitoring frequency is based on the type of unit as follows.

NO_x from Combustion Sources (Not Reciprocating Engines or Turbine Engines)

For each emission unit having allowable emissions of between 10 and 30 tons per year, the Division will typically require that the source be tested once every two years using EPA Reference Methods 1-4 & 7E or a Portable Emissions Analyzer. If emission results from biennial performance tests are less than or equal to 75 percent of the emission limit for the unit, the frequency of subsequent performance tests may be reduced to once every four years. If the results of any subsequent performance test exceed 75 percent of the emission limit, biennial testing shall resume.

For each emission unit having allowable emissions between 30 and 100 tons per year, the following may satisfy periodic monitoring requirements:

- Annual Reference Methods 1-4 & 7E testing; a less frequent testing schedule may also be proposed with supporting analysis
- Annual Portable Emission Analyzer; a less frequent testing schedule may also be proposed with supporting analysis
- Periodic parameter monitoring
- Any of the methods below for ≥ 100 TPY

For combustion sources having allowable emissions ≥ 100 tons per year of NO_x, the following may satisfy periodic monitoring requirements:

- Continuous Emissions Monitoring (CEM)
- Annual Reference Methods 1-4 & 7E testing; a less frequent testing schedule may also be proposed with supporting analysis
- Semiannual Portable Emission Analyzer; a less frequent testing schedule may also be proposed with supporting analysis
- Periodic parameter monitoring with reference method testing once every five years

Example: Monitoring the temperature of a selective catalyst bed on a catalytic converter can indicate that the control device is operating properly, assuring adequate reductions of NO_x emissions. Appropriate control device operating ranges and frequency of monitoring must be specified.

NO_x Emissions from Reciprocating Engines

Reciprocating Engines Without Add-on Controls or Controlled by Nature of Engine Design

(for example, use of lean burn technology)

For each reciprocating engine having allowable emissions of between 10 and 30 tons per year, the Division will typically require that the source be tested once every two years using EPA Reference Methods 1-4 & 7E or the Portable Emissions Analyzer. If emission results from biennial performance tests are less than or equal to 75 percent of the emission limit for the unit, the frequency of subsequent performance tests may be reduced to once every four years. If the results of any subsequent performance test exceed 75 percent of the emission limit, biennial testing shall resume.

For each reciprocating engine with allowable emissions between 30 and 70 tons per year, the following may satisfy periodic monitoring requirements:

- Semiannual Reference Methods 1-4 & 7E testing; a less frequent testing schedule may also be proposed with supporting analysis
- Semiannual Portable Emission Analyzer
- Any of the methods below for ≥ 70 TPY

For each reciprocating engine with allowable emissions ≥ 70 tons per year, the following may satisfy periodic monitoring requirements:

- Continuous Emissions Monitoring (CEM)
- Quarterly Reference Methods 1-4 & 7E testing; a less frequent testing schedule may also be proposed with supporting analysis
- Quarterly Portable Emission Analyzer

Reciprocating Engines with Add-on Controls

(for example, use of a catalyst or steam injection)

For each reciprocating engine having allowable emissions less than 5 tons per year of NO_x, the Division will typically require that it be tested once every five years.

For each reciprocating engine having allowable emissions between 5 and 30 tons per year of NO_x without CAM requirements, the following may satisfy periodic monitoring requirements:

- Annual Reference Methods 1-4 & 7E testing; a less frequent testing schedule may also be proposed with supporting analysis
- Annual Portable Emission Analyzer
- Any of the methods below for ≥ 30 TPY

For reciprocating engines having allowable emissions between 30 and 70 tons per year, the following may satisfy periodic monitoring requirements:

- Semiannual Reference Methods 1-4 & 7E testing; a less frequent testing schedule may also be proposed with supporting analysis
- Semiannual Portable Emission Analyzer
- Continuous Emissions Monitoring (CEM)

Reciprocating engines having allowable emissions ≥ 70 tons per year will usually be subject to CAM. If circumstances arise where CAM does not apply, the following may satisfy periodic monitoring requirements:

- Continuous Emissions Monitoring (CEM)
- Quarterly Reference Methods 1-4 & 7E testing; a less frequent testing schedule may also be proposed with supporting analysis
- Quarterly Portable Emission Analyzer

NO_x Emissions from Turbine Engines

For turbines with allowable emissions between 10 and 30 tons per year, the Division will typically require that the source be tested once every two years using EPA Reference Methods 1-4 & 7E or the Portable Emissions Analyzer. If emission results from biennial performance tests are less than or equal to 75 percent of the emission limit for the unit, the frequency of subsequent performance tests may be reduced to once every four years. If the results of any subsequent performance test exceed 75 percent of the emission limit, biennial testing shall resume.

For turbines with allowable emissions ≥ 30 tons per year, the following may satisfy periodic monitoring requirements:

- Quarterly Portable Emission Analyzer; a less frequent testing schedule may also be proposed with justification and the support of historical data showing compliance, however portable analyzer testing will be required at least annually in most cases
- Any of the methods below for ≥ 100 TPY

For turbines with allowable emissions ≥ 100 tons per year, the following may satisfy periodic monitoring requirements:

- Continuous Emissions Monitoring (CEM)
- Quarterly Reference Methods 1-4 & 7E testing; a less frequent testing schedule may also be proposed with justification and the support of historical data showing compliance, however testing will be required at least annually in most cases
- Quarterly Portable Emission Analyzer; a less frequent testing schedule may also be proposed with justification and the support of historical data showing compliance, however portable analyzer testing will be required at least semiannually in most cases

Other Operating Permit Concerns

For the units with more than one emission limit (i.e. NO_x and CO, or NO_x, CO, VOC and formaldehyde), the Division will harmonize periodic monitoring frequency when applicable.

Please note that the operating permit program cannot increase emission limits that have been set in a WAQSR Ch 6, Sec 2 permitting action, NSPS, or NESHAP requirement. The operating permit program also cannot reduce the stringency of any monitoring applied as part of those same requirements. If you are requesting an increase of any emission limit, or a reduction of monitoring requirements (included in a WAQSR Ch 6, Sec 2 permit, NSPS, or NESHAP) you are required to submit a new construction permit request, request a modification to a current permit, or petition the EPA for a custom monitoring schedule or limit, as may be appropriate.

Figure 1

(Please refer back to the NO_x emissions section for more detailed descriptions)

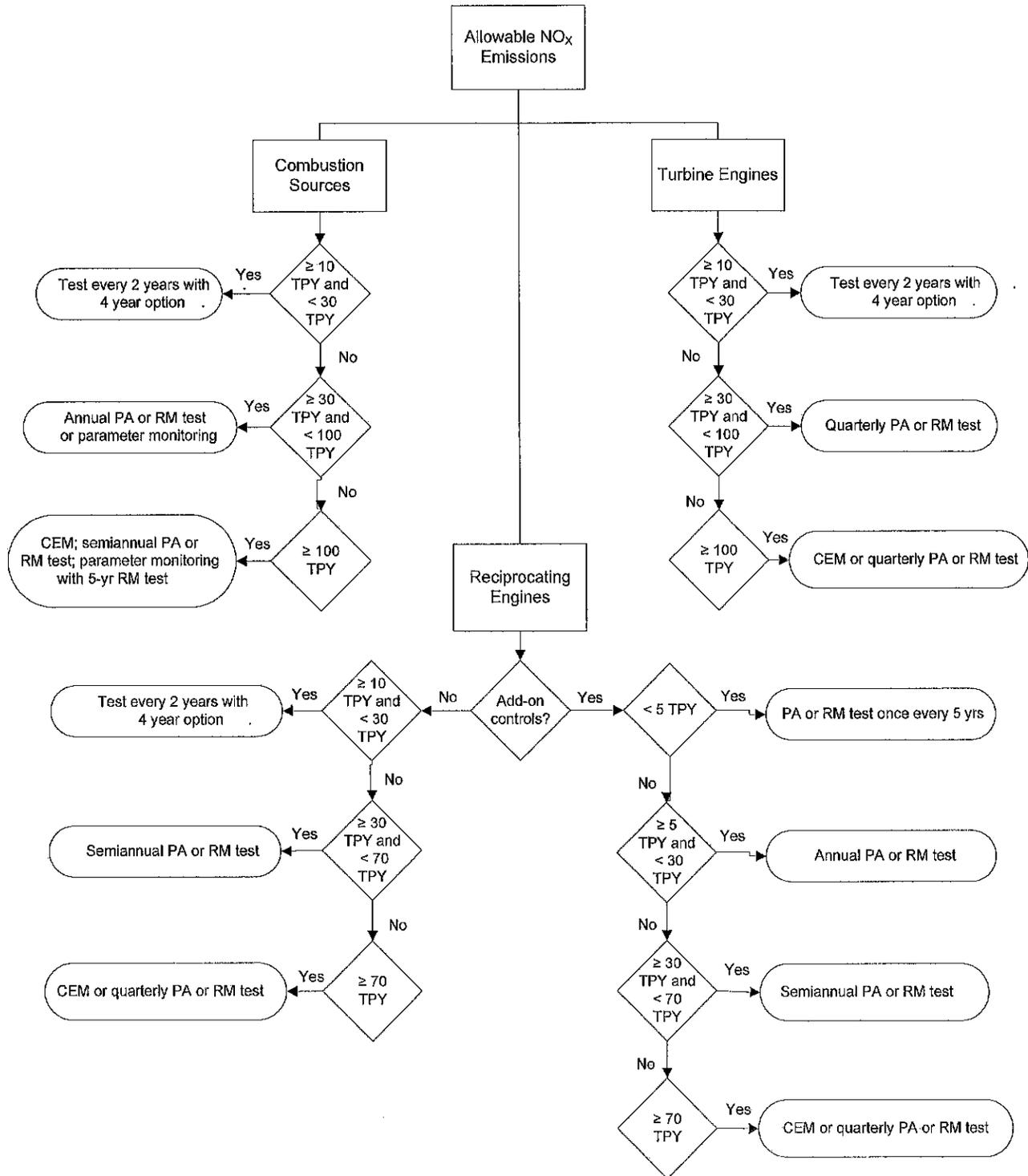


Figure 2

(Please refer back to the CO emissions section for more detailed descriptions)

