M E M O R A N D U M

TO: Chapter 6, Section 3 Operating Permit Holders

FROM: Dan Olson, Administrator, Air Quality Division
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SUBJECT: Guidance for Developing Compliance Assurance Monitoring Plans

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The Compliance Assurance Monitoring (CAM) rule, issued by Federal Register on October 22, 1997, became effective on November 21, 1997. It has been revised since initial promulgation, and the current rule is incorporated into Wyoming Air Quality Standards and Regulations (WAQSR) at Chapter 7, Section 3. CAM applicability is further explained in the "Compliance Assurance Monitoring - Questions and Answers" guidance developed by the Division. Both the rule and the guidance, as well as EPA guidance and examples of CAM plans, are available on the DEQ website:

Go to http://deq.state.wy.us/aqd/operating.asp. The lower part of this webpage lists "Documents Related to the CAM Rule", including "Compliance Assurance Monitoring - Questions and Answers" and "WAQS&R Chapter 7, Monitoring Regulations, Section 3, Compliance assurance monitoring."

Review the Q&A guidance first to see if CAM applies to you. CAM requirements apply to pollutant specific emissions units (each unit must be evaluated on a pollutant-by-pollutant basis) located at a major source which is required to obtain a Chapter 6, Section 3 operating permit. A pollutant specific emissions unit must meet all the following criteria to be subject to CAM:

- Be subject to a limit or standard for a regulated air pollutant;
- Use a control device to achieve compliance with that limit or standard; and
- Have potential pre-control device emissions greater than the major source threshold for that pollutant (generally 100 tpy for criteria pollutants, 10 tpy for HAPs).

Once you have determined that CAM applies to a pollutant specific emissions unit at your facility, you must develop a CAM plan for inclusion in your Chapter 6, Section 3 operating permit. For most sources in Wyoming, this will need to be included in your application for renewal of your operating permit. It will also need to be included in an operating permit application for the following:

- A large unit (with a potential to emit, considering controls, emissions greater than the major source threshold for a pollutant B generally 100 tpy for criteria pollutants, 10 tpy for HAPs) that has not previously been included as a part of an operating permit.
- A modification to an operating permit that affects a large unit.
- A permit reopening for cause by the EPA or the Division, if the EPA or the Division require submittal of CAM plans.

A separate CAM plan is needed for each pollutant specific emissions unit that is subject to CAM; however, similar units may be grouped (for example, particulate emissions from baghouse-controlled sources) if the monitoring proposed is the same for each unit. The following are items that need to be included in your CAM plan:

Briefly describe the emission unit, and which pollutant is subject to CAM. Some emission units may have more than one pollutant that will be subject to CAM. Each pollutant that meets the criteria for CAM

applicability may need a separate CAM plan. [Ch 7 Sec 3(b)(i)] *Note: Opacity limitations are not subject to CAM.*

State the emission limit for that pollutant, and how that limit was established. If the limit was established as part of a construction permit, or a standard (such as NSPS) that was proposed before November 15, 1990, then that emission unit may be subject to CAM. If the emission limit is from an NSPS or NESHAP that was proposed after November 15, 1990, then the standard already includes CAM-equivalent monitoring and a CAM plan is not required. Other exceptions to CAM are described in Ch 7 Sec 3(b)(ii).

Describe the control device(s). Only units with emission limits/standards and add-on controls are subject to CAM. [Ch 7 Sec 3(b)(i)]

If appropriate, describe the capture system. Can pollutants escape somewhere between the process unit producing the emissions and the control device? If so, monitoring may need to address the performance of your capture system. [Ch 7 Sec 3(c)(i)]

State the potential to emit (PTE) before controls. This is what your emissions would be if no pollution control equipment were in place. Describe how you make this estimate. [Ch 7 Sec 3(b)(i)(C)]

State the potential to emit (PTE) after controls. If the PTE after controls is greater than the major source threshold (generally 100 tpy for criteria pollutants, 10 tpy for HAPs), then more frequent monitoring is required than for smaller sources. [Ch 7 Sec 3(c)(ii)(D)(II)]

Describe any operational parameters in the process unit that affect performance of the control device. They may need to be monitored as part of the CAM plan. For example, if the inlet temperature to a scrubber can vary as a part of normal operations, you would need to assess whether this variability could cause you to exceed your emissions limit, even if the scrubber were operating normally. Your proposed CAM monitoring should detect such an exceedance. Any process variable (within expected operational ranges; not including upset conditions) that could result in excess emissions while the control device is operational may need to be monitored. [Ch 7 Sec 3(c)(i)(B) and 3(c)(iii)]

To carry this example further, if you determine that inlet temperature to the scrubber can affect compliance, you would need to either measure the inlet temperature directly as one of your CAM indicators, or demonstrate that another CAM indicator would show an excursion if inlet temperature caused emissions to exceed limits.

Define the proposed indicator(s) to be monitored. These can include emission measurement at the outlet of the control device, performance monitoring of the control device, monitoring process parameters, or any other indicator that can be linked to compliance with the emission limitation. One way to come up with possible indicators is to ask the question - "What could happen that may cause emissions to exceed limits?" Examine control devices and determine which parameters indicate that they are - or are not - performing as needed. Look at your system: what data would you need to feel assured that you are meeting your emission limitations?

There can be many choices for you to consider. A continuous emission monitor that measures the pollutant regulated is an obvious choice, but may not be technically possible, economically reasonable, or cost-effective. Measuring a surrogate pollutant (such as opacity for particulates) may be an option, but must be demonstrated to be appropriate (there must be data showing a correlation between the pollutant and the surrogate at your emission unit). In many cases, a pollutant-surrogate relationship at one emission unit will be completely different than that at another. There are also control device and/or process operating parameters that can be monitored; but, as with surrogate monitoring, a correlation between the parameter measured and meeting emission limitations must be demonstrated. If an indicator can not be shown to be related to emissions, it is not appropriate.

Once you have tentatively determined your compliance indicator(s), check whether they adequately demonstrate compliance. If there is a way that your emission limitations could be exceeded even if the indicators are within acceptable levels, you may need to monitor an additional parameter. Examples of monitoring strategies are included at the end of this guidance to further illustrate some of the kinds of parameters that could be used. [Ch 7 Sec 3(c)(i), 3(c)(iii), 3(c)(iv), and 3(d)(ii)]

Discuss any possible bypass of the control device and proposed CAM monitoring system. If bypass can occur based on the design of your unit, an indicator that the control and/or monitoring has been bypassed must be monitored and addressed in the CAM plan. For example, if an overpressure situation in the process would result in release at a rupture disc prior to a control device, that rupture disc must be monitored in some fashion (i.e., alarm, visual checks by operators, indication at a control panel, etc.). The CAM plan should state explicitly whether bypass is possible or not. [Ch 7 Sec 3(c)(i)(B)]

Describe how the indicator(s) is/are measured. What is used to measure the indicator(s)? Where is it installed? Are there any installation specifications to ensure data is representative of the parameters being monitored? [Ch 7 Sec 3(c)(ii)(A) and 3(c)(iv)]

If the monitoring equipment is new or modified, state how it is verified. This would only apply if the monitoring system hasn't previously been in use. It could include calibration or any other manufacturer recommendations for installation and startup. If monitoring equipment will be added or changed, a schedule for installation, startup, and validation should be included. [Ch 7 Sec 3(c)(ii)(B), 3(d)(ii), and 3(d)(v)]

Describe the QA/QC procedures for the monitoring system. What is needed to ensure continuing validity of data? [Ch 7 Sec 3(c)(ii)(C) and 3(d)(ii)]

Define the indicator range for an excursion. The CAM rule states: "The owner or operator shall establish an appropriate range(s) or designated condition(s) for the selected indicator(s) such that operation within the ranges provides a reasonable assurance of ongoing compliance with emission limitations or standards for the anticipated range of operating conditions." [Ch 7 Sec 3(c)(i)(B)] You need to determine what range of values or conditions show compliance for each indicator you monitor.

For example, if scrubber liquid flow rate is one of your indicators, and testing data and manufacturer's information show that flow must be between 2 and 8 gpm in order for the scrubber to operate properly and emission limitations to be met, you could set the range to be 2 to 8 gpm. It may be advisable to define an excursion more narrowly, however, in order to avoid being out of compliance with emission limitations. In this example, if the *excursion* range is defined as 2.5 to 7.5 gpm, action could be taken as soon as flow rate goes outside the excursion range and an exceedance of emission limits would be avoided. **An *excursion* of CAM indicators is not necessarily an *exceedance* of regulatory requirements.** An excursion would trigger corrective action only, and would not mean that you are out of compliance - if you define excursion ranges appropriately. Used in this fashion, CAM can promote continuous compliance with emission limits.

If test data does not exist to establish an indicator range, you may either submit a test plan and schedule for obtaining that data or propose an indicator range using engineering assessments to support your proposal. [Ch 7 Sec 3(c)(i)(B), 3(c)(i)(C), 3(c)(iv), and 3(d)]

State the monitoring frequency. If the emission unit has a potential to emit <u>after controls</u> equal to or greater than the major source threshold for that pollutant (generally 100 tpy for criteria pollutants, 10 tpy for HAPs), indicators must be monitored at least four times, equally spaced, over each hour, and averaged as specified in the CAM rule. In some cases, based on the data collection mechanisms available, a reduced data collection frequency may be allowed. Smaller emission units must be monitored at least once per day. [Ch 7 Sec 3(c)(ii)(D)]

Describe how data is recorded. Is data stored by a computer system, manual log entry, or by other means? How often? [Ch 7 Sec 3(c)(ii)(D)]

If applicable, describe how data is averaged. If appropriate, propose a minimum data availability per averaging period and reporting period. For example, a system may be monitored every minute, then every 60 minutes averaged to an hour. You could specify that at least 30 minutes of every hour must be monitored for the hour average to be valid. This is not applicable if you do not average your CAM data. [Ch 7 Sec 3(c)(ii)(D) and 3(f)(iii)(D)]

Discuss action(s) prompted by an excursion. Is there an alarm, immediate inspection, process slowdown/shutdown, maintenance/repair? [Ch 7 Sec 3(g)(iv)]

Describe the trigger for a QIP (OPTIONAL). QIP stands for "quality improvement plan", and involves a review of processes, controls, and monitoring to improve compliance with regulatory standards. The trigger for QIP could be a number of excursions (for example, more than 6 excursions in a 6-month period) or a percentage (for example, an accumulation of excursions exceeding 5% of a unit's operating time). Including the QIP trigger in your CAM plan is <u>optional</u>. The District or the EPA may require a QIP at any time they find reason to believe a CAM plan is inadequate. [Ch 7 Sec 3(h)]

Justify your CAM plan. You may demonstrate appropriateness by using any or all of the following: generally available air pollution engineering manuals, EPA guidance or other publications, indicator data obtained during performance tests, engineering assessments, and manufacturer's recommendations. Any existing indicator and operating parameter data obtained during performance testing shall be submitted. [Ch 7 Sec 3(d)(ii), 3(d)(iii), and 3(d)(iv)]

Figure 1 gives a checklist of the minimum things to consider when developing your CAM plan.

Figure 1

CAM Plan Checklist

• Emission Unit and Pollutant	• Emission Limit (and origin)
• Control Device(s)	• Capture System (if applicable)
• Pre-control PTE	• Post-control PTE
• Indicator(s) monitored (may include process operational parameter(s))	• Bypass indicator(s) (if applicable)
• How measured (what is used, where, any installation specifications)	• Schedule and verification of new/modified monitoring equipment
• QA/QC of monitoring system	• Indicator range for excursion
• Indicator range for exceedance (if applicable)	• Monitoring frequency
• Monitoring recording	• Data averaging and minimum data availability (if applicable)
• Action for excursion	• QIP trigger (optional)
• Justification	

Example CAM indicators

The following are brief examples of indicators that could be used for CAM. These are not CAM plans, but would be included in a CAM plan.

Source/Pollutant: Dryer with cyclone; limits on particulate; PTE after controls less than major source threshold

Indicator: Daily visual observations by a Method-22 trained observer

Excursion/Action: Any visible emissions; excursion triggers inspection of system within 60 minutes and maintenance/repair as soon as practicable but no more than 48 hours from the time of the initial excursion.

Source/Pollutant: Combustion with a scrubber; limits on SO_2; PTE after controls less than major source threshold

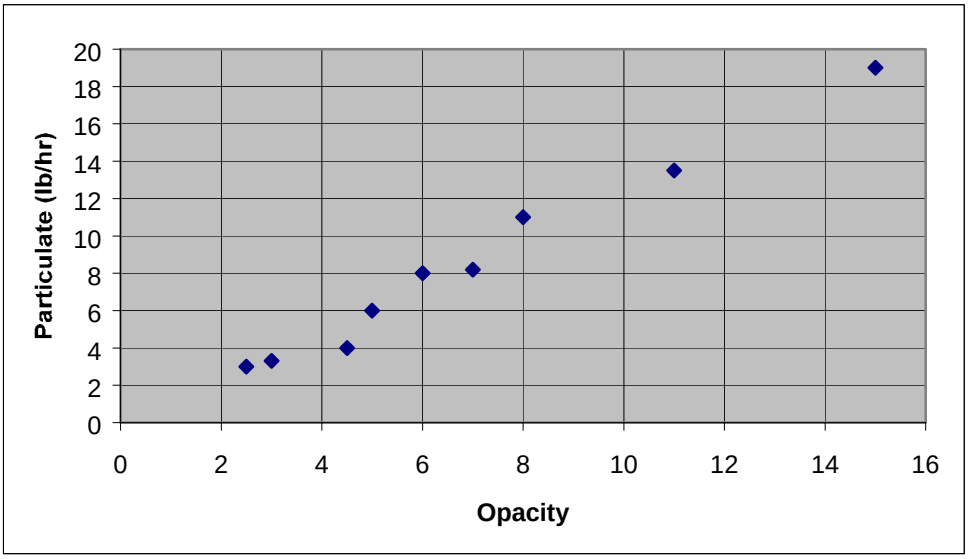
Indicator: a) Pressure drop across the scrubber, measured daily

b) Liquid supply pressure, measured daily

Excursion/Action: Minimum pressure drop and supply pressure values are established using test data and manufacturer's recommendations. Approaching those values to within 10% triggers an alarm and inspection within an hour.

Source/Pollutant: Materials transfer with baghouse control; limits on particulate (15 lb/hr)

Indicator: Opacity, monitored with a continuous opacity monitor. Test data showed a clear correlation between opacity and measured particulate matter (see chart below) and indicated that particulate matter limits would be exceeded at about 12.5% opacity.



Excursion/Action: Opacity greater than 10%; excursion triggers an alarm in the control room and inspection/corrective action within an hour.

Source/Pollutant: Combustion with catalytic converter; limits on NO_x; PTE after controls greater than major source threshold

Indicator: a) Temperature at the inlet to the catalyst, measured every minute and averaged to 15-minute blocks

b) Temperature increase across the catalyst, measured every minute and averaged to 15-minute blocks

c) NO_x measured by portable analyzer annually and compared to temperature measurement

Test data showed NO_x emission levels were within regulatory limits as long as the inlet temperature to the catalyst was between 750º and 1200º F, and the temperature increase of the gas across the catalyst was at least 25º F.

Excursion/Action: Excursion ranges were set at 800º and 1150º F for the inlet temperature, and 28º F minimum temperature increase across the catalyst; excursion triggers alarm and investigation within an hour. Annual NOx measurement confirms that the temperature ranges still indicate compliance.

Source/Pollutant: Combustion with a 2-field electrostatic precipitator (ESP); limits on particulate

Indicator: ESP power input (the sum of secondary voltage and secondary current for each field)

Excursion/Action: ESP power input less than 15 kW; excursion triggers alarm and investigation within an hour.

The above examples are for illustration only. CAM proposals for each emission unit will be evaluated based on the characteristics of that unit. The Division will consider any reasonable CAM proposal that can be supported by test data and/or engineering assessments.

Additional information on CAM and CAM plans is available in the regulations, guidance, and examples on the DEQ website referenced on the first page of this guidance. This is intended only as a summary and explanation of some of the requirements.

Please contact us if you have questions or need assistance. Mike Stoll or Lori Bocchino of the operating permits group are available at:

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