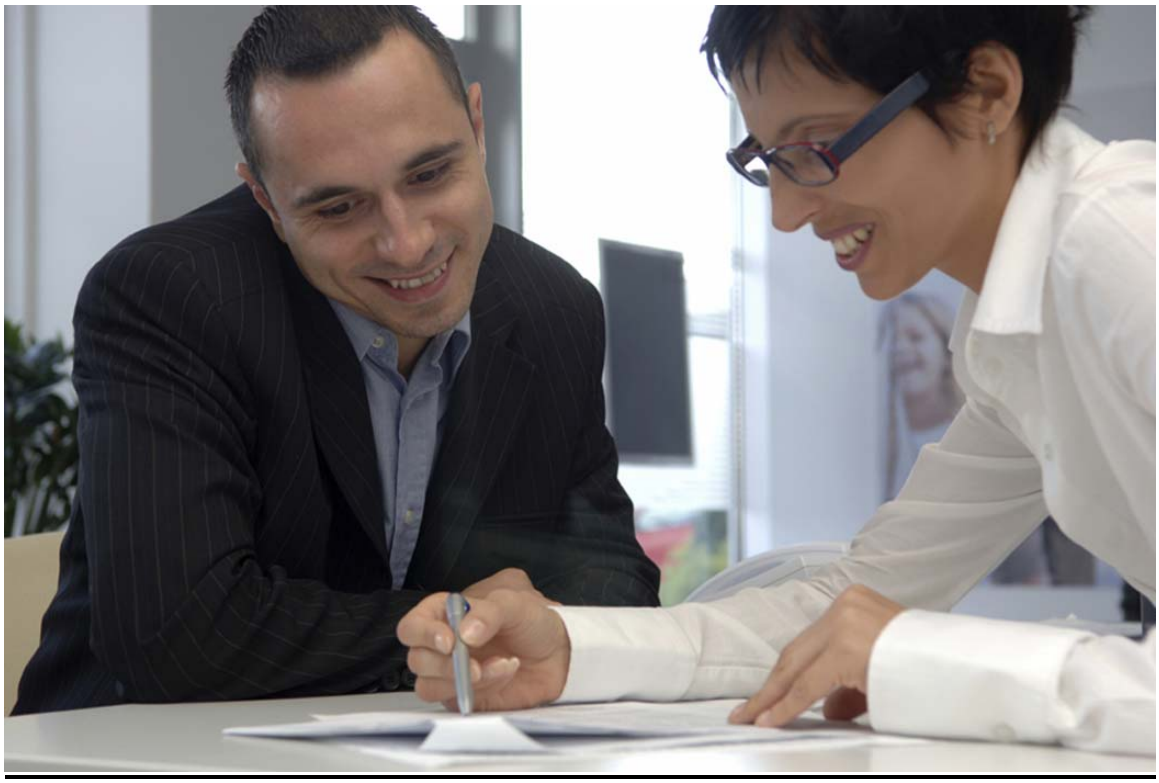
CEMS Question/Answer Document Continuous Source Monitoring Manual Revision No. 8 (Manual) and New CEM Data Processing System (CEMDPS)

DRAFT



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Bureau of Air Quality
Division of Source Testing and Monitoring
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INTRODUCTION

The Continuous Source Monitoring Manual (Manual) contains design specifications, performance specifications, performance test procedures, data storage and reporting requirements, quality assurance criteria, and administrative procedures for obtaining Department approval of continuous emission monitoring systems or other monitoring systems required pursuant to the Pennsylvania Department of environmental Protection Rules and Regulations. The manual is not intended to provide step-by-step instructions on designing, selecting, installing, or performance testing of continuous source emission monitoring systems or other monitoring systems.

Revision No. 8 of the Manual was developed through a cooperative effort between the Department and the Air Quality Technical Advisory Committee (AQTAC). The foundation for many of the changes contained in the manual was the Pennsylvania DEP CEM Harmonization Study which was conducted by Perrin Quarles Associates, Inc., in 2004. The study examined the current PA DEP CEM program and identified areas in which the Department could harmonize the requirements of multiple programs, provided that such changes are appropriate for achieving the accuracy necessary to provide credible data from the continuous emission monitoring systems subject to those programs.

The existing CEM Data Processing System (CEMDPS) was inadequate to accommodate the numerous changes contained in Revision 8 of the Manual. Therefore, the Department undertook a project in 2005 to develop and implement a new and enhanced CEMDPS. CIBER was awarded the contract and the new system was developed between 2006 and 2008. It addresses several weaknesses that impacted the system's security and degree of effectiveness. It also provides several enhancements that the Department believes can contribute to increased system utilization by both Department and Industry Users.

In an effort to ensure that the new CEMDPS functioned as designed, representatives from the Department and AQTAC took part in a Pilot Program (2007) and Trial (2008). It was during this time that users identified the need to establish a question and answers document to address policy questions involved with the implementation of Revision No. 8 of the Manual and the new CEMDPS. This will help ensure that the requirements are applied consistently for all affected sources.

This document is intended to be a living document. The Department will issue new Questions and Answers as they arise and will revise previously issued Questions and Answers as necessary to provide clarification on technical procedures.

The procedures outlined in this document are intended to supplement existing requirements. Nothing in the procedures shall affect regulatory requirements.

The Department may decide to follow the guidance provided in this document, or to act at variance with this guidance, based upon its analysis of the specific facts presented.

The contents of this document are available to the general public through the Internet on the Department's CEM homepage (http://www.dep.state.pa.us/dep/deputate/airwaste/aq/cemspage/cems.htm). If after reviewing Revision No. 8 of the Continuous Source Monitoring Manual and this document, the reader still has an unresolved issue, the reader should contact a representative of the CEM Section for clarification.

REVISION NO. 8 IMPLEMENTATION/GENERAL REQUIREMENTS

Section 1 – How Will My Facility Be Impacted?

Question 1.1: Removed.

Question 1.2: What are the guidelines for how the owners/operators of facilities will implement the new Manual and CEMDPS?

Topic: Applicability and Implementation of Revision No. 8 of the Manual and CEMDPS

Answer: The "Applicability Determination and Implementation Procedures for Continuous Source Monitoring Manual Revision No. 8" contains the guidelines for implementing Revision No. 8 of the Manual. The document was finalized and posted in the *PA Bulletin* on January 10, 2009 and is available on the Department's CEM homepage.

Reference: Applicability Determination and Implementation Procedures for Continuous Source Monitoring Manual Revision No. 8 (274-0300-005), January 10, 2009

Question 1.3: How will outstanding work in process be handled?

Topic: Work in process

Answer: Contact the Department for specific instructions in the event that the facility has not implemented Revision No. 8 of the Manual.

Reference: N/A.

Question 1.4: Removed.

Question 1.5: Will the owners/operators of sources with CEMSs have training opportunities concerning the use of the new CEMDPS and the electronic data records (EDRs) contained in them?

Topic: Training on the new CEMDPS

Answer: A user manual has been developed for the new CEMDPS. It is currently available in draft form on the Department's CEM Homepage. In addition,

guidance on how to complete normal CEM activities will be provided throughout this document. The Department will likely schedule another round of workshops to discuss the new CEMDPS (no dates have been set).

Reference: CEM Homepage: http://www.dep.state.pa.us/dep/deputate/airwaste/aq/cemspage/cems.htm

Question 1.6: Can you have multiple submitters for a facility?

Topic: Roles in the new CEMDPS

Answer: No. Only one submitter will be allowed for each facility. Please contact the Chief of the Continuous Emission Monitoring Section if ones role in the system needs to be temporarily changed (i.e. coverage for when the assigned submitter will be out of the office for a period of time).

Reference: N/A

Question 1.7: Was an impact study on the costs associated with the changes necessary to comply with Revision No. 8 of the Manual and the CEMDPS conducted?

Topic: Impact study

Answer: Yes. The impact of complying with the new Manual revision and the CEMDPS was conducted. There is a significant cost associated for both Industry and the Department to implement the changes contained in the latest Manual revision.

Reference: Revision No. 8 Impact of Proposed Changes on Implementation

Question 1.8: How will information be entered into the new CEMDPS?

Topic: Use of the new CEM Document Processing System (CEMDPS)

Answer: Representatives from the Department will mail or e-mail the owners/operators of affected facilities the applicability and implementation procedures contained in this guidance, along with a "Request For Security Access/ Portal Account" form for the CEMDPS Online Application. The form should be completed and returned to the Chief of the CEM Section in order to establish a user account through the PA GreenPort for the application. A copy of the registration form can be obtained at the Department's CEM Homepage at: http://www.dep.state.pa.us/dep/deputate/airwaste/aq/cemspage/cems.htm.

Upon obtaining Portal Access, the Department will work with the owners/operators of affected facilities to make any necessary data/information corrections in the current CEMDPS and, ultimately, migrate all facility data/information into the new CEMDPS.

Reference: Applicability Determination and Implementation Procedures for Continuous Source Monitoring Manual Revision No. 8 (274-0300-005), January 10, 2009

Question 1.9: What do the owners/operators of a facility need to do to implement Revision No. 8 of the Manual?

Topic: Manual Implementation

Answer: The Applicability Determination and Implementation Procedures for Continuous Source Monitoring Manual Revision No. 8 (274-0300-005), outlines the requirements and timeframe for implementing the new manual. There are also a number of materials that were provided during the 2009 CEM Workshop to assist users with the implementation process.

Pages 79-88 of Revision No. 8 of the Manual outlines the major changes from Revision No. 7 to Revision No. 8 of the Manual and the major changes from Revision No. 6 to Revision No. 7 of the Manual are outlined on pages 54-59 of Revision No 7 of the Manual.

The biggest change is to the reporting format and what constitutes a valid hour. The Department has developed a "Data Validation Clarification Document (DRAFT) – Continuous Source Monitoring Manual Revision No. 8 (Manual)" to assist users with this process.

The Department strongly recommends that the owners/operators of impacted facilities contact their software/hardware vendors (if applicable) and develop an implementation plan to address their particular situation.

References: CEM Website,
Applicability Determination and Implementation Procedures for Continuous Source Monitoring Manual Revision No. 8 (274-0300-005), January 10, 2009
Data Validation Clarification Document (DRAFT) – Continuous Source Monitoring Manual Revision No. 8 (Manual)

Question 1.10: Do any of the old CEMSs certification tests need to be submitted to backfill the historical database?

Topic: Manual Implementation

Answer: Sources currently under Revision No. 6 of the Manual will need to demonstrate compliance of all associated measurement devices with the 7-day calibration error requirements of Revision No. 8, if the Revision No. 8 requirements are more stringent than those of Revision No. 6.

The Department will migrate the configuration and historical test and emissions data into the new CEMDPS when the facility implements Revision No. 8 of the Manual. The owners/operators of the facilities will not be required to "backfill" the database when they implement Revision No. 8 of the Manual. The Department will require the owners/operators of sources to fill in information that is not currently contained in the old CEMDPS when a Phase 1 Monitoring Plan is submitted in the new CEMDPS. Software/hardware vendors may request that clients complete a Phase 1 monitoring as soon as facility information has been migrated into the new CEMDPS. This information is often used to program the data acquisition and handling system.

References: CEM Website
Applicability Determination and Implementation Procedures for Continuous Source Monitoring Manual Revision No. 8 (274-0300-005), January 10, 2009

Question 1.11: Can the individual considered the Responsible Official as defined under 25 Pa. Code §121.1 for submission and certification requirements under the Pennsylvania Air Pollution Control Act, have the ability to formally delegate authority to submit information to the Department in the new CEMDPS? What is the process that should be followed for such requests? Should a process similar to 40 CFR 72.26 be followed?

Topic: Submittal of information in the new CEMDPS

Answer: A Responsible Official is an individual who is:

(i) For a corporation: a president, secretary, treasurer or vice president of the corporation in charge of a principal business function, or another person who performs similar policy or decision making functions for the corporation, or an authorized representative of the person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for, or subject to, a permit and one of the following applies:

(A) The facility employs more than 250 persons or has gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars).

(B) The delegation of authority to the representative is approved, in advance, in writing, by the Department.

(ii) For a partnership or sole proprietorship: a general partner or the proprietor, respectively.

(iii) For a municipality, State, Federal or other public agency: a principal executive officer or ranking elected official. A principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency—for example, a regional administrator of the EPA.

(iv) For affected sources:

(A) The designated representatives in so far as actions, standards, requirements or prohibitions under Title IV of the Clean Air Act (42 U.S.C.A. §§ 7641 and 7642) or the regulations thereunder are concerned.

(B) The designated representative or a person meeting provisions of subparagraphs (i)—(iii) for any other purpose under 40 CFR Part 70 (relating to operating permit programs) or Chapter 127 (relating to construction, modification, reactivation and operation of sources).

The Submitter may delegate authority to another individual provided they comply with the stipulations outlined above. An individual that has been delegated authority would then be considered responsible for any submittals to the Department. There can only be one responsible official for each facility. Any requests for delegations or changes to delegations should be made in writing to the Chief of the Continuous Emission Monitoring Section, Bureau of Air Quality, 12th Floor, 400 Market Street, Harrisburg, PA 17105-8468.

Requests should include information that the Responsible Official deems pertinent to the Department's review of the request. It should also be accompanied by a completed "Request For Security Access/Portal Account" form, which is available at the Department's CEM website at: http://www.dep.state.pa.us/dep/deputate/airwaste/aq/cemspage/cems.htm. The Department may request additional information.

References: 25 Pa. Code §121.1
40 CFR 72.26

Question 1.12: Removed.

Question 1.13: Can a CEMS software vendor register to use the CEMDPS*Online Application?

Topic: Providing access to the CEMDPS*Online Application

Answer: A responsible official from a facility that is required to certify/operate CEMSs is the only individual that can make a request for system access for themselves, staff, or for a vendor. A representative from the Department's CEM Section would verify that the person making the request is the responsible official for the facility prior to granting access to the application. Vendors who seek system access for a particular facility would need to obtain approval from the responsible official before access to the application could be provided.

Reference: N/A

Question 1.14: Are the owners/operators of facilities with CEMS(s) required to upgrade their data acquisition system (DAS) or poling system in order to become compliant with the guidelines of Revision No. 8 of the Manual?

Topic: DAS or poling system upgrades

Answer: The function of the DAS or poling system is to compile emissions data and perform the recordkeeping and reporting and quality assurance activities in accordance with the requirements of Revision No. 8 of the Manual. All applicable emissions data reports must be created and submitted to the Department in accordance with the format outlined in the electronic data reporting formats contained in Attachment No. 3 of Revision No. 8 of the Manual. The DAS or poling systems would need to be upgraded, as appropriate, to accommodate the changes contained in Revision No. 8 of the Manual.

Reference: N/A

Question 1.15: Removed.

Question 1.16: Removed.

Question 1.17: Are testing companies required to be Air Emission Testing Body (AETB) certified?

Topic: Testing requirements

Answer: EPA's "Protocol Gas Verification Program and Minimum Competency Requirements for Air Emission Testing" rule became effective on March 27, 2012. It includes changes to EPA Protocol Gasses and a requirement for testing companies to be Air Emission Testing Body (AETB) certified.

The new rules and regulations are currently not required for testing conducted for only PA purposes but are required for any 40 CFR Part 75 testing conduct and submitted directly to the Federal Environmental Protection Agency (EPA). The Department encourages testing firms to become AETB certified and may include it as a requirement for State only testing in the future (possibly in Revision No. 9 of the Continuous Source Monitoring Manual).

Reference: EPA-HQ-OAR-2009-0837; FRL-9280-9

SUBMITTAL AND APPROVAL

Section 2 – Initial Application (Phase I)

Question 2.1: Does NOTE 2 on page 14 translate to: "for analyzer ranges used to determine compliance with emission standards for the facility (as opposed to a single source at the facility), the performance specification is 2.5% of the range. For example, if the range is 100 PPM, the performance specification is 2.5 PPM."

Topic: NOTE 2 in Tables

Answer: Not exactly. CEMSs are not configured to address facility emission caps; they would be addressed by the appropriate DEP regional office.

Note 2 would be applicable to sources that don't have an emission standard or an emission standard for the highest range (for sources with duel analyzers). For instance, a source has an emission standard of 15 PPM. It has duel range analyzers with ranges of 0-20 PPM and 0-100 PPM. The high range analyzer is essentially used to document emissions during start-up or during times in which problems are encountered with pollution control equipment. Since there is no emission standard to be used for the high range, 2.5% of the measurement device range of 100 PPM will be applicable for drift determination.

Reference: NOTE 2, page 14, Manual

Question 2.2: What is the Department's expected turnaround on distributing the various monitoring plan ID's once an initial electronic monitoring plan is submitted (days, weeks, months)?

Topic: Monitoring Plan (Phase 1)

Answer: The turnaround time would vary, depending upon current work in process, the complexity and completeness of the submitted monitoring plan, and the learning curve on Department use of the new CEMDPS. Once the monitoring plan is deemed to be complete, the ID's could, potentially, be specified immediately. Should errors in the monitoring plan be subsequently discovered, changes could be required that could result in removal of components (and their associated IDs) or addition of components (with additional IDs assigned).

Reference: N/A

Question 2.3: In Table I (of Revision No. 8 of the Continuous Source Monitoring Manual), is it the agencies intent to have all opacity monitors re-ranged to no greater than 0 – 80% as was accepted in Revision 6 and earlier?

Topic: Opacity monitor range

Answer: No. The installation specification cited in Table I of the Manual actually states that the range of the opacity monitor should be 0 – ≥ 80%.

Reference: Manual, Table 1, page 12

Question 2.4: What reference values should be used for conducting a linearity test for a temperature monitoring system where emf is used as a reference?

Topic: Linearity test, temperature monitoring specifications

Answer: The intent was that the linearity check for thermocouples could be conducted either:

1. In accordance with the "Linearity Check (general procedures)" of 40 CFR, Part 75, Appendix A
    a. In-situ via emf simulated signals sent from thermocouple output location to readout device (emf reference), or
    b. Thermocouple and readout device removed to a testing location using actual temperature references applied to the thermocouple (temperature reference)
2. In accordance with NIST procedures
    a. Thermocouple and readout device removed to a testing location

Footnote +, in Table X of the manual states the following:

"In accordance with the procedures specified in the Quality Assurance section of this manual, if temperature used as reference **(5 repetitions at each of 3 levels)**, expressed as the sum of the absolute value of the mean and the absolute value of the 95% confidence coefficient for each level. **If emf used as reference (single measurement every 200 degrees), expressed as the absolute value of the mean for each comparison."**

In doing the "signal simulation" linearity checks for temperature (emf meaning the millivolt signal representing a particular temperature), the most meaningful check would be over the "range of interest".

For instance, for monitoring of MWI secondary temperature, signals representing 1600 degrees F, 1800 degrees F, and 2000 degrees F would be appropriate. For monitoring of baghouse temperatures, 200 degrees F, 400 degrees F, 600 degrees F would be appropriate. For other applications, the measurements should cover the range of interest with respect to the applicable operational criteria or standards.

Footnote + incorrectly indicates that "5 repetitions at each of 3 levels…" should be conducted for linearity checks. This language should be removed because it is not consistent with the requirements cited at the beginning of this answer.

Reference: Manual, Table X, page 27

Question 2.5: Provide a detailed example of how/what a facility should use to select the appropriate ranges for a duel range analyzer and calculation of the Lowest Monitored Emission Standard Equivalent (LMESE) and daily calibration check.

Topic: Analyzer range selection and calculation of LMESE

Answer: Given:
SO_2 emission standards
500 PPM, 1-hr block average
59.4 lbs/hr, 1-hr block average
0.6 lbs/MBtu, 30-day average, rolling by 1 day

SO_2 maximum expected emissions ≈ 500 PPM
SO_2 average emissions ≈ 30 PPM
O_2 diluent analyzer with range = 0-25%
O_2 average emissions ≈ 8%

1. Is a dual range analyzer recommended?

The applicable tables in the Continuous Source Monitoring Manual stipulate whether a dual range analyzer is recommended. The following guidelines are specified for SO_2 (as appropriate):

- Highest range (PPM): 0 to ≥ the maximum expected emissions (MEE) and ≥ 1.25 times the highest emission standard.
- Optional low range (PPM): 0 to ≥ 1.25 times the highest emission standard for this range.

As a rule of thumb, if the average emissions are anticipated to be ≤20% of the maximum expected emissions, a dual range analyzer is recommended. For this particular instance for SO_2,

$$X = \frac{\text{Average emissions}}{\text{Maximum expected emissions}} = \frac{30\ \text{PPM}}{500\ \text{PPM}} = 0.06 = 6\%$$

If $X \leq 20\%$, duel range analyzer is recommended

If $X > 20\%$, single range analyzer is recommended

Since 6% is ≤ 20%, a duel range analyzer is recommended

A range of 0-25% is required for oxygen analyzers unless an alternate is approved by the Department.

2. Calculate the emission standard equivalent for each standard

$$\text{For } SO_2\ \frac{\text{lbs}}{\text{hr}} = \text{emission standard} = 59.4\ \frac{\text{lbs}}{\text{hr}}$$

$$\text{Flow}(Q_n) = 4{,}800{,}000\ \frac{\text{dsft}^3}{\text{hr}}$$

$$SO_2\ \frac{\text{lbs}}{\text{hr}} = SO_2(\text{conc., PPM}) * \text{flow}\left(Q_n, \frac{\text{dsft}^3}{\text{hr}}\right) * 1.663\text{E}^{-7}$$

$$59.4 = SO_2(\text{conc., PPM}) * 4{,}800{,}000 * 1.663\text{E}^{-7}$$

$$SO_2(\text{conc., PPM}) \cong 75$$

$$\text{For } SO_2\left(\frac{\text{lbs}}{\text{MBtu}}\right) = \text{emission standard} = 0.6\ \frac{\text{lbs}}{\text{MBtu}}$$

Fuel type = natural gas = $F_d = 8{,}710$

$\text{Diluent} = \text{Oxygen}(O_2) = 8\%$

$$SO_2\ \frac{\text{lbs}}{\text{MBtu}} = SO_2(\text{conc., PPM}) * F_d * 1.663\text{E}^{-7} * \left[\frac{20.9}{20.9 - O_{2d,\%}}\right]$$

$$0.6 = SO_2(\text{conc., PPM}) * 8{,}710 * 1.663\text{E}^{-7} * \left[\frac{20.9}{20.9 - 8}\right]$$

$$SO_2(\text{conc., PPM}) \cong 256$$

There are 3 emission standards/equivalents; 75 PPM (from lbs/hr std.), 256 PPM (from lbs/MBtu std.), and 500 PPM (given standard).

You should not calculate emission standard equivalents from any limits longer than 30 days in duration (i.e. tons/yr, 12 month sums or

rolls, etc.) or any based upon mass of pollutant per unit of production (i.e. lbs/ton of glass pulled, lbs/ton of clinker produced, etc.). If the example did not contain any emission standards of a 30-day duration or less, the specification would be the equivalent, in device units of measurement, of 2.5% of the measurement device range (view NOTE 2 in the applicable specification table in the Manual). An example is provided in Item 4, below.

There is no emission standard equivalent for O_2.

3. Calculation of range(s)

According to Table II (page 13) of the Manual for SO_2:

Highest range = 0 to ≥ MEE and ≥ 1.25 * highest standard for range
= 0 to ≥ 500 PPM and 0 to ≥ 1.25 ∗ 500 PPM = 625 PPM
therefore, the range should be ≅ 0 – 625 PPM

Optional lower range = 0 to ≥ 1.25 ∗ highest standard for range
= 0 to ≥ 1.25 ∗ 75 PPM = 94 PPM ≅ 0 – 100 PPM

A good rule of thumb for range selection is that the optional low range should be around 20% of the high range. In this case, the low range is 16% of the highest range. Therefore, the selection of 0-100 PPM and 0-625 PPM ranges appear to be appropriate.

$$\frac{100\ \text{PPM}}{625\ \text{PPM}} = 0.16 = 16\%$$

The range of the O_2 analyzer is 0-25%.

4. Calculation of daily calibration error checks

I.D.1.a. of the Quality Assurance Section in the Manual, states the following:

> a. Calibration must be conducted at least daily for determination of measurement device zero and upscale calibration error on all measurement device ranges, except for fuel flowmeters. Fuel flowmeters must meet the quality assurance requirements specified in Table XIII of this Manual. **The results of daily calibrations are calculated as the value of the reference material used minus the measurement device reading and as [the value of the**

reference material used minus the measurement device reading] divided by the lowest monitored emission standard equivalent.

Table II (Specifications for Sulfur Dioxide and Nitrogen Oxides Monitors) lists the following performance specifications for daily calibration error checks:

2	Zero calibration error (% of lowest monitored emission standard equivalent for range as determined during Phase I)	5.0 maximum +++
	or (ppm).....	2.0 maximum
	or	as specified in applicable Federal regulations if more stringent in terms of units of measurement
2	Upscale calibration error (% of lowest monitored emission standard equivalent for range as determined during Phase I)	5.0 maximum +++
	or (ppm).....	2.0 maximum
	or	as specified in applicable Federal regulations if more stringent in terms of units of measurement

Daily calibration error for the SO_2 analyzer would be calculated as follows:

Given : Assumed values inserted

For highest range : 0 - 625 PPM

$$\text{Zero calibration error} = \frac{\text{Reference} - \text{Measurement}}{\text{LMESE (for range)}} = \frac{0 \text{ PPM} - 4 \text{ PPM}}{256 \text{ PPM}} = -0.016$$

Zero calibration error = – 1.6%

Result is passing because 1.6% ≤ 5%

$$\text{Upscale calibration error} = \frac{\text{Reference} - \text{Measurement}}{\text{LMESE (for range)}} = \frac{550 \text{ PPM} - 535 \text{ PPM}}{256 \text{ PPM}} = 0.059$$

Upscale calibration error = 5.9%

Result is failing because 5.9% > 5%. However, data is still considered valid because it did not exceed twice the performance specification = 2 * 5% = 10%

For lower range : 0 - 100 PPM

$$\text{Zero calibration error} = \frac{\text{Reference} - \text{Measurement}}{\text{LMESE (for range)}} = \frac{0 \text{ PPM} - 2 \text{ PPM}}{75 \text{ PPM}} = -0.027$$

Zero calibration error = – 2.7%

Result is passing because 2.7% ≤ 5%

$$\text{Upscale calibration error} = \frac{\text{Reference} - \text{Measurement}}{\text{LMESE (for range)}} = \frac{80 \text{ PPM} - 79 \text{ PPM}}{75 \text{ PPM}} = 0.013$$

Upscale calibration error = 1.3%

Result is passing because 1.3% ≤ 5%

Let's assume that there was no emission standard for the highest range. Follow the guidelines contained in Note 2 of Table II, which states the following:

2 NOTE: For measurement device ranges not used to determine compliance with emission standards for a single source combination (as opposed to emission standards for the facility), the specification shall be the equivalent, in device units of measurement, of 2.5% of the measurement device range.

Daily calibration error should be calculated as follows:

$$\text{Zero calibration error} = \frac{\text{Reference} - \text{Measurement}}{\text{Range}} = \frac{0 \text{ PPM} - 4 \text{ PPM}}{625 \text{ PPM}} = -0.006 = -0.6\%$$

$$\text{Upscale calibration error} = \frac{\text{Reference} - \text{Measurement}}{\text{Range}} = \frac{510 \text{ PPM} - 500 \text{ PPM}}{625 \text{ PPM}} = 0.016 = 1.6\%$$

Table III (Specifications for Oxygen and Carbon Dioxide Monitors) lists the following performance specifications for daily calibration error checks:

Zero calibration error (% O_2 or % CO_2)	0.5 maximum^{+++}
Upscale calibration error (% O_2 or % CO_2)	0.5 maximum^{+++}

Daily calibration error for the O_2 analyzer would be calculated as follows:

Given : Assumed values inserted

For range : 0 - 25 %

Zero calibration error = Reference value − Measurement device reading

Zero calibration error = 23.5% − 23.1% = 0.4%

Result is passing because 0.4% ≤ 0.5%

Upscale calibration error = 0% − 0.2% = 0.2%

Result is passing because 0.2% ≤ 0.5%

References: Initial Application (Phase 1), Manual, I.I, page 6
Specification Table II, Manual, pages 13-14
Specification Table III, Manual, pages 15-16
Quality Assurance Section of the Manual, I.D.1., pages 66-67

Question 2.6: What type of notification does the Department require from the owner/operator of a source in order to change the range of a gas analyzer? What performance testing would be required?

Topic: Analyzer range change requirements

Answer: The owners/operators of the facility would be required to complete and submit a Monitoring Plan (Phase 1), detailing the particulars of the intended change. Upon approval of the Phase 1, a Testing Protocol would be required to be submitted to the Department. A linearity test and 7-Day Calibration Error Test would be required to be successfully conducted. The test results should be submitted to the Department for review. The Department will certify the CEMSs and request quarterly emissions and linearity data upon approval. All information should be submitted through the new CEMDPS.

Reference: N/A. Information concerning analyzer range changes have not been addressed in Attachment No. 5 of the Manual. Such changes will be included in the next revision of the Manual.

Question 2.7: The owners/operators of a facility operate a boiler that exhausts emissions through two stacks (Stack A and Stack B). One time-shared CEMSs is currently in operation which samples emissions from Stack A for 5 minutes before switching to sample Stack B for 5 minutes. There is approximately 25 minutes of valid sampling that occurs on each of the stacks in each operating hour.

A. Could/should an hourly emission average for Stack A and Stack B be collected and then averaged to arrive at an hourly average?

B. It appears that the Manual allows for the use of time-shared CEMSs. Is it possible for the owners/operators of a source to use a time-shared CEMS to comply with the 45 minute data collection requirement? I believe that the only way to make it work would be to use the data from whatever stack is being sampled, verify that we collect 45 minutes (from both stacks data) and calculate an hourly average. Is that correct? Is there guidance anywhere on how this would work? Is what was proposed in B (above), acceptable under Revision 6 and 8 of the Manual?

Topic: Time-shared CEMSs

Answer: The definition of an hourly average is provided on page 64 of Revision 8 of the Manual and reads as follows:

4. Hourly averages.

   a. All parameters except for opacity, temperature, CO, parameters addressed by Tables XI, XII, or XIII of this manual - data from measurement devices of these types can be used to calculate a valid monitoring system hourly average if at least one valid data reading is obtained in each 15-min quadrant during which the process was operating. Notwithstanding this requirement, if the process operated during more than one quadrant of the hour and if some data is unavailable as a result of the performance of calibration, quality assurance activities, preventive maintenance activities, or backups of data from the data acquisition and handling system, valid data readings from at least two points separated by a minimum of 15 minutes may be used.

   b. For opacity, temperature, CO, parameters addressed by Tables XI, XII, or XIII of this manual - data from measurement devices of these types can be used to calculate a valid monitoring system hourly average if it contains at least 75 percent of the segments of the hour corresponding to the minimum required cycle time (for measurement) during which the process was operating.

A. Approval of the above proposal would be dependent upon the situation and on how the permit/plan approval/order was written. There are facilities in Pennsylvania that build an hourly average in the manner you've described.

B. If 4.b. of the above passage from the Manual is applicable, you must have 75% of the segments of the hour corresponding to the minimum required cycle time (for measurement) during which the process was operating in order to have a valid hour. The Department's intent has been that a "segment" would correspond to a valid one-minute average.

The best way illustrate the feasibility of using 4.b. of the Manual (above) is by way of an example.

Given:
CO is the pollutant
Minimum number of cycles per hour (measured and recorded) = 12
A cycle must be completed at least once in every 5 minutes
Monitoring was required for the entire hour

To determine the cycle time for time-shared systems, at each monitoring location, report the sum of the cycle time observed at that monitoring location plus the sum of the time required for all purge cycles (as determined by the continuous emission monitoring system manufacturer) at each of the probe locations of the time-shared systems.

The hour would be considered valid if it contains at least one valid one-minute average during at least 75% of the segments of the hour corresponding to the minimum required cycle time (for measurement) during which the process was operating. This would equate to at least 9 of 12 segments in the hour.

It would be difficult to construct time-shared CEMSs for pollutants/parameters which are required to follow the requirements of 4.b. of the Manual (above). There is no specific guidance other than what is provided in this explanation.

References: Continuous Source Monitoring Manual, page 64, 4a. and 4b.
40 CFR Part 75, Appendix A § 6.4, Cycle Time Test

Question 2.8: The title paragraph in Table XII references specifications for "temperature", is this incorrect since Table X is specifically for temperature monitoring systems?

Topic: Table XII parameters

Answer: In Revision No. 7 of the manual, the intent was that only those temperature monitoring devices used to report temperature for compliance with an operational criterion (maximum baghouse temperature limits, etc.) would need to conduct the test for 2-hour drift (difference between Tables X and XII). Since there is no longer any requirement for 2-hour drift, "temperature" should be removed from the header.

Reference: N/A.

Question 2.9: If a measurement device range is not used to determine compliance with emission standards for a single source combination, the drift specification is 2.5% of the measurement device range. This appears to be the same whether or not the analyzer measures NO_x, SO_2, or CO even though the specified zero/upscale calibration limit is 5% (of the lowest monitored emission standard equivalent) for NO_x and SO_2 but 10% for CO. Is this correct? How should this be handled for a flow monitor?

Topic: Zero/Upscale calibration error specification

Answer: In most cases, the owners/operators of sources that certify dual range analyzers utilize the low range to demonstrate compliance with emission standards and the high range to measure emissions in the event of a control system failure. The manual states that for measurement device ranges not used to determine compliance with emission standards for a single source combination, the specification shall be the equivalent, in device units of measurement, of 2.5% of the measurement device range. This can be found in NOTE 2 of the applicable tables in the Manual.

The method to calculate the LMESE is outlined under I.I. of the Initial Application Section of the Manual and a detailed example is provided in Question 2.5, above.

Because the zero/upscale calibration error is calculated in terms of the % of the LMESE, back calculating this value from the 2.5% of the range will produce a different LMESE depending on the pollutant/parameter. This is illustrated, below:

Given

No emission standards for each of the ranges

SO_2 range = 0 - 625 PPM

CO range = 0 - 625 PPM

SO_2 drift specification = $(625\ \text{PPM})(0.025) = 15.625\ \text{PPM}$

Calculate equivalent LMESE

Zero/upscale calibration error specification = 5% of LMESE = 0.05

$15.625\ \text{PPM} = (X)(0.05)$

$X = 312.5\ \text{PPM} = \text{LMESE}$

CO drift specification = $(625\ \text{PPM})(0.025) = 15.625\ \text{PPM}$

Calculate equivalent LMESE

Zero/upscale calibration error specification = 10% of LMESE = 0.1

$15.625\ \text{PPM} = (X)(0.1)$

$X = 156.25\ \text{PPM} = \text{LMESE}$

Table IX ("Stack" Flow Monitoring Performance Specifications) of the manual does not contain the NOTE as described above, but the owners/operators of facilities should follow the same guidance to determine an LMESE. The NOTE will be added in the next revision of the manual. The following example depicts how to calculate such an LMESE:

Given

No emission standards for the range.

Flow range = $0 - 10{,}000{,}000 \frac{\text{dsft}^3}{\text{hr}}$

Flow drift specification = $\left(10{,}000{,}000 \frac{\text{dsft}^3}{\text{hr}}\right)(0.025) = 250{,}000 \frac{\text{dsft}^3}{\text{hr}}$

Calculate equivalent LMESE

Zero/upscale calibration error specification = 6% of LMESE = 0.06

$250{,}000 \frac{\text{dsft}^3}{\text{hr}} = (X)(0.06)$

$X = 4{,}166{,}667 \frac{\text{dsft}^3}{\text{hr}} = \text{LMESE}$

The use of an alternative LMESE may be considered if the owners/operators of the facility are consistently unable to meet the specified tolerances. The Department will revisit this requirement when developing the next revision of the manual.

Reference: NOTE 2 in the Tables of the Manual
Manual, Initial Application Section, I.I.

Question 2.10: The owners/operators of a facility wish to add a high range to an analyzer to capture emission spikes when their control system is not operating correctly. The low range of the analyzer is a component of a CEM that was certified in the past. Is a monitoring plan required to be submitted to the Department? What performance testing is required to be conducted?

Topic: Addition of a high range analyzer

Answer: This change should be considered an initial certification because a second range was never part of the original certification. A monitoring plan containing information concerning the addition of the range should be submitted to the Department.

The performance testing required includes a 7 day calibration error, linearity, and cycle time. A relative accuracy test audit is not required because it is not the range normally used for measuring emissions.

Reference: 40 CFR Part 75, Appendix A, 2.1.1.4, 6.2, 6.3.1, 6.4, and 6.5.

Question 2.11: How should the lowest monitored emission standard equivalent (LMESE) be calculated for emission standards that are based upon a pollutant corrected to some percentage of oxygen?

Topic: Calculation of LMESE for oxygen corrected pollutants

Answer:

Given

$\text{TRS Emission Standard} = 5 \text{ PPM @ } 8\% \text{ O}_2$

$\text{Average Hourly O}_2 \text{ Concentration} = 8.5\%$

$$\left[\frac{\text{Standard}}{\frac{(20.9 - \text{Corrected \% O}_2)}{(20.9 - \text{Actual \% O}_2)}}\right] = \text{LMESE (ppmdv)}$$

$$\left[\frac{5}{\frac{(20.9 - 8)}{(20.9 - 8.5)}}\right] = 4.8 \text{ PPM}$$

Reference: N/A

Section 3 – Performance Testing (Phase II)

Question 3.1: Has the confidence coefficient been completely removed from the calibration error and linearity error calculations?

Topic: Calibration error and linearity test calculations

Answer: It has been removed for continuous gas monitoring systems, since they now follow Part 75, Appendix A, requirements. Please note that the confidence coefficient remains for the zero and upscale calibration drift and calibration error testing for opacity monitors as required in Part 60, Performance Specification 1. Testing for opacity monitoring systems should follow the requirements outlined in Part 60, Performance Specification 1. Table's I-XIII of the Manual should also be referenced for requirements specific to each pollutant/parameter.

References: Part 75, Appendix A
Part 60, Performance Specification 1
Table's I-XIII, Manual

Question 3.2: Are the owners/operators of a source required to perform a 5-run linearity check or a 3-run linearity check as per Part 75, Appendix A, requirements?

Topic: Linearity test

Answer: A 3-run linearity check as per Part 75, Appendix A, requirements.

References: Performance Testing (Phase II) Section, I.A.
Part 75, Appendix A

Question 3.3: What procedures should be followed to complete a 7-day Calibration Error Test for CO analyzers? What performance specifications should be adhered to?

Topic: 7-day Calibration Error Test

Answer: Calibration error testing should be conducted in accordance with the procedures specified in the "Gas Monitor 7-day Calibration Error Test" section of Part 75, Appendix A (except that the test must be conducted on all ranges of each measurement device and the requirements for calibration gas levels, data validation, and acceptability shall be specified in the Manual). The performance specifications outlined in Table IV of the Initial Application Section (Phase I) of the Manual should be met.

References: Initial Application (Phase I), Table IV
Performance Testing (Phase II) Section, I.A.
Part 75, Appendix A

Question 3.4: Please provide a response for the following scenario:
A NO_x analyzer has been replaced and necessary adjustments and corrective maintenance performed. A calibration error test is then passed for the monitoring system to begin collecting quality-assured data. A linearity test is performed several days later, but does not pass. Upon investigation, it appears that the reason it did not pass was due to a problem with the calibration gas connection. The calibration gas connection problem was addressed and a linearity was subsequently passed without adjusting the analyzer. Does the Department consider this corrective (unscheduled) maintenance conducted on the monitoring system?

Topic: Initial performance specification testing, corrective (unscheduled) maintenance

Answer: The Department does not consider correcting the calibration gas connection problem corrective (unscheduled) maintenance conducted on the monitoring system. The NO_x analyzer did not require any adjustments during the test period.

References: Performance Testing (Phase II), I.A

Question 3.5: Does the Department require the owners/operators of a source to re-conduct a test that had previously passed during the recertification test period in the event that another recertification test fails?

Topic: Initial performance specification testing

Answer: Not necessarily. Generally, unscheduled maintenance conducted on the CEMS would invalidate any testing conducted before the maintenance. Therefore, the relative accuracy test audit (RATA), if necessary, should be the last test conducted, due to the time and expense involved. The Department may consider the impact of the unscheduled maintenance on any previously passed testing, when requested.

References: N/A

Question 3.6: Are linearity checks/tests required for moisture analyzers?

Topic: Linearity check – moisture analyzers

Answer: A linearity test of each O_2 analyzer is required for each continuous moisture monitoring system consisting of wet- and dry-basis O_2 analyzers. No linearity test is required for a continuous moisture sensor or for a continuous moisture monitoring system consisting of a temperature sensor and a data acquisition and handling system (DAHS) software component programmed with a moisture lookup table.

Reference: Performance Testing (Phase II) Section, I.A
40 CFR § 75.20(c)(5) – (c)(7)

Question 3.7: Can multiple sources be audited simultaneously during an opacity relative accuracy test audit?

Topic: Opacity – Relative accuracy test audit

Answer: Yes, provided that the observer's line of sight does not include more than one plume at a time and his/her line of sight should be perpendicular to the longer axis of such a set of multiple stacks. Method 9 does not specify the maximum number of plumes that can be observed at a given time. But sufficient time to momentarily observe each plume and record the reading at 15-second intervals must be provided.

Reference: 40 CFR Part 60, Appendix A, Method 9

Question 3.8: Are linearity checks/tests required for air flow monitors?

Topic: Linearity check – air flow monitors

Answer: No. I.A of the Performance Testing (Phase II) section of the manual indicates that linearity testing should be conducted in accordance with the procedures specified in the "Linearity Check" section of 40 CFR, Part 75, Appendix A (with a few caveats). Linearity testing is not required for air flow monitors in Part 75 and is not required for Pennsylvania regulatory purposes. Any such statements contained the manual should be disregarded.

Please note that for differential pressure flow monitors, a leak check of all sample lines must be successfully performed at least once during each QA operating quarter.

Reference: Performance Testing (Phase II) Section, I.A
40 CFR, Part 75, Appendix A
40 CFR, Part 75, Appendix B, 2.2.2

Section 4 – Final Approval (Phase III)

RECORD KEEPING AND REPORTING

Section 5 – Continuous Source Emission Monitoring Systems

Question 5.1: Elaborate on the examples provided under Option 2) on page 49 and page 50 of the Manual.

Topic: Recordkeeping and Reporting

Answer: Example 1

Below is an example of an invalid hour, **requiring data substitution** in accordance with the first example provided in option 2) of the Record Keeping and Recording Section of the Manual (pages 49-50);

Given

Highest valid one-hour emission value during the reporting quarter = 1.234
Invalid data time (primary analyzer malfunction) = 20 minutes
Valid data = 40 minutes
Operational time – normal operation
Assume the pollutant is SO_2

Minute	Value	Minute	Value	Minute	Value
1	1.234	21	0.123	41	0.123
2	1.234	22	0.123	42	0.123
3	1.234	23	0.123	43	0.123
4	1.234	24	0.123	44	0.123
5	1.234	25	0.123	45	0.123
6	1.234	26	0.123	46	0.123
7	1.234	27	0.123	47	0.123
8	1.234	28	0.123	48	0.123
9	1.234	29	0.123	49	0.123
10	1.234	30	0.123	50	0.123
11	1.234	31	0.123	51	0.123
12	1.234	32	0.123	52	0.123
13	1.234	33	0.123	53	0.123
14	1.234	34	0.123	54	0.123
15	1.234	35	0.123	55	0.123
16	1.234	36	0.123	56	0.123
17	1.234	37	0.123	57	0.123
18	1.234	38	0.123	58	0.123
19	1.234	39	0.123	59	0.123
20	1.234	40	0.123	60	0.123

Q1 Q2 Q3 Q4

A value of 1.234 has been substituted for minutes 1-20 because it is the highest valid one-hour emission value that occurred during the reporting quarter.

The hourly average would be calculated as follows:

$$\text{Hourly Average} = \frac{\left[\left(1.234 * 20\right) + \left(0.123 * 40\right)\right]}{60} = 0.493$$

The operating time for the hour would be 40 minutes (40 minutes of valid data)

The hour is considered invalid because it does not contain at least one valid one-minute average in the 1st quadrant. The quadrants are identified by grey shaded vs. unshaded "Minutes". This would be considered a whole hour of operation (data substitution required) and should be reported with the above hourly average, PC=08, MC=16, and MDC=DA (Department agreed data substitution method).

Example 2

Below is an example of an invalid hour, **requiring data substitution** in accordance with the second example provided in option 2) of the Record Keeping and Recording Section of the Manual (page 50);

Given

Highest valid one-hour emission value during the reporting quarter = 1.234
Invalid data time (primary analyzer malfunction) = 20 minutes
Process down time = 20 minutes
Valid data = 20 minutes
Operational time – normal operation
Assume the pollutant is SO_2

Minute	Value	Minute	Value	Minute	Value
1	0.000	21	1.234	41	0.123
2	0.000	22	1.234	42	0.123
3	0.000	23	1.234	43	0.123
4	0.000	24	1.234	44	0.123
5	0.000	25	1.234	45	0.123
6	0.000	26	1.234	46	0.123
7	0.000	27	1.234	47	0.123
8	0.000	28	1.234	48	0.123
9	0.000	29	1.234	49	0.123
10	0.000	30	1.234	50	0.123
11	0.000	31	1.234	51	0.123
12	0.000	32	1.234	52	0.123
13	0.000	33	1.234	53	0.123
14	0.000	34	1.234	54	0.123
15	0.000	35	1.234	55	0.123
16	0.000	36	1.234	56	0.123
17	0.000	37	1.234	57	0.123
18	0.000	38	1.234	58	0.123
19	0.000	39	1.234	59	0.123
20	0.000	40	1.234	60	0.123

Q1
Q2
Q3
Q4

A value of 1.234 has been substituted for minutes 21-40 because it is the highest valid one-hour emission value that occurred during the reporting quarter.

The hourly average would be calculated as follows:

$$\text{Hourly Average} = \frac{\left[(0 * 20) + (1.234 * 20) + (0.123 * 20)\right]}{60} = 0.452$$

The operating time for the hour would be 40 minutes (20 minutes invalid data and 20 minutes of valid data)

The hour is considered invalid because it does not contain at least one valid one-minute average in the 2nd quadrant. The quadrants are identified by grey shaded vs. unshaded "Minutes". This would be considered a partial hour of operation (data substitution required) and should be reported with the above hourly average, PC=08, MC=16, and MDC=DA (Department agreed data substitution method).

Reference: Record Keeping and Reporting Section, pages 49-50

Question 5.2: If the owners/operators of a source are subject to Part 75 and elect to use those substitution routines for NO_x, SO_2 and CO_2, what routine is allowed for CO since it doesn't fall under Part 75? Should it follow a load based routine like NO_x/flow or one more like SO_2/CO_2? Would this be considered Option 3 under the substitution options?

Topic: CO data substitution procedures

Furthermore, there are various sources implementing Part 75 type substitution routines on the resulting compliance parameter (i.e. lb/hr). This is a Part 75 variation and not "Part 75". Should they be changed to use the standard Part 75 individual parameter substitution (i.e. on the raw data, CO PPM and Stack flow scf) or will the lb/hr substitution be acceptable? Would this be considered Option 3 under the substitution options?

Answer: The default data substitution procedure for CO CEMSs is as follows (Option 2, under the second NOTE in the Record Keeping and Reporting section of the Manual):

The emission value for any hours that are invalid during which the process operated for the entire hour should be calculated using data collected during valid data periods for the hour and the **highest valid one-hour emission value that occurred during the reporting quarter** for any invalid data periods during that hour (if no valid data were collected during the reporting quarter, use the most recent quarter for which valid data were collected; if no valid data were collected during the reporting quarter or any previous quarter, contact the Department for specific instructions).

An alternative method of data substitution as approved concurrently by the Air Quality Program Manager of the appropriate DEP Regional Office and the Chief of the Division of Source Testing and Monitoring would also be considered (Option 3). Approval of any procedures contrary to Option 2 would need to go through this process.

Reference: Quality Assurance Section, pages 49-51

Question 5.3: If a source has a mass limit (i.e. SO_2 lb/hr) based on a 30-day rolling average, rolling by 1-day, how is compliance calculated during partial operating hours? Should all hours be converted to a mass or be left as a rate? For example, do we multiply each of the lb/hr (rates) hourly values by the operating minutes divided by 60? The example provided on page 50 indicates that all partial operating hours will be converted to hourly mass numbers.

Topic: Partial hour reporting

Answer: The examples provided on pages 49-50 of the Manual are correct, but only provide illustrations for **substituted** hours. The following examples illustrate how partial operating hours should be calculated when data substitution **is not** required:

Example 1
Given

CEMS, SO_2, lbs/hr
Cycle time = 1 minute
Invalid data time (preventative maintenance) = 15 minutes
Process down = 10 minutes
Valid data = 35 minutes
Operational time – normal operation
Data substitution **is not** required

Minute	Value	Minute	Value	Minute	Value
1	0	21	20	41	50
2	0	22	20	42	50
3	0	23	20	43	50
4	0	24	20	44	50
5	0	25	20	45	50
6	0	26	Invalid	46	50
7	0	27	Invalid	47	50
8	0	28	Invalid	48	50
9	0	29	Invalid	49	50
10	0	30	Invalid	50	50
11	20	31	Invalid	51	50
12	20	32	Invalid	52	50
13	20	33	Invalid	53	50
14	20	34	Invalid	54	50
15	20	35	Invalid	55	50
16	20	36	Invalid	56	50
17	20	37	Invalid	57	50
18	20	38	Invalid	58	50
19	20	39	Invalid	59	50
20	20	40	Invalid	60	50

Q1
Q2
Q3
Q4

The hour would be considered valid because it contained a valid data reading (one-minute average) in each quadrant that the process operated.

The hourly average would be calculated as follows:

$$\text{Hourly Average} = \frac{[(20 * 15) + (50 * 20)]}{35 \text{ minute valid data segments}} = 37.14 \frac{\text{lbs}}{\text{hr}}$$

with,

$$\text{operating time} = 35 \text{ minute valid data segments} + 15 \text{ minute invalid data segments}$$
$$= 50 \text{ minutes}$$

This would be considered a partial hour of operation (no data substitution required) and should be reported with the above hourly average, PC=08, MC=00, and MDC=P.

Example 2
Given

CEMS, CO, lbs/hr
Actual cycle time = 1 minute
Minimum cycle time = 5 minutes
Invalid data time (primary analyzer malfunction) = 15 minutes
Process down = 10 minutes
Valid data = 35 minutes
Operational time – normal operation
Data substitution **is not** required

Minute	Value	Minute	Value	Minute	Value
1	0	21	20	41	50
2	0	22	20	42	50
3	0	23	20	43	50
4	0	24	20	44	50
5	0	25	20	45	50
6	0	26	Invalid	46	50
7	0	27	Invalid	47	50
8	0	28	Invalid	48	50
9	0	29	Invalid	49	50
10	0	30	Invalid	50	50
11	20	31	Invalid	51	50
12	20	32	Invalid	52	50
13	20	33	Invalid	53	50
14	20	34	Invalid	54	50
15	20	35	Invalid	55	50
16	20	36	Invalid	56	50
17	20	37	Invalid	57	50
18	20	38	Invalid	58	50
19	20	39	Invalid	59	50
20	20	40	Invalid	60	50

C1 C2 C3 C4 C5 C6 C7 C8 C9 C10

The Manual stipulates that an hourly average is valid for CO if it contains at least 75 percent of the segments of the hour corresponding to the "minimum required cycle time" (for measurement) during which the process was operating. According to Table IV of the Manual (Specifications for Carbon Monoxide Monitors), the "minimum cycle time" is 5 minutes, which equates to a minimum of 12 cycles (identified

by grey shaded vs. unshaded "Minutes") per hour (measured and recorded).

For the above example, since the process was down for 2 5-minute segments, the hour would have to contain valid data for at least 8 valid 5-minute segments out of 10 5-minute segments when the process was operating.

The hour would be considered invalid, because it does not contain at least one valid one-minute average during at least 75% of the segments of the hour corresponding to the minimum required cycle time (for measurement) during which the process was operating.

$$\text{Valid Time} = \frac{7 \text{ valid data segments in hour}}{10 \text{ operating segments in the hour}} = 0.70 < 0.75$$

with,

$$\text{operating time} = 35 \text{ minute data segments} + 15 \text{ minutes data segments invalid}$$
$$= 50 \text{ minutes}$$

This would be considered a partial hour of operation (no data substitution required) and should be reported with the emissions value blank, PC=8, MC=16, MDC=NV.

Example 3
Given

CEMS, CO, lbs/hr
Cycle time = 5 minutes
Invalid data time (primary analyzer malfunction) = 20 minutes
Process down = 10 minutes
Valid data = 30 minutes
Operational time – normal operation
Data substitution **is not** required

Minute	Value
1	0
6	0
11	20
16	20
21	Invalid
26	Invalid
31	Invalid
36	Invalid
41	50
46	50
51	50
56	50

Follow the same procedures as outlined in Example 2 (above). Determination of the validity of the hour would be calculated as follows:

$$\text{Valid Time} = \frac{6 \text{ valid segments in the hour}}{10 \text{ operating segments in the hour}} = 0.60 < 0.75$$

with,

$$\text{operating time} = \left[\begin{array}{l}(6 \text{ valid segments} * 5 \text{ minute data segments}) + \\ (4 \text{ invalid segments} * 5 \text{ minute data segments})\end{array}\right]$$
$$= 50 \text{ minutes}$$

The hour would be considered invalid, because it does not contain at least 75% of the segments of the hour corresponding to the "minimum required cycle time" (for measurement) during which the process was operating. This would be considered a partial hour of operation (no data substitution required) and should be reported with the emissions value blank, PC=08, MC=16, and MDC=NV.

Reference: Manual, Quality Assurance Section, I.B.4
Manual, Table IV (Specifications for Carbon Monoxide Monitors)

Question 5.4 When does the use of "Monitoring Not Required" (Code 13) apply?

Please confirm or clarify when Monitoring Code 13 (MC=13) would apply? Does this mean that hours get marked with an MC=13 when the unit is off-line for > 15 minutes in an hour? This appears to look like a carryover from the previous revisions (Manual Revision 6/Manual Revision 7) and should not apply for Manual Revision 8.

Topic: Use of Monitoring Code 13

Answer: The first NOTE on page 51 of the Manual states the following:

NOTE: Unless instructed otherwise by the Department, use of Monitoring Code 13, "monitoring not required" is allowed to identify hours of invalid data if the total time of "monitoring not required" during the hour exceeds: 1) 6 minutes for monitoring of CO, Combustion Efficiency, and Temperature for incinerators, or 2) 15 minutes in all other cases.

This paragraph is a carryover from past revisions of the Manual and is incorrect. MC=13 should only be used if the process was not in operation during the entire hour.

Reference: Record Keeping and Reporting Section, NOTE on page 51
Manual, Quality Assurance Section, I.B.4

Question 5.5 Has anyone ever inquired about using a "geometric mean" instead of a "arithmetic mean" for calculating a daily or 30-day average?

Topic: Use of "geometric mean" vs. "arithmetic mean" for calculating the daily or 30-day average

Answer: Emission standards and their associated averaging periods are established by regulation, or by the Department's Region Offices, Air Quality Programs, through the permitting process. The Department's CEMDPS programming calculates values to be used for compliance determination, according to the standards and definitions as established.

An average, unless otherwise specified, is considered to be equivalent to an arithmetic mean. An average is one of the several types of means, and is defined as the quotient obtained by dividing the sum total of a set of figures by the number of figures. For emission limits that are stated as averages, the Department's CEMDPS software program calculates a value for compliance determination, derived from the sum of the values to be averaged, divided by the number of values.

Some emission limits are stated as geometric means or geometric averages. Until June of 2006, the Department's CEMDPS programming calculated a value for determination of compliance for any standard stated as a geometric mean or geometric average, according to the normal mathematical convention:

The **geometric mean** of a data set [a_1, a_2, ..., a_n] is given by

$$\left(\prod_{i=1}^{n} a_i\right)^{1/n} = \sqrt[n]{a_1 \cdot a_2 \cdot \ldots \cdot a_n}$$

or

$$\left(\prod_{i=1}^{n} x_i\right)^{1/n} = \exp\left[\frac{1}{n}\sum_{i=1}^{n} \ln x_i\right]$$

The equation as applied in the CEMDPS to express this for the normal geometric mean, is:

$$\mathbf{AV_{ga}} = \mathbf{EXP}\left(\frac{1}{n_t}\sum_{j=1}^{n_t} \ln E_j\right)$$

where, E_j: Hourly emission average values.

40 CFR Part 60, Appendix A, Method 19 establishes a different methodology for determining "geometric averages", for compliance with certain SO_2 and NO_x limits, notably SO_2 percent-reduction. In June, 2006, the Department adopted Equation 19-26 of Method 19, to calculate geometric means for determination of compliance with percent-reduction standards, only. All other geometric means are still calculated according to the equation immediately above. Equation 19-26 is applied in the CEMDPS as follows:

SO_2 Reduction: (Daily) Geometric Average (ga) Percent Reduction from Hourly Values.

$$\%R_{ga} = 100\left[1 - \mathbf{EXP}\left(\frac{1}{n_t}\sum_{j=1}^{n_t} \ln \frac{E_{jo}}{E_{ji}}\right)\right]$$

where, E_{jo}, E_{ji}: are matched pair hourly arithmetic average pollutant rate, for the outlet and inlet, respectively.

Reference: 40 CFR Part 60, Appendix A, Method 19

Question 5.6: Will the new CEMDPS calculate compliance with emission and data availability standards in the same manner as the existing CEMDPS?

Topic: Compliance with emission and data availability standards

Answer: The standards and averaging/summation periods that the owners/operators of CEMS(s) are required to meet are defined in permits, plan approvals, or orders. The new CEMDPS utilizes the same programming as the current CEMDPS. Therefore, calculation of compliance with emission and data availability standards should not materially change in the new CEMDPS. The format and content of the new quarterly emission summary report will be very similar to the current report.

Reference: N/A

Question 5.7: If data substitution is required for hours when the data hour is considered invalid, the default substitution value is the highest valid one-hour emission value that occurred during the reporting quarter. Should this value be substituted at the emission result or can it be substituted at the analyzer level?

Topic: Data Substitution

Answer: Default substitution must take place at the emission result level (i.e. substitute the highest valid emission result value obtained during the quarter). The substituted value should be utilized during each minute of invalid data. Any deviations from this procedure must be petitioned to the Department and will be reviewed on a case by case basis.

Reference: N/A

Section 6 – Coal Sampling/Analysis Systems

Section 7 – “Stack” Flow and Temperature Monitoring Systems

QUALITY ASSURANCE

Section 8 – Continuous Source Emission Monitoring Systems

Question 8.1: Is it the agencies intent to allow over-scaling events? If so, how will it be supported? For example, when each minute a value is over the defined range would it substitute 200% of the existing range, substitute 200% for the entire hour, etc. It would help if the agency provided an over-scaling definition and procedure and not simply reference it was allowed.

Topic: Applicability and definition of over-scaling

Answer: Sources subject to applicable Federal requirements for substitute data for "over-scaling" purposes may petition the Department for use of such substitute data for DEP purposes if they can demonstrate that the use of such substitute data will not adversely impact the Department's ability to enforce compliance with all applicable requirements.

The definition of over-scaling is defined at length in the Part 75 Emission Monitoring Policy Manual (Question 9.19). The methodology should be followed:

Over-scaling is an exceedance of the high range of a continuous monitor, as described in Appendix A, Sections 2.1.1.5 (for SO_2), 2.1.2.5 (for NO_x), and 2.1.4.3 (for flow). During hours in which the NO_X concentration, SO_2 concentration, or flow rate is greater than the analyzer's capability to measure, the owner or operator is instructed to substitute 200% of the full scale range of the instrument for that hour. This is sufficiently clear for hours in which all data recorded by a monitor are off-scale. However, the rule does not give specific instructions on how to calculate emissions during an hour in which over-scaling occurs during only part of an hour.

There are two acceptable methods for reporting hourly data when a high scale range exceedance occurs only for part of an hour. Regardless of what method is used, the method must be implemented by the data acquisition and handling system in an automated fashion so that a value of 200% of the range is automatically substituted at the appropriate time. The two methods are outlined below:

Method 1

1. Establish the shortest or fundamental averaging period for which data are continuously recorded by the monitor (i.e., the time "x" required for one complete cycle of analyzing, reading, and data recording, where "x" may be 5 seconds, 10 seconds, or 60 seconds,

depending on the type of data collection used in the DAHS/CEMS).

2. If *any* of the fundamental readings recorded during an hour exceeds the range of the analyzer (i.e., if over-scaling occurs) then report 200% of the range for that hour and use the applicable process code, monitoring code 99, and method of determination code 20 to indicate a full scale range exceedance.

Method 2

1. Establish the shortest or fundamental averaging period for which data are continuously recorded by the monitor (i.e., the time "x" required for one complete cycle of analyzing, reading, and data recording, where "x" may be 5 seconds, 10 seconds, or 60 seconds, depending on the type of data collection used in the DAHS/CEMS).

2. Calculate the hourly average pollutant concentration as the arithmetic average of all fundamental data values recorded during the hour, in the following manner:

    a. If the fundamental reading is lower than the analyzer range, use the reading directly in the calculation of the hourly average;

    b. If the fundamental reading indicates a range exceedance, then substitute 200% of the range for that reading.

3. Report the hourly average calculated in the manner described in step (2) above as an unadjusted concentration value and use the applicable process code, monitoring code 99, and method of determination code 20 to indicate a full scale range exceedance.

An explanation of the method used for determination of the over-scale reading(s) should be noted in the cover letter of the quarterly report. The hours in which substituted values were utilized should also be included.

References: Quality Assurance Section of the Manual, NOTE: 5, page 61
Part 75, Appendix A, §2.1.1.5, §2.1.2.5, §2.1.4.3
Part 75 Emission Monitoring Policy Manual, Question 9.19

Question 8.2: If over-scaling is allowed, would it count towards the minimum data collection requirement like it does for Part 75?

Topic: Over-scaling

Answer: Yes

Reference: Part 75, Appendix A, §2.1.1.5, §2.1.2.5, §2.1.4.3

Question 8.3: If a source operates less than 168 hours in a calendar quarter, is a linearity test required to be conducted and the results submitted to the Department?

Topic: Quarterly Linearity Check

Answer: No. At least once during each calendar quarter in which the source operates for 168 hours or more, or within 168 source operating hours after the close of such quarter (If source did not operate at all during the calendar quarter, the provisions of the Extended outage/shutdown (NOTE 2, Quality Assurance Section) apply), except that if four consecutive calendar quarters elapse after the last linearity testing was performed, the test for linearity must be performed within 168 source operating hours. Fuel flowmeters must meet the Quality assurance requirements specified in Table XIII of this Manual.

Reference: Quality Assurance Section, NOTE 2 and 1.D.2.a

Question 8.4: How should linearity be calculated when a zero gas is used? Won't an error be generated when dividing by zero?

Topic: Quarterly Linearity Check

Answer: According to the instructions provided in Record Type 888 (Emissions Data Report Linearity Results), you should proceed as follows:

Low Range Linearity Result (% of Reference Material Value) (30). Report the Low Range Linearity Result, in units of % of Reference Material Value in F5.1 format. If zero is used as the reference material value, report the result as "999.9". The Low Range Linearity (% of Reference Material Value) should be decimal-justified and padded with blanks to the left.

Low Range Linearity Result (Units of Measurement) (35). Report the Low Range Linearity Result, in Units of Measurement in F13.3 format. The Low Range Linearity (Units of Measurement) should be decimal-justified and padded with blanks to the left. **Please note this guidance is somewhat different than what is specified in the Field Descriptions and Instructions for RT 888.**

Reference: Attachment 3, Record Type 888 (Emissions Data Report Linearity Result)

Question 8.5: Emissions Data Report Linearity Results (RT 888) states that if a zero gas is used, the linearity result for both % of reference **and** units of measurement should be reported as 999.9. If this procedure is followed, it contradicts the instructions provided in I.D.2.d of the Quality Assurance Section of the Manual, which only states that low-level linearity is not calculated in terms of "% of actual concentration".

Topic: Quarterly Linearity Check

Answer: The solution to this issue is addressed in Question 8.4, above.

There are several instances in which the content of the manual conflicts with the record types, this is one of them. The record types contained in Attachment 3 of the Manual were originally developed in the 1990's and there are many instances where they weren't updated to reflect the content of the new manual. Because many of these inconsistencies were not identified until after the manual was finalized, corrections cannot be made until the next release.

If the contradiction is not addressed in the Question & Answer Document, the Department recommends following the instructions provided in the record type and attaching a note in the system to explain what has been submitted and why. The inconsistencies will be addressed in the next revision of the manual.

References: Quality Assurance Section, I.D.2.d. (page 68)
Attachment 3, Record Type 888 (Emissions Data Report Linearity Result)

Question 8.6: Does Revision 8 of the Manual require the owners/operators of sources to change low-level, mid-level, and high-level measurement values?

Topic: Quarterly Linearity Check

Answer: No. But any monitoring systems currently approved under the requirements of Revision No. 6 of the Manual must also conduct a demonstration of compliance for all associated measurement devices with the 7-day calibration error requirements (formerly known as drift requirements) of Revision No. 8. This could potentially reduce the tolerances for conducting daily calibrations of analyzers. However, this in itself should not impact measurement values.

References: Quality Assurance Section, I.D.2.b, I.D.2.c, and I.D.2.d.
Applicability Determination for Continuous Source Monitoring Manual Revision No. 8 (274-0300-005)

Question 8.7: Please illustrate the calculations utilized to determine compliance with the Department linearity specifications, including how this should be reported in RT 884. **Topic:** Linearity Check

Answer: Example 1

Given

NO_x analyzer
Range: 0-100 PPM

See the below table for the calculations utilized to determine compliance with the NO_x linearity specifications:

ZERO/LOW RANGE			MID RANGE			HIGH RANGE		
REF	CEM	DIFF	REF	CEM	DIFF	REF	CEM	DIFF
0.000	1.100	-1.100	50.000	51.600	-1.600	85.000	84.100	0.900
0.000	0.500	-0.500	50.000	49.800	0.200	85.000	86.200	1.200
0.000	-0.300	0.300	50.000	50.600	-0.600	85.000	85.300	0.300
CEM	0.433	AVG	CEM	50.667	AVG	CEM	85.200	AVG
[1]% REF	999.9		[1]% REF	1.333		[1]% REF	0.235	
[2]UOM ERR	0.433		[3]UOM ERR	0.800		[3]UOM ERR	0.800	

[1]Utilized Equation 1
[2]Utilized Equation 2
[3]Utilized Equation 3

The % of reference value is calculated using the following equation:

$$LE = \frac{|R - A|}{R} * 100 \qquad \text{Equation 1}$$

where,

LE = Percentage linearity error, based upon the reference value.
R = Reference value of low-, mid-, or high-level calibration gas introduced into the monitoring system.
A = Average of the monitoring system responses.

There is also an alternative performance specification (5 PPM) that can be utilized to pass the linearity check. There are two conditions attached to use of this specification:

For reference method averages of twice the specification (10 PPM) or less, the calculations should be expressed as the absolute value of the mean:

$$LE = \frac{\left(\left|\text{Difference } 1 + \text{Difference } 2 + \text{Difference } 3\right|\right)}{3} \qquad \text{Equation 2}$$

For reference method averages of over twice the specification (>10 PPM), the calculations should be expressed as the mean of the absolute values:

$$LE = \frac{\left(\left|\text{Difference } 1\right| + \left|\text{Difference } 2\right| + \left|\text{Difference } 3\right|\right)}{3} \qquad \text{Equation 3}$$

Therefore, Equation 2 was utilized to determine the Zero/Low Range value and Equation 3 was utilized to determine the Mid and High Range values.

The values contained in the shaded orange column would be reported to the Department. Follow the "Computational Requirements and Rounding" instructions contained on Page 103 of the Manual as your guideline. Please be aware that once you have begun the calculation sequence, do not round off any of the intermediate values. Rather, retain the full decimal display of the computer in the intermediate values until the final result is obtained and then round off the final result. Use the standard arithmetic rounding convention where numbers 5 through 9 round to the next highest number in the previous decimal position to the left.

Example 2

Given

O_2 analyzer
Range: 0-25 PPM

ZERO/LOW RANGE			MID RANGE			HIGH RANGE		
REF	CEM	DIFF	REF	CEM	DIFF	REF	CEM	DIFF
0.000	0.020	-0.020	12.500	12.460	-0.040	21.000	20.990	0.010
0.000	-0.010	0.010	12.500	12.520	-0.020	21.000	21.050	-0.050
0.000	0.050	-0.050	12.500	12.550	-0.050	21.000	21.070	-0.070
CEM	0.020	AVG	CEM	12.510	AVG	CEM	21.037	AVG
[1]% REF	999.9		[1]% REF	0.080		[1]% REF	0.175	

[2]UOM ERR	0.020		[2]UOM ERR	0.010		[2]UOM ERR	0.037	

[1]Utilized Equation 1
[2]Utilized Equation 2

The % of reference value is calculated using Equation 1.

There is also an alternative performance specification (0.5%) that can be utilized to pass the linearity check. Equation 2 should be utilized universally for this calculation.

The values contained in the orange shaded column would be reported to the Department.

Reference: Initial Application Section of the Manual, Table II (page 13).
Part 75, Appendix A.

Question 8.8: Is the DAHS required to implement data validation routines during periods of non-operation? For example if an analyzer fails calibration while the process is off-line should it count towards downtime? If yes, how would data substitution work?

Topic: Quarterly Linearity Check

Answer: No.

Reference: N/A

Question 8.9: Provide examples of what would and would not constitute a valid hourly average.

Topic: Hourly average data validation

Answer: The Department has developed a data validation clarification document, which is posted on the Department's CEM homepage. The document was designed to assist facility owners and operators in programming their data acquisition and handling systems (DAHS) and ensuring that hourly averages are coded/calculated properly.

Reference: N/A

Question 8.10: Does the language in NOTE 2 on page 61 of the Manual still apply regarding "... downtime entered as II13.08 (or 0000.13 if the report are subject to data substitution requirements)"?

Topic: Infrequently operated sources

Answer: Yes. The passage in question is as follows:

> NOTE 2: (Infrequent operation/extended outage/shutdown) Regardless of the number of hours or process operation during a calendar quarter, quarterly emission reports must continue to be submitted, with hourly data during process **downtime entered as "II13.08" (or "0000.13" if the reports are subject to data substitution requirements)**. Quarterly and annual quality assurance activities must continue to be conducted during such time in accordance with the requirements listed in the "Periodic calibration" and "Periodic Self-Audits" sections below. Note that, for extended outages or shutdowns, "Daily calibration" procedures need only be conducted as necessary to validate data collected during actual source operating hours (successful daily calibration necessary in order to validate data for subsequent hours).

Reference: Quality Assurance Section, page 61, NOTE 2

Question 8.11: I.B.3 on page 64 of the Quality Assurance Section of the Manual states that: "A six-minute average will be considered valid if it contains at least 75 percent valid data readings."

I.B.4 on page 64 of the Quality Assurance Section of the Manual states that for hourly averages:

a. All parameters except for opacity, temperature, CO, parameters addressed by Tables XI, XII, or XIII of this manual - data from measurement devices of these types can be used to calculate a valid monitoring system hourly average **if at least one valid data reading is obtained in each 15-min quadrant during which the process was operating.** Notwithstanding this requirement, if the process operated during more than one quadrant of the hour and if some data is unavailable as a result of the performance of calibration, quality assurance activities, preventive maintenance activities, or backups of data from the data acquisition and handling system, valid data readings from at least two points separated by a minimum of 15 minutes may be used.

b. For opacity, temperature, CO, parameters addressed by Tables XI, XII, or XIII of this manual - data from measurement devices of these types

can be used to calculate a valid monitoring system hourly average if it contains at least 75 percent of the segments of the hour corresponding to the minimum required cycle time (for measurement) during which the process was operating.

In I.B.4a, for the definition of an hourly average, it reads that **if a system has at least 1 valid minute in each 15-minute quadrant that the source was operating then the hour is valid.** Is this not contrary to I.B.3 (above) which states that a valid "on-line" hour only occurs when there is operation for more than 45 minutes? Please confirm which case applies.

Topic: Valid data readings

Answer: The data reduction criterion that is applicable is stipulated in Title 25 of the Pennsylvania Code, in a plan approval, permit condition or in an order issued by the Department. Data reduction criteria may vary according to averaging period as stipulated under I.B (Data Reduction Criteria) of the Quality Assurance Section of the Manual. Therefore, I.B.3 is not contrary I.B.4.

Please note that the owners/operators of sources may petition the Department to use more stringent applicable Federal data reduction criterion (in order to maintain consistency between data considered invalid by multiple agency programs).

Reference: Quality Assurance Section, I.B.3, I.B.4

Question 8.12: I.B.4 on page 64 of the Quality Assurance Section of the Manual states that an hourly average is valid if a system has at least 1 valid minute in at least two (2) 15-minute quadrants separated by 15 minutes (during periods of QA, preventative maintenance or back-ups of the DAS are taking place). Is this contradictory to I.B.3, which states that a valid "on-line" hour only occurs when there is operation for more than 45 minutes? Please confirm which case applies.

Topic: Valid data readings

Answer: The data reduction criterion that is applicable is stipulated in Title 25 of the Pennsylvania Code, in a plan approval, permit condition or in an order issued by the Department. Data reduction criteria may vary according to averaging period as stipulated under I.B (Data Reduction Criteria) of the Quality Assurance Section of the Manual. Therefore, I.B.3 is not contrary I.B.4.

Please note that the owners/operators of sources may petition the Department to use more stringent applicable Federal data reduction criterion (in order to maintain consistency between data considered invalid by multiple agency programs).

Reference: Quality Assurance Section, I.B.3, I.B.4

Question 8.13: I.D.1.a of the Quality Assurance Section of the Manual (page 66), states that the results of daily calibrations should be calculated as (R - A) / LMESE, where R = value of the reference material, A = actual value of the instrument, and LMESE = lowest monitored emission standard equivalent. This is consistent with the Tables in pages 12 - 33 for all parameters except O_2, CO_2 and opacity. Please confirm that the results of calibrations for O_2, CO_2, and opacity are calculated as R - A. In addition, please confirm that the 2 PPM maximum (R-A) for NO_x/CO/SO_2/H_2S/HCl analyzers is applicable. Are these options only available for initial certification or can it be used for ongoing compliance?

Topic: Daily calibration

Answer: The interpretation for the calculation of daily calibration is correct on all accounts. The options for (R-A) are available for both initial certification and ongoing compliance.

Reference: Quality Assurance Section, page 66

Question 8.14: In I.A.1.d of the Quality Assurance Section of the Manual (page 62), data must be considered invalid if:

"The results of a daily zero or upscale calibration error check for any measurement device exceeds twice the applicable calibration error performance specification as indicated in this manual. Data is considered invalid from the time of the failed zero or upscale calibration error check until the successful completion of a zero and upscale calibration error check. Sources may petition the Department to use a more stringent applicable Federal requirement (in order to maintain consistency between data considered invalid by multiple agency programs)."

Does this mean that for a NO_x analyzer, the Pass/Fail criteria is 2 * 5% = 10% based on the LMESE or 2 * 2.0 PPM = 4 PPM?

Topic: Data validation criteria

Answer: The interpretation outlined above is correct. Keep in mind that this data validation criterion is for the results of daily zero or upscale calibration

error checks for analyzers servicing certified CEMSs. Please note that CEMSs undergoing certification must demonstrate that they meet the installation specifications outlined in the applicable table of the Manual.

References: Quality Assurance Section, I.A.1.d

Question 8.15: In I.A.1.e of the Quality Assurance Section of the Manual (page 62), data must be considered invalid if:

"A zero or upscale calibration error check for a measurement device is not conducted during or before the 26th hour following a successful zero or upscale calibration error check, except that if the process has been out of operation for at least one complete clock hour during the time period from the 19th clock hour through the 26th clock hour following the previous successful zero or upscale calibration error check, successful zero and upscale calibration error checks are required to be conducted within 8 process operating hours following startup. Data is considered invalid starting with the 27th hour following the previous successful zero and upscale calibration error check or the 9th process operating hour following startup (as applicable) and until completion of successful zero and upscale calibration error checks."

a. Please confirm when the 8-hour grace period applies. At any time? Only after a startup in which the unit was off-line for more than 1 clock hour during the last 8 hours after a successful calibration? Does the 8-hour grace period apply if the source operated for less than 19 hours following a successful calibration?

b. If a unit starts operating (after a long outage) and stops before completing a calibration, does the grace period apply for 8 unit operating hours regardless of how long it takes to collect 8 unit operating hours?

c. Is it the agencies intent to grant sources an 8 process operating hour grace period or 8 clock hour grace period? The proposed process operating hour language is not consistent with Part 75, which uses clock hours.

Topic: Data validation criteria, grace period

Answer: The applicability of the 8-hr grace period should be determined in accordance with the conditions outlined in 40 CFR Part 75, Appendix B, 2.1.5.2. It is the agencies intent to provide the owners/operators of sources an 8 process operating hour grace period.

Reference: 40 CFR Part 75, Appendix B, §2.1.5.2
Quality Assurance Section, I.A.1.e, page 62

Question 8.16: Do only calibrations conducted on-line count toward data validation?

Topic: Daily calibration

Answer: The Department prefers that calibrations be conducted on-line, but exceptions have been approved, provided that pressure and temperature corrections are not required on the system. Contact the Department if you are uncertain as to whether this applies.

Reference: N/A

Question 8.17: Does a failed calibration that is done off-line count toward invalidating data if a successful recalibration is not conducted before the unit goes on-line?

Topic: Daily calibration

Answer: Yes.

Reference: Quality Assurance Section, I.A.1.d

Question 8.18: Removed.

Question 8.19: The existing method for calibration of analyzers is by using EPA certified calibration gases for online calibrations. Are there any modifications or new methods for conducting analyzer online calibrations?

Topic: Daily calibrations

Answer: For Continuous Source Emission Monitoring Systems, the owner/operator of sources may petition the Department to use Federal calibration level requirements rather than those listed in the Manual if they can demonstrate that the requirements will not adversely impact the Department's ability to enforce compliance with all applicable requirements.

In addition, the owners/operators of sources may petition the Department to use a more stringent applicable Federal daily calibration error check procedure requirement than that listed in the Manual in order to maintain consistency between data considered invalid by multiple agency programs.

Language has also been added in I.D.1.a. indicating that the results of daily calibrations are calculated as the value of the reference material used minus the measurement device reading and/or as [the value of the reference material used minus the measurement device reading] divided by the lowest monitored emission standard equivalent.

Please note that for devices such as flow monitors, a simulated signal (applied as close to the point of signal generation as possible) may be used.

Reference: Quality Assurance Section of the Manual, I.D, pages 66-67

Question 8.20: What filter values are required for quarterly calibration error testing for opacity monitors?

Topic: Quarterly calibration error check – opacity monitors

Answer: Quarterly calibration error testing on each range of the measurement device should be conducted in accordance with the procedures specified in Attachment No. 1 (of the Manual) or with procedures previously approved by the Department. The filter level values outlined in the Quality Assurance Section, I.D.2 of the Manual should be followed. The Department recognizes that the use of a 0% filter may not be practical. Therefore, the use of a slightly opaque filter (5-10%) for the low-level measurement would be acceptable. The owners/operators of facilities may petition the Department for alternatives.

Reference: Quality Assurance Section, I.D.2

Question 8.21: Are quarterly linearity checks/tests required for moisture analyzers?

Topic: Quarterly linearity check – moisture analyzers

Answer: A linearity test of each O_2 analyzer is required for each continuous moisture monitoring system consisting of wet- and dry-basis O_2 analyzers. No linearity test is required for a continuous moisture sensor or for a continuous moisture monitoring system consisting of a temperature sensor and a data acquisition and handling system (DAHS) software component programmed with a moisture lookup table.

Reference: Quality Assurance Section, I.D.2
40 CFR Part 75, Appendix B, §2.2.1

Question 8.22: If a quarterly linearity check is failed on one of the levels (Zero, Low, Mid, or High) or aborted due to a problem with the measurement device or monitoring system, what data is considered invalid?

Topic: Quarterly linearity check – failed or aborted check

Answer: Data is considered invalid from the time the failed test is completed or aborted until successful completion of a linearity check following corrective action and/or measurement device repair.

Reference: Quality Assurance Section, I.A.1.g

Question 8.23: How many valid hours does it take to create a valid 24-hour rolling average? Is the 24-hour rolling average based on 24 consecutive operating hours or calendar hours?

Topic: Data validation

Answer: You must have at least 18 valid hours during the last 24 calendar or clock hours in order for an average to be generated. If there isn't, a 24-hour rolling average will not be generated. The system does not look back until it finds 24 operating hours.

Reference: Quality Assurance Section, I.B.10

Question 8.24: Do the quarterly opacity filter checks need to be done while the unit is combusting fuel?

Topic: Quarterly calibration error testing – Opacity

Answer: No. 40 CFR Part 60, Appendix B, Performance Specification 1, does not stipulate that the unit must be combusting fuel.

Reference: 40 CFR Part 60, Appendix B, Performance Specification 1, 8.1.3.ii

Question 8.25: Please provide an explanation of the Periodic Self-Audit (relative accuracy test audit, RATA) requirements and include a few examples.

Topic: Periodic Self-Audits (annual RATAs)

Answer: The main Periodic Self-Audit requirements can be summarized in the below statements, along with examples to assist you in understanding them. A test protocol must also be submitted to the Department and approved prior to conducting the testing. The Department should also be

provided at least 21 days' notice prior to testing. The submittals should be made electronically through the CEMDPS*Online Application for those facilities that have successfully implemented Revision No. 8 of the Department's Continuous Source Monitoring Manual (Manual).

Statement 1 – A successful relative accuracy test audit (RATA) is required once in every four calendar quarters in which the source operates for 168 hours or more or within 720 source operating hours after the close of such four quarters. For example,

3Q11	4Q11	1Q12	2Q12	3Q12	4Q12
Successful RATA on CEMS	168 operating hours or more	168 operating hours or more	168 operating hours or more	168 operating hours or more, **Successful RATA on CEMS is required or**	[1]**Successful RATA on CEMS is required within 720 source operating hours**

[1]A successful RATA may take place in a later quarter (1Q13, 2Q13, etc.) if 720 source operating hours is not exceeded.

Statement 2 – A successful RATA is required when eight consecutive calendar quarters elapse after the last successful RATA or within 720 source operating hours after the close of such eight quarters.

	3Q11	4Q11	1Q12	2Q12	3Q12
	Successful RATA on CEMS	<168 operating hours	>168 operating hours	>168 operating hours	<168 operating hours
Operating quarter?, **Count**		NO, **0**	YES, **1**	YES, **2**	NO, **2**
Calendar quarters since successful RATA		**1**	**2**	**3**	**4**

Action					

	4Q12	1Q13	2Q13	3Q13	4Q13
	<168 operating hours	<168 operating hours	<168 operating hours	>168 operating hours	
Operating quarter?, **Count**	NO, **2**	NO, **2**	NO, **2**	YES, **3**	
Calendar quarters since successful RATA	**5**	**6**	**7**	**8**	
Action				**Successful RATA on CEMS is required or**	**[2]Successful RATA on CEMS is required within 720 source operating hours**

[2]A successful RATA may take place in a later quarter (4Q13, 1Q14, etc.) if 720 source operating hours is not exceeded.

The Department included this language in Revision No. 8 of the Manual in order to be consistent with the Federal Program requirements. Please view Section 2.3.3 of Appendix B of 40 CFR 75 for a full explanation of the RATA grace period. You must petition the Department if you wish to utilize Part 75 requirements that are not explicitly stated on Page 68 of the Manual.

The requirements stipulated in NOTE 2 (Infrequent operation/extended outage/shutdown) of the Quality Assurance Section of the Manual should also be followed in the event that extended outage provisions are utilized. Additional information/language is contained in I.D, I.E, and I.F of the Quality Assurance Section of the Manual.

Reference: Quality Assurance, I.E and I.F, Quality Assurance, NOTE 2

Question 8.26: What testing is required when there is a change to the air flow monitor K-factor or moisture computation?

Topic: K-factor or moisture computation change

Answer: A daily calibration (calibration error test) is required on the air flow monitor or moisture sensor. A linearity test is not required for either change (this is contrary to what is specified in the table on page 229 and 230 of Revision No. 8 of the Manual). A relative accuracy test audit (RATA) is also required for any CEMS impacted by the change. For example, a RATA on the NO_x lbs/hr CEMS is required when a change is made to the air flow monitor K-factor.

Reference: Manual, Attachment 5, pages 229 – 230.
Part 75 Emission Monitoring Policy Manual, Question 12.10

Question 8.27: Please provide an explanation of the quarterly linearity check requirements and include a few examples.

Topic: Quarterly linearity check

Answer: The quarterly linearity check requirements can be summarized in the below statements, along with examples to assist you in understanding them. The results of the quarterly linearity checks should be submitted to the Department through RT 888 (Emissions Data Report Linearity Results, which is calibration error for opacity monitors).

Statement 1 – Successfully complete the quarterly linearity check (calibration error check for opacity) at least once during each calendar quarter in which the source operates for 168 hours or more, or within 168 source operating hours after the close of such quarter. For example,

3Q11	**4Q11**
168 operating hours or more Linearity check is required during the 3Q11 or within 168 source operating hours after the close of the quarter	168 operating hours or more [1, 2]Linearity check is required within 168 source operating hours for the 3Q11 if not conducted in the 3Q11

(grace period)	[1, 2]Linearity check is required during the 4Q11 or within 168 source operating hours after the close of the quarter (grace period)

[1]Note that when a linearity check is conducted within a grace period for the purpose of satisfying the linearity check requirement from a previous QA operating quarter, the results of that linearity check may only be used to meet the linearity check of the previous quarter, not the quarter in which the missed linearity check is completed.

[2]A successful linearity check may take place in a later quarter if 168 source operating hours has not been exceeded.

Statement 2 – Successfully complete the quarterly linearity check (calibration error check for opacity) at least once during each calendar quarter in which the source operates for 168 hours or more, or within 168 source operating hours after the close of such quarter. If the source did not operate at all during the calendar quarter, the provisions of the extended outage/shutdown apply, except that if four consecutive calendar quarters elapse after the last linearity testing was performed, the test for linearity must be performed within 168 source operating hours. For example,

	3Q11	**4Q11**	**1Q12**	**2Q12**	**3Q12**	**4Q12**
	>168 operating hours	<168 operating hours	<168 operating hours	<168 operating hours	<168 operating hours	<168 operating hours
Operating quarter?, **Count**	YES, **0**	NO, **1**	NO, **2**	NO, **3**	NO, **4**	NO, **5**
Calendar quarters since successful linearity check		**1**	**2**	**3**	**4**	**5**

Action	[1, 2]Linearity check is required during the 3Q11 or within 168 source operating hours after the close of the quarter (grace period)					[1, 2]Linearity check is required to be conducted within 168 source operating hours after the close of 3Q12 (grace period)

[1]Note that when a linearity check is conducted within a grace period for the purpose of satisfying the linearity check requirement from a previous QA operating quarter, the results of that linearity check may only be used to meet the linearity check of the previous quarter, not the quarter in which the missed linearity check is completed.

[2]A successful linearity check may take place in a later quarter if 168 source operating hours has not been exceeded.

Reference: Quality Assurance, I.D.2 and I.F, Quality Assurance, NOTE 2.
40 CFR Part 75, Appendix B, 2.2.3, 2.2.4

Question 8.28: What is the definition of Zero Air Materials referenced as per 40 CFR Part 72? This language is cited in I.G.3 of the Quality Assurance Section of the Manual.

Topic: 40 CFR Part 72, Zero Air Materials

Answer: *Zero air material* means either:

(1) A calibration gas certified by the gas vendor not to contain concentrations of SO_2, NO_X, or total hydrocarbons above 0.1 parts per million (ppm), a concentration of CO above 1 ppm, or a concentration of CO_2 above 400 ppm;
(2) Ambient air conditioned and purified by a CEMS for which the CEMS manufacturer or vendor certifies that the particular CEMS model produces conditioned gas that does not contain concentrations of SO_2, NO_X, or total hydrocarbons above 0.1 ppm, a concentration of CO above 1 ppm, or a concentration of CO_2 above 400 ppm;
(3) For dilution-type CEMS, conditioned and purified ambient air provided by a conditioning system concurrently supplying dilution air to the CEMS; or

(4) A multicomponent mixture certified by the supplier of the mixture that the concentration of the component being zeroed is less than or equal to the applicable concentration specified in paragraph (1) of this definition, and that the mixture's other components do not interfere with the CEM readings.

Reference: Manual, Quality Assurance, I.G.3
40 CFR Part 72.2, Zero Air Material

Question 8.29: How many valid hours does it take to create a valid 24-hour rolling average? Is the 24-hour rolling average based on 24 consecutive operating hours or calendar hours?

Topic: Data validation criteria

Answer: At least 18 valid hours are required to create a valid 24-hr rolling average. The 24-hour rolling average is generated based upon calendar (or clock) hours in order for an average to be generated. If there isn't, a 24-hour rolling average will not be generated.

Reference: Manual, Quality Assurance, I.B.10

Question 8.30: Should quarterly emissions data be submitted to the Department if the owners/operators of the facility have CEMS that are under certification?

Topic: Emissions data reporting

Answer: Quarterly emissions data is required to be reported each quarter for an Emissions Result utilizing data from a certified CEMS. No reporting should take place for an Emission Result while the CEMS is undergoing certification unless a certified CEMS is operating in parallel with the new uncertified CEMS.

The owners/operators of the facility should continue to report emission data for CEMS not affected by the certification. For instance, opacity emission data should continue to be reported each quarter while the SO_2 CEMS undergoes certification.

Reference: Manual, Quality Assurance, NOTE 4

Question 8.31: Can the owners/operators of the facility elect to utilize CEMS calibration gas that is on-site for the Periodic Self-Audit? Such gas is typically

utilized for daily calibration and/or quarterly linearity checks of the CEMS at the facility.

Topic: Periodic Self-Audits – Calibration Gas

Answer: You may utilize CEM calibration gas that is on-site for the Periodic Self-Audit provided that it meets the gas cylinder certification requirements contained in the Quality Assurance Section of the Department's Continuous Source Monitoring Manual and the test method requirements. However, the use of such gas could be problematic under certain circumstances.

For example, the span value defined under 40 CFR Part 75 is different than the span value as defined in several of the test methods. This could result in the use of gas concentration that doesn't meet the requirements as outlined in the test methods. This is illustrated in the following example.

Given:
NO_x analyzer span value (based on 40 CFR Part 75): 100 PPM
40 CFR Part 75 gas concentration requirements:
- Zero-level concentration: 0-20% of span
- Low-level concentration: 20-30% of span
- Mid-level concentration: 50-60% of span
- High-level concentration: 80-100% of span

NO_x analyzer cylinder concentrations (selected for linearity): 25 PPM (low), 55 PPM (mid), 90 PPM (high)
Method 7E calibration gas requirements
- Zero-level concentration, Zero Air Material, 40 CFR Part 72
- Low-level concentration: 0-<20% of span
- Mid-level concentration: 40-60% of span
- High-level concentration: = to the calibration span

If you use the 90 PPM gas as the span during the Periodic Self-Audit and wish to use the 55 PPM gas as the mid-level concentration, the mid-level gas will be outside of the acceptable concentration to conduct the reference method test as follows:

(55 PPM/90 PPM) = 61.1%
61.1% > 60%, which makes it unacceptable for use as a mid-level concentration gas for the purposes of the Periodic Self-Audit.

The Department recommends that you take such things into consideration when selecting calibration gas for a Periodic Self-Audit.

Reference: Manual, Quality Assurance, I, G
40 CFR Part 75, Appendix A

40 CFR Part 60, Appendix A, Method 7E

Question 8.32: In 2012, EPA's "Protocol Gas Verification Program and Minimum Competency Requirements for Air Emission Testing" rule went into effect. Are these new rules applicable for testing conducted only for Pennsylvania purposes?

Topic: EPA Protocol Gas and Air Emission Testing Requirements

Answer: These requirements are applicable for any 40 CFR Part 75 testing conducted and submitted to EPA. They currently are not required for testing conducted for Pennsylvania only purposes. However, we will consider adding such requirements as part of Revision No. 9 of the Department's Continuous Source Monitoring Manual.

Reference: N/A

Question 8.33: How often are Neutral Density Filters (NDFs) required to be factory calibrated?

Topic: Neutral Density Filter (NDF) Calibration

Answer: The guidelines for filter recalibration are outlined in 7.1 and 7.2 of Performance Specification 1. Those defined as "primary attenuators" and "secondary" are generally required to be recalibrated semi-annually. However, there is an instance where only an annual recalibration is required. These sections also contain the recalibration procedures/details and should be self-explanatory.

Reference: 40 CFR Part 60, Appendix B, Performance Specification 1

Section 9 – Coal Sampling/Analysis Systems

Section 10 – "Stack" Flow and Temperature Monitoring Systems

Question 10.1: What are the quarterly linearity check requirements for temperature monitoring systems?

Topic: Quarterly linearity check, temperature monitoring systems

Answer: The intent was that the linearity check for thermocouples could be conducted either:

1. In accordance with the "Linearity Check (general procedures)" of 40 CFR, Part 75, Appendix A
    a. In-situ via emf simulated signals sent from thermocouple output location to readout device (emf reference), or
    b. Thermocouple and readout device removed to a testing location using actual temperature references applied to the thermocouple (temperature reference)
2. In accordance with NIST procedures
    a. Thermocouple and readout device removed to a testing location

Reference: Quality Assurance Section, III.D.2, and III.D.4

Question 10.2: Quality Assurance Section III.D.2 indicates that the quarterly linearity check may be waived provided that quarterly recalibration is conducted in accordance with the procedures specified in "3" below. The procedures in "3" refer to stack flow measurement devices not temperature monitoring systems.

Topic: Quarterly linearity check, temperature monitoring systems

Answer: Quality Assurance Section III.D.2 should be revised to reference "4" instead of "3".

Reference: Quality Assurance Section, III.D.2, III.D.3, and III.D.4

APPENDIX

Section 11 – Attachment No. 1

Section 12 – Attachment No. 2

Section 13 – Attachment No. 3

Question 13.1: Will PADEP be providing sources with the electronic version of the monitoring plan or will each source be responsible for creating it from scratch using the CEMDPS tool?

Topic: Monitoring Plan Electronic Data Record (EDR)

Answer: The owners/operators of sources will enter the CEMDPS application through GreenPort and can create monitoring plans through a series of dropdown menus or by uploading EDR records that have been created from the disconnected client application or developed from scratch.

Reference: N/A

Question 13.2: At what point will the owners/operators of sources be able to start generating their electronic monitoring plans for submission to PADEP?

Topic: Electronic Data Records (EDRs)

Answer: Monitoring plans can be generated after the configuration information has been migrated for the facility. Individuals will need to have a username and password set-up in the new CEMDPS before they can create (in the new CEMDPS) or upload a monitoring plan. Please contact the Department for the exact date that this can be done for a specific facility.

Reference: N/A

Question 13.3: Why is linearity data required in the Certification Report Linearity Data (RT 860) and the Emissions Data Report Linearity Results (RT 888)? Shouldn't they both be submitted as part of the certification and emissions level reports?

Topic: RT 860, RT 888: Linearity Check

Answer: Full linearity test data, reported in Certification Report Linearity Data (RT 860), is only required for certification and recertification events. Quarterly quality assurance linearity test results only, reported in Emission Data Report Linearity Results (RT 888), are required to be submitted with quarterly emissions data. Test data for the quarterly quality assurance linearity testing need only be submitted upon request made by the Bureau.

References: RT 860: Certification Report Linearity Data

RT 888: Emissions Data Report Linearity Results

Question 13.4: In Emissions Data Report Hourly Average Monitoring Data (RT 884), should all off-line data (i.e. For NO_x, unit not combusting fuel) be reported using a value of 0.0, PC = 8, MC = 13, MODC = P?

Topic: Emissions Data Report Hourly Average Monitoring Data, RT 884

Answer: Yes.

Reference: RT 884: Emissions Data Report Hourly Average Monitoring Data

Question 13.5: Will the CEMPDS tool have the ability to import individual analyzer monitoring data & excess emission reports and then in turn export/submit data for a complete facility? There are multiple data acquisition and handling systems (DAHSs) installed at facilities and the ability to generate one consolidated report (automatically, from a DAHS) will be difficult. There are even situations where there are multiple DAHS vendors at a facility where this function would near impossible.

Topic: CEMDPS Tool

Answer: Just as is the case with EPA's MDC software, the CEMDPS tool will not address the creation of the emissions data record types (884, 892, and 896). Just as is the case with EPA's MDC software, the generation of the emissions data records will be the responsibility of each facility. However, the CEMDPS tool will allow for the same screening and submittal functions as for all other record types.

Reference: N/A

Question 13.6: EPA has provided a report checking tool to check the electronic data reports that are submitted to them. Will the Department supply a similar tool or some type of tool for the new CEMDPS?

Topic: CEMDPS Tool

Answer: The system will provide validation checks as noted in the "Field Descriptions and Instructions" that are provided in electronic data records. A comprehensive list of all the checks that are conducted has not been provided.

Reference: N/A

Question 13.7: Will the Department have a tool different than the tool provided to the facilities for checking quarterly reports?

Topic: CEMDPS Tool

Answer: The application has built in checks that screen for completeness and compliance with the range of values contained in the EDR when the submittal is validated for submission to the Department. Submittals can contain warnings that may later result in their rejection following a visual inspection of the data. There are no additional application driven checks other than at the time of validation for submission to the Department.

Reference: N/A

Question 13.8: What is a Truncation Level Indicator as defined and referenced the Monitoring Plan Emission Standard Information EDR (RT 822)? How is it determined?

Topic: Truncation Level Indicator

Answer: The Field Descriptions and Instructions of RT 822 (Start Col. 114), require the owners/operators of sources to report the truncation level indicator (as supplied by DEP). Acceptable value are in the range "-6 to +9, with "0" as a valid value.

Truncation levels are normally set at the units of the standard as stated in the Permit. Below is a tabular representation of how a number would be represented, given a specific truncation level. Please keep in mind that there may be exceptions to what is stated above.

Original Data (Recorded Data)	**Truncation Level**	**X Being Truncated to "Truncation Level" N (Reported Data)**
X	**N**	**Truncated X**
9999999.999999	-6	9999999.999999
	-5	9999999.99999
	-4	9999999.9999
	-3	9999999.999
	-2	9999999.99
	-1	9999999.9
	1 or 0	9999999
	2	9999990
	3	9999900

	4	9999000
	5	9990000
	...	…

The following example illustrates how the truncation level is utilized in determination of compliance with an emission standard. Keep in mind that RT 884 requires the value of the hour to be reported in the units of the emission standard in the F13.3 format (i.e. with three numerals to the right of the decimal point).

Pollutant	Period	Truncation Level	Emission Standard	Reporting - No Violation	Reporting - Violation
SO_2	Daily	-2	0.40	0.409	≥0.410
SO_2	30 day rolling average	-3	0.350	0.350	≥0.351
NO_x	30 day rolling average	-1	0.3	0.399	≥0.400

Reference: RT 884: Emissions Data Report Hourly Average Monitoring Data Attachment No. 3, II, A, page 93

Question 13.9: On page 95 of the Manual, the "Record Order" for "Certification/Recertification Submittals" lists fields which are not common to all of the "Certification" records. My assumption is that the order should be in accordance with the following:

1. RT 844 - Date of Test Completion, Test ID, CEMS ID Code, Type of Testing
2. RT 848 - Date of Test Completion, Test ID, Analyzer ID Code, Type of Testing
3. RT 852 - Date of Test Completion, Test ID, CEMS ID Code, Test Run Number
4. RT 856 - Date of Test Completion, Test ID, CEMS ID Code, Test Run Number Within Series
5. RT 860 - Date of Test Completion, Test ID, Analyzer ID Code, Zero or Low/Mid/High Range Flag, Reading Number Within Range
6. RT 868 - Date of Test Completion, Analyzer ID Code, Zero/Upscale Flag, Period Number
7. RT 872 - Date of Test Completion, Test ID, Analyzer ID Code, Zero/Upscale Flag, Period Number
8. RT 876 - Date of Test Completion, CEMS ID Code

9. RT 878 - Date of Test Completion, CEMS ID Code, Minute/Hour Flag, Period Number

Topic: EDR Record Order

Answer: Page 95, "Record Order" indicates guidelines to be used when ordering the record types in an EDR packet. The record types for Certification Test Results should be ordered with CEMS Id relevant types coming first. For example, RT 801 and RT 802 should be followed with RT 844 if CEMS testing is being submitted. After an RT 844, and depending on the tests performed on the CEMS, the following record types would be included in the order appearing below:

1. RT 852: Certification Report Non-Opacity Relative Accuracy Test Audit Data
2. RT 856: Certification Report Opacity Relative Accuracy Test Audit Data
3. RT 876: Certification Report Operational Test Period Results
4. RT 878: Certification Report DAS Test Data

If the analyzer testing is being submitted, the record types would be submitted in the following order:

1. RT 848: Certification Report Analyzer Test Completion Date
2. RT 860: Certification Report Linearity Data
3. RT 868: Certification Report 7-Day Calibration Error Data
4. RT 872: Certification Report Cycle Time Data

Both CEMS testing and analyzer testing can be submitted in the same file with the CEMS record types appearing first in the file, followed by the analyzer relevant record types.

Reference: N/A

Question 13.10: There are instances in which the Field Descriptions and Instructions for record types state that entries should be padded with leading zeroes (like the DEP Emission Result ID Code for RT 822), but the EDR that gets generated from the CEMDPS does not pad it. Is this a situation where either input is fine?

Topic: Padding with zeroes or spaces

Answer: Yes. Pad with zeroes or leave the unused portion of the field as null.

Reference: N/A

Question 13.11: There are some fields that say to use a certain default value but the EDR shows it as being blank. For instance, the field "Last Date Standard Applies" in RT 823 says to use "99991231" if the standard still applies. Upon inspection, I see the EDR shows blank. Another example is the "Serial Number" field for RT 829; the Field Descriptions and Instructions indicate that a single "0" should be inserted if the actual analyzer has not yet been received. What should be entered in such cases?

Topic: Field Descriptions and Instructions

Answer: The Last Date Standard Applies: If it is blank we treat the standard to be active. Serial Number: It can be either zero or blank. The system will validate either way. The Department will be fixing the system so that whatever is entered for the serial number will be reproduced when the EDR is generated. Currently, the zero is being converted to null.

Reference: N/A

Question 13.12: Whose name should be under the submitter information found in RT 801/802?

Topic: RT 801/802: Submitter Information

Answer: In actuality, this should be the originator of the submittal. This individual may or may not be the actual submitter.

Reference: N/A

Question 13.13: Should the 24-hr drift specification or calibration error limit be entered in this record type? This is confusing because of the new naming and test procedures contained in Revision No. 8 of the Manual.

Topic: RT 830: Monitoring Plan Calibration Error Limit Information

Answer: The purpose of this record type is to receive confirmation from industry users that the instrument will meet the calibration error limit (gases) or zero & calibration drift - 24 hours limit (opacity) that are listed in the appropriate table in Revision No. 8 of the Manual.

Page 5 of the "Applicability Determination and Implementation Procedures for Continuous Source Monitoring Manual Revision No. 8" indicates that there are a number of administrative changes/errors and

fixes that should be applied to RT 830. It also includes information concerning other record types. This document is available on the Department's CEM Website at the following website: http://www.dep.state.pa.us/dep/deputate/airwaste/aq/cemspage/cems.htm.

Reference: N/A

Question 13.14: What quarterly checks should be conducted for opacity monitors? How should the results be reported to the Department?

Topic: RT 888: Emissions Data Report Linearity Results

Answer: Opacity calibration error tests must be conducted in accordance with the procedures outlined in 40 CFR 60, Appendix B, Performance Specification 1 (15 test runs at 3 levels). In RT 888 for opacity, the columns 35 (F13.3), 53 (F13.3), and 71 (F13.3) must be left blank because there is only one applicable performance specification (3% opacity). The CEMDPS*Online Application has been updated to ensure compliance with this guidance.

Reference: N/A

Question 13.15: How should the results of quarterly linearity checks for temperature and steam flow be reported to the Department?

Topic: RT 888: Emissions Data Report Linearity Results

Answer: In RT 888, the results should be entered in columns 30 (F5.1), 48 (F5.1), and 66 (F5.1). Columns 35 (F13.3), 53 (F13.3), and 71 (F13.3) must be left blank because there is only one applicable performance specification (5% of reference temperature or emf). The CEMDPS*Online Application has been updated to ensure compliance with this guidance.

Reference: N/A

Question 13.16: How should the results of quarterly linearity checks for fuel samples (for the owners/operators of SO_2 % Reduction CEMS) be reported to the Department?

Topic: RT 888: Emissions Data Report Linearity Results

Answer: In RT 888, the results should be entered in columns 30 (F5.1), 48 (F5.1), and 66 (F5.1). Columns 35 (F13.3), 53 (F13.3), and 71 (F13.3) should be

left blank. The **worst** value determined on each measurement level for the "Linearity for percent sulfur analysis, dry basis" should be entered under the inlet SO_2 analyzer Id. The CEMDPS*Online Application has been updated to ensure compliance with this guidance.

Reference: N/A

Question 13.17: How is the "Quarterly Average" calculated for each monitored parameter in the Department's Quarterly Continuous Source Monitoring Report? Does it include data that is exempt from compliance?

Topic: Quarterly Continuous Source Monitoring Report calculations

Answer: The "Quarterly Average" is the average of all valid reported emission values for the quarter (Monitoring Code (MC) = 0). This includes data that is exempted during Startup (E3), Shutdown (E4) or Malfunction (E0). This may increase the average over the course of the quarter if the excluded time periods contained elevated emissions (which they typically do). This would not impact compliance with short-term emission standards, because such data is exempted. The Department does not plan on making any changes to the programming because it does provide an accurate representation of the emissions over the course of the quarter.

Reference: N/A

Question 13.18: The linearity specifications contained in Table I, II, III, IV, V, VI, X, XI, and XII of Revision No. 8 of the Continuous Source Monitoring Manual indicate that compliance should be determined to one numeral to the right of the decimal point. However, RT 888 requires that the results be reported to three numerals to the right of the decimal point (F13.3) for the results in terms of the Units of Measurement. What procedures should I follow?

Topic: RT 888: Emissions Data Report Linearity Results

Answer: Compliance with the specifications should be based upon what is contained in the applicable Table in the manual.

For reporting, the instructions for QA Test Calculations under the Computational Requirements and Rounding Section of Attachment No. 3 should be followed. Begin the linearity calculation with the raw data values and retain the full decimal display in the computer for the intermediate values until the final result is obtained. The final value

should be rounded off to the number of decimals digits required by the format using the standard arithmetic rounding convention.

The linearity results in terms of % should be reported in the F5.1 format (report one digit to the right of the decimal point with that digit rounded appropriately) and the linearity results in terms of units of measurement should be reported in the F13.3 format (report three digits to the right of the decimal point with the last digit rounded appropriately), A thorough explanation of this format type can be found in the General Instruction section of Attachment No. 3 of the manual.

Reference: Attachment No. 3, II, C, 7, b
Attachment No. 3, II, C, 7, d
Attachment No. 3, II, A
Attachment No. 3, RT 888

Question 13.19: How should the results of periodic quality assurance tests for fuel flow meters be reported to the Department?

Topic: RT 888: Emissions Data Report

Answer: The results of periodic quality assurance tests for fuel flow meters must be reported within EDR 888 (unless exempted by Federal Regulation or by the Department through the petition process). The procedures being utilized must be specified in column 84 of EDR 888 (e.g. 40 CFR Part 75, D.2.1.6.1-sum, etc.).

The owners/operators of sources with fuel flow meters that utilize the 40 CFR Part 75, Appendix D requirements (as specified within Table XIII of the Manual) must report fuel flow meter quality assurance testing results in RT 888 as required (e.g. every four fuel flow meter QA operating quarters or up to 20 calendar quarters based on allowable deadline extensions under Part 75, Appendix D, 2.1.6(d)). The fuel flow meter quality assurance test results should be entered in columns 30 (F5.1), 48 (F5.1), and 66 (F5.1). Columns 35 (F13.3), 53 (F13.3), and 71 (F13.3) should be left blank.

In addition, the owners/operators of sources who conduct transmitter accuracy tests for orifice-, nozzle- or venturi-type fuel flow meters in accordance with 40 CFR Part 75, Appendix D, 2.1.6(c) should include the date and the results of the most recent primary element visual inspection in the cover letter. For the tests performed under 40 CFR Part 75, Appendix D, 2.1.6.1, the sum of the individual accuracies of the three transducers must be reported in EDR 888 as outlined above, and the reference 40 CFR-Part 75, App. D, 2.1.6.1-sum must be entered in column 84.

The owners/operators of sources that have been approved (through a petition process) to continue using linearity (formerly calibration error) procedures according to a previous version of the Continuous Source Monitoring Manual should also submit linearity results in RT 888 (as outlined above).

The results of all quality assurance activities should be maintained on site and available upon request.

Reference: N/A

Question 13.20: How should excess emissions be reported for opacity monitors with a 6-minute rolling limit?

Topic: RT 892: Emissions Data Report Opacity Excess Emissions Data

Answer: When the owners/operators of the source only report excess emissions for compliance with a 6-minute opacity limitation, report zeroes in columns 29, 31, and 44 of RT 892 (see below). Contact the Department for specific instructions in the event that a 1 or 3-minute limitation is combined with the 6-minute opacity limitation.

RT 892: Emissions Data Report Opacity Excess Emissions Data

EMISSIONS DATA REPORT OPACITY EXCESS EMISSION DATA (PAEDR 2.00)							
TYPE CODE	**START COL**	**For 1min/3min REVISION 8 DATA ELEMENT DESCRIPTION**	**For 6-min averages ELEMENT DESCRIPTION**	**UNITS**	**RANGE**	**LENGTH**	**FORMAT (FTN)**
892	1	Record Type Code	Record Type Code		892	3	I3
	4	PAEDR Version	PAEDR Version		2	4	F4.2
	8	Emission Result ID Code (as assigned by DEP)	Emission Result ID Code (as assigned by DEP)			9	I9
	17	Date	Date	YYYY MMDD		8	I8
	25	Hour	Hour		00-23	2	I2
	27	Number of incidents at or above standard 1 but below	Number of 6-minute averages incidents at or above standard 1		00-10	2	I2

		standard 2	but below standard 2				
	29	Number of incidents at or above standard 2	n/a		00	2	I2
	31	Highest one-minute average	n/a		0.000	13	F13.3
	44	Fourth highest one-minute average	n/a		0.000	13	F13.3
Total Record Length:						**56**	

Section 14 – Attachment No. 4

Section 15 – Attachment No. 5

REFERENCE MATERIALS