DRAFT Part 75 Emissions Monitoring Policy Manual

U.S. Environmental Protection Agency
Clean Air Markets Division
Washington, D.C.

July 10, 2009

TABLE OF CONTENTS

Page

Introduction ... iii

Section 1 -- General ... 1-i

Section 2 -- SO_2 Monitoring ... 2-i

Section 3 -- Flow Monitoring ... 3-i

Section 4 -- NO_x Monitoring ... 4-i

Section 5 -- Opacity Monitoring ... 5-i

Section 6 -- CO_2 Monitoring ... 6-i

Section 7 -- Backup and Portable Monitoring ... 7-i

Section 8 -- Relative Accuracy ... 8-i

Section 9 -- Span, Calibration, and Linearity ... 9-i

Section 10 -- Other QA/QC Requirements. ... 10-i

Section 11 -- Certification: Administrative/Procedural ... 11-i

Section 12 -- Recertification ... 12-i

Section 13 -- DAHS, Recordkeeping, and Reporting ... 13-i

Section 14 -- Missing Data Procedures ... 14-i

Section 15 -- Add-On Emission Controls and Parametric Monitoring ... 15-i

Section 16 -- Common, Multiple, and Complex Stacks ... 16-i

Section 17 -- Conversion Procedures ... 17-i

Section 18 -- Applicability ... 18-i

Section 19 -- Reference Methods as Backup Monitors ... 19-i

Section 20 -- Subtractive Configurations ... 20-i

Section 21 -- Bypass Stacks ... 21-i

Page

Section 22 -- NO_x Apportionment 22-i

Section 23 -- Appendix D 23-i

Section 24 -- Appendix E 24-i

Section 25 -- NO_x Mass Monitoring 25-i

Section 26 -- Moisture Monitoring 26-i

Section 27 -- Low Mass Emitters 27-i

Appendix A -- Miscellaneous Support Documents A-1

Appendix B -- October 2003 Policy Manual Crosswalk B-1

INTRODUCTION

In order to reduce acid rain in the United States and Canada, Title IV of the Clean Air Act Amendments of 1990 established the Acid Rain Program. The program has substantially reduced sulfur dioxide emissions and nitrogen oxide emissions from electric utility plants. These emissions reductions have been achieved at low cost to society, by employing both traditional regulatory techniques and innovative, market-based approaches. The centerpiece of the program is the allowance trading system, under which affected utility units are allocated "allowances" (each "allowance" permits a utility to emit one ton of SO_2) based on historical fuel consumption and specified emission rates. The allowances can be traded as commodities.

To ensure that allowances are consistently valued and to ensure that all of the projected emission reductions are in fact achieved, it is necessary that actual emissions from each affected utility unit be accurately determined. To fulfill this function, Title IV requires that affected units continuously measure and record their SO_2 mass emissions. Most plants will fulfill these requirements by using continuous emission monitoring systems (CEMS). The EPA initially promulgated regulations for Acid Rain Program continuous emission monitoring (CEM) requirements at 40 CFR Part 75 on January 11, 1993 (58 FR 3590) and has published numerous revisions to Part 75 since then. The most recent revisions were published on January 24, 2008 (73 FR 4312).

In the past, this manual addressed only policy questions involving the implementation of the Acid Rain CEM, and was entitled the "Acid Rain Program Policy Manual." However, since the Manual was first published, Part 75 monitoring has been adopted by other emissions trading programs, including the NO_x Budget Program, and, most recently, the Clean Air Interstate Regulation (CAIR). As a result, we changed the title of the manual to "Part 75 Emissions Monitoring Policy Manual."

This manual provides a series of Questions and Answers that can be used on a nationwide basis to ensure that Part 75 emissions monitoring and reporting requirements are applied consistently for all affected sources. The manual is organized into sections by subject matter. Each section has its own table of contents, which provides page references for the applicable Questions and Answers. At the end of the manual, a key word index is provided that identifies, for each key word, the question number(s) where an issue concerning that key word is addressed.

This manual is intended to be a living document. The EPA will issue new Questions and Answers and will revise previously issued Questions and Answers as necessary. The "History" information in each answer indicates when the question and answer was originally published and, if applicable, when it was revised.

Note that the purpose of this manual is to clarify the regulations and to facilitate program implementation. This document is not intended, nor can it be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA may decide to follow the guidance provided in this document, or to act at variance with this guidance, based on its analysis of the specific facts presented. This guidance may be revised without public notice to reflect changes in EPA's approach to implementation, or to clarify and update rule text.

The contents of this manual are available to the general public through the Internet on the Clean Air Markets homepage. The electronic version is provided in an Adobe Acrobat file (PDF format). Updates to the manual will be issued as separate Adobe Acrobat files. Periodically, EPA will reissue a complete manual that incorporates the updates.

If after reviewing the Part 75 regulation and the supplementary guidance provided in this manual, you still have an unresolved issue, contact EPA Headquarters or the EPA Regional Office. You can find a list of contact persons on the Clean Air Markets Division website (www.epa.gov/airmarkets).

SECTION 1
GENERAL

Page

1.1 Time-shared Analyzers 1-1

1.2 Acceptable Monitors 1-1

1.3 Use of Optical In-situ Monitoring 1-1

1.4 PEMS 1-2

1.5 Exemptions from Part 60 Requirements 1-3

[This page intentionally left blank.]

Question 1.1

Topic: Time-shared Analyzers

Question: If two individual probes (for example, where the probes are installed in two different ducts) share an analyzer, are they considered individual monitoring systems?

Answer: Yes. The minimum data capture requirements of § 75.10(d)(1) therefore apply to each system separately (i.e., a minimum of one cycle of operation (sampling, analyzing, and data recording) must be completed in each successive 15-minute interval, for each monitoring system).

References: § 75.10(d)

Question 1.2

Topic: Acceptable Monitors

Question: Are all types of monitors, including in-situ monitors, appropriate for use in the Part 75 program?

Answer: Yes, all types of CEMS are appropriate for use in the CEM program as long as the CEMS is able to meet the design specifications, all the initial performance test requirements, and the annual, semi-annual, quarterly, and daily QA/QC requirements of Part 75.

References: § 75.10, § 75.66(l)

Question 1.3

Topic: Use of Optical In-situ Monitoring

Question: Can I use an optical in-situ monitoring system for monitoring under Part 75? If so, how do I challenge the system with calibration gases and what procedure should I use to calculate the required gas tag values?

Answer: Yes. An optical in-situ system may be used so long as it is approved under the Part 75 regulations via issuance of a monitoring system certification. This means the system must undergo all required tests and pass. To test the instrument linearity and calibration error, EPA Protocol gases must be used. The use of a calibration cell that is placed in the measurement path is acceptable. The calibration cell must be located so as to challenge the entire measurement system. This is analogous to the injection of calibration gas to the probe tip of extractive systems.

For path measurement systems where the calibration gas materials are introduced into a cell of different optical path length than the measurement optical path length, use the following equation to calculate the calibration gas tag values needed for daily calibration error tests or linearity checks:

$$EAV = SAV * \left(\frac{MPL}{CCPL}\right)$$

Where:

EAV	=	Equivalent Audit Value
SAV	=	Specified Audit Value
MPL	=	Measurement Path Length
CCPL	=	Calibration Cell Path Length

The EAV is the actual tag value of the EPA protocol gas to be injected. The SAV is the required reference gas concentration specified in Section 5.2 of Appendix A of the rule as a percentage of the calculated span value.

The design should be such that the audit calibration gas is maintained at the same temperature and pressure as the stack gas to be measured. Alternatively, the owner or operator could determine the calibration cell temperature and apply appropriate corrections to the audit measurements to represent monitor performance at actual effluent conditions, subject to the approval of the Administrator. Any such petitions must be approved by the Administrator prior to implementation of acceptable testing.

References: § 75.10

Question 1.4

Topic: PEMS

Question: Are Predictive Emissions Monitoring Systems (PEMS) allowed under Part 75?

Answer: Yes. In 2003–2004, the Agency conducted PEMS background work and field testing to determine whether the use of PEMS should be allowed for particular source categories under the Acid Rain Program or Subpart H. The scope of the work was limited to evaluation of NO_x PEMS at gas-fired turbines and boilers. The study results indicated that PEMS can be an effective alternative monitoring system for NO_x emissions for certain gas-fired and possibly oil-fired sources when proper QA/QC is implemented.

Sources may petition EPA to use a PEMS as an alternative monitoring system, in accordance with § 75.66 and Subpart E of Part 75. To date, EPA has approved several NO_x PEMS petitions for gas- or oil-fired turbines and gas-fired boilers. PEMS approved under 40 CFR 60 Appendix B, Performance Specification 16 must still be approved by petition for use under Part 75.

References: § 75.66 and Subpart E of Part 75

Question 1.5

Topic: Exemptions From Part 60 Requirements

Question: My facility is subject to continuous monitoring requirements under both 40 CFR Part 60 and 40 CFR Part 75. Part 75 allows us to claim limited exemptions from linearity testing of our gas monitors for quarters in which the unit operates for fewer than 168 hours. May I obtain a similar exemption from the Part 60, Appendix F quality assurance provisions for quarterly cylinder gas audits (which are similar to Part 75 linearity checks) for quarters in which the unit operates for fewer than 168 hours?

Answer: You may only obtain an exemption from the Part 60 cylinder gas audit (CGA) requirement if the regulations allow it or if the permitting authority allows it.

Generally speaking, the sources that are subject to the CEM quality assurance requirements of both Part 75, Appendix B and Part 60, Appendix F are fossil fuel-fired electricity generating units (EGUs) regulated under the Acid Rain Program (or the Clean Air Interstate Rule (CAIR)) and under NSPS Subpart Da or Db.

In past years, sources subject to both the Part 60 and Part 75 CEMS quality assurance provisions were required to meet the both sets of QA requirements unless, on a case-by-case basis the permitting authorities made exceptions. However, on June 13, 2007, EPA published the following revisions to Subparts Da and Db, harmonizing certain CEM provisions of Subparts Da and Db with Part 75 (see 72 FR 32710, et. seq., June 13, 2007):

- Subparts Da and Db now clearly allow the use of data from certified Part 75 monitoring systems to document compliance with the Part 60 SO_2 and NO_x emission limits.
- Part 75 monitor span values may be used in lieu of the Part 60 spans.
- With certain exceptions, the QA provisions in Part 75, Appendix B may be followed instead of Part 60, Appendix F. Among other things, this means that for SO_2 and NO_x monitors with span values > 30 ppm, and for all diluent gas monitors, Part 75 linearity checks may be performed instead of Part 60 CGAs.

- For SO_2 and NO_x monitors with span values ≤ 30 ppm, CGAs are still required, even though Part 75 linearity checks are not required for these span values.

Along with the revisions to Subparts Da and Db, an important change was made to the CGA provisions in Section 5.1.4 of Appendix F, Procedure 1 on June 13, 2007. The requirement to perform CGAs has been waived in non-operating quarters (i.e., calendar quarters with zero unit operating hours).

(Note: In the June 13, 2007 Federal Register notice, there are two typographical errors regarding the use of Part 75 QA in lieu of Part 60 QA, for daily calibrations of the CEMS. In §60.49Da(w)(2) of Subpart Da, the words "span values greater than 100 ppm" should read, "span values greater than *or equal to* 100 ppm". In §60.47b(e)(4)(i) of Subpart Db, the words "span values less than 100 ppm" should read, "span values *greater than or equal to* 100 ppm".)

References: 40 CFR §§ 60.49Da(b) – (d), 60.49Da(i)(3), 60.49Da(w), 60.47b(a), 60.48b(b), 60.48b(e), 60.47b(e); Part 60, Appendix F; Part 75, Appendix B, Section 2.2.3(f)

SECTION 2
SO_2 MONITORING

Page

2.1 SO_2 Monitoring for Very Low Sulfur Fuel 2-1

2.2 Use of Default SO_2 Value 2-2

[This page intentionally left blank.]

Question 2.1

Topic: SO_2 Monitoring for Very Low Sulfur Fuel

Question: If I have a coal-fired unit with an SO_2 CEMS that occasionally burns a "very low sulfur fuel" (as defined in 40 CFR 72.2), am I required to use a different monitoring approach for SO_2 for hours in which very low sulfur fuel is the only fuel being combusted, or may I continue to use the SO_2 CEMS for those hours?

Answer: When a very low sulfur fuel (e.g., natural gas) is the only fuel being combusted in the unit, you may either continue to use the SO_2 CEMS (as described in paragraph (1), below) or you may use the alternative method described in paragraph (2), below, to quantify SO_2 emissions.

(1) Section 75.11(e)(3) allows you to continue using the SO_2 monitor during the combustion of a "very low sulfur fuel" such as natural gas. If you choose this option, you must report a default value of 2.0 ppm SO_2 whenever the bias-adjusted SO_2 hourly average value recorded by the CEMS is less than 2.0 ppm.

(2) As an alternative to using the SO_2 monitor when very low sulfur fuel is the only fuel being combusted, § 75.11(e)(1) allows you to use hourly measurements of heat input rate (derived from CO_2 or O_2 and flow rate CEMS data), together with a default SO_2 emission rate from Section 2.3.1.1 or Section 2.3.2.1.1 of Part 75, Appendix D, to calculate the hourly SO_2 emission rates. If this option is selected, Equation F-23 from Section 7 of Appendix F to Part 75 is used:

$$E_h = ER \;\; x \;\; HI \qquad \text{(Equation F-23)}$$

Where:

E_h = Hourly SO_2 mass emission rate, lb/hr
ER = Default SO_2 emission rate, either: 0.0006 for "pipeline natural gas" (as defined in 40 CFR 72.2); or as calculated using Equation D-1h in Appendix D, for (as defined in 40 CFR 72.2), lb/mmBtu
HI = Hourly heat input rate measured with CEMS, mmBtu/hr

For hours in which Equation F-23 is used, the following activities are all temporarily suspended: (a) calculation of the SO_2 percent monitor data availability (PMA); (b) use of the standard SO_2 missing data procedures; and (c) QA assessments of the SO_2 monitor. These activities resume when the SO_2 monitor returns to service. However, for the flow and diluent monitors, PMA calculations, missing data substitution, and QA assessments continue uninterrupted during Equation F-23 hours.

If you elect to use Equation F-23, you must include the equation in your electronic monitoring plan (in a Monitoring Formula Data record), and you must specify your default SO_2 emission rate in a Monitoring Default Data record. For emissions reporting purposes, do not report a Monitor Hourly Value (MHV) record for SO_2 when Equation F-23 is used. Rather, report the calculated SO_2 mass emission rate in the "adjusted hourly value" field of a Derived Hourly Value (DHV) record, leaving the "unadjusted hourly value" field blank.

[Regulatory Update: Prior to 2008, § 75.11(e) placed two restrictions on the use of Equation F-23: (1) the equation could only be used by an affected unit equipped with an SO_2 monitor; and (2) the equation could only be used during the combustion of very low sulfur *gaseous* fuel. However, on January 24, 2008, EPA revised § 75.11(e) to remove these restrictions (see: 73 FR 4315-16, January 24, 2008). The revised rule no longer limits the use of Equation F-23 to units with SO_2 monitors. Also, the use of Equation F-23 has been expanded to include "very low sulfur fuel" in all three states of matter (solid, liquid, and gas). To use Equation F-23 for very low sulfur fuels other than natural gas, (or mixtures of these fuels) the owner or operator must obtain Administrative approval of fuel-specific default SO_2 emission rates, by means of special petition under § 75.66.]

References: § 75.11(e), 75.64, 75.21(a)(4); Appendix D, Section 2.3; Appendix F, Section 7; ECMPS Monitoring Plan Reporting Instructions, sections 9.0 and 10.0; ECMPS Emissions Reporting Instructions, Sections 2.5.1 and 2.5.2

Question 2.2

Topic: Use of Default SO_2 Value

Question: A solid fuel-fired (e.g., wood, coal, or refuse) unit with certified SO_2 and flow monitoring systems occasionally fires gaseous fuel. According to § 75.11(e)(3)(iii), the DAHS must automatically substitute a 2.0 ppm default for hours when: (a) the unit is combusting gaseous fuel that meets the definition of "very low sulfur fuel" in § 72.2; and (b) the measured SO_2 concentration reading is less than 2.0 ppm. Does EPA require me to demonstrate that my gaseous fuel qualifies as very low sulfur fuel before I use the 2.0 ppm default value?

Answer: No demonstration is required. The definition of very low sulfur fuel in § 72.2 includes the following: "pipeline natural gas" (as defined in § 72.2), "natural gas" (as defined in § 72.2), and any other gaseous fuel which has 20 grains or less of total sulfur. If, based on a knowledge of the composition of the gaseous fuel being combusted (e.g., from contract specifications or historical fuel sampling information), you believe the fuel qualifies as very low sulfur fuel, report the 2.0 ppm default SO_2

concentration for gas-fired hours when the bias-adjusted SO_2 concentration is less than 2.0 ppm.

References: § 72.2, § 75.11(e)(3)(iii)

[This page intentionally left blank.]

SECTION 3
FLOW MONITORING

Page

3.1 Applicability 3-1

3.2 Requirements for Dual Flow (X-Pattern Flow) Monitoring Systems...... 3-1

3.3 Length of Reference Method 2 Test Runs 3-2

3.4 Flow Monitor Interference Check.. 3-3

3.5 Accuracy of Flow Monitoring and Reference Methods 3-3

3.6 Interference Checks when Unit is Operating 3-4

3.7 Interference Checks on Differential Pressure Flow Monitors 3-5

3.8 Moisture Content Determination 3-5

3.9 Re-linearization of Flow Monitor During Pre-RATA Testing 3-6

3.10 Test Methods 2F, 2G, and 2H -- Application 3-6

3.11 Test Method 2H -- Applying the Default Wall Effects Adjustment Factor (WAF) 3-7

3.12 Test Method 2H -- Minimum Acceptable Calculated Wall Effects Adjustment Factor (WAF) 3-8

3.13 Test Method 2H -- Frequency of Performing Wall Effects Testing 3-8

3.14 Test Method 2H -- Wall Effects Adjustment Factors (WAFs) and Load Levels... 3-8

3.15 Test Method 2H -- Discarding Wall Effects Adjustment Factors (WAFs)... 3-9

Page

3.16 Test Method 2, 2F, 2G, and 2H -- Determining Wall Effects Adjustment Factors (WAFs) as Part of the RATA 3-9

3.17 Test Method 2, 2F, and 2G -- Using Different Test Methods at Different Load or Operating Levels.. 3-10

3.18 Test Method 2H -- Applicability of Notes Regarding Stack Diameters in Sections 8.2.3(b) and 8.2.3(c).. 3-10

3.19 Test Method 2H -- Typographical Error in Headers of Columns D and E of Form 2H-2 3-11

3.20 Test Method 2H -- Using Default Wall Effects Adjustment Factor (WAF) After Deriving a Calculated WAF 3-11

3.21 Stack Flow-to-load Test.. 3-12

3.22 Hourly Averages for Abbreviated Flow-to-load Test........................... 3-13

3.23 Test Method 2H -- Restrictions on Use of Default Wall Effects Adjustment Factors (WAFs)... 3-13

3.24 Test Method 2H -- Qualification for Default Value 3-14

3.25 Test Method 2H -- Gunite Stack... 3-14

3.26 Use of Spherical Probes for Flow Test Methods 3-14

3.27 Calibration of Probe.. 3-15

3.28 Use of Three-dimensional Probe for Methods 2F and 2H..................... 3-15

3.29 Use of WAF for Square and Rectangular Stacks.................................. 3-16

3.30 Test Method 2H -- Traverse Points.. 3-16

3.31 Minimum WAF... 3-16

3.32 Test Methods 2 and 2H 3-17

3.33 Flow Measurement in Rectangular Stacks or Ducts.............................. 3-18

3.34 Reporting of Support Records for Flow RATA's 3-19

3.35 Flow-to-load Ratio Test -- Multiple Stacks 3-22

Page

3.36 Flow-to-load Ratio Test -- Multiple Stacks 3-22

3.37 Flow-to-load Ratio Test -- Multiple Stacks 3-24

3.38 Flow-to-load Ratio Test -- Multiple Stacks 3-25

3.39 Flow-to-load Ratio Test -- Multiple Stacks 3-26

3.40 Flow-to-load Ratio Test -- Exemptions 3-26

3.41 Converting Volumetric Flow Data to Standard Temperature and Pressure 3-27

[This page intentionally left blank.]

Question 3.1

Topic: Applicability

Question: Is a flue gas volumetric flow monitor required on a gas-fired or oil-fired unit?

Answer: A gas-fired unit or oil-fired unit subject to the Acid Rain Program does not need a flue gas volumetric flow monitor if the owner or operator reports SO_2 mass emissions using the procedures specified in Appendix D or uses the low mass emissions (LME) methodology in § 75.19. Gas-fired and oil-fired units subject to Subpart H also have options for monitoring NO_x mass that do not require flow CEMS. These are outlined in § 75.71.

References: § 75.11(d)(2), § 75.19, § 75.71; Appendix D

Question 3.2

Topic: Requirements for Dual Flow (X-Pattern Flow) Monitoring Systems

Question: A number of sources have installed two sets of flow monitors in a single stack and are reporting the average flow value as the unit flow on an hourly basis. This includes systems using x-pattern ultrasonic monitors, as well as systems using two differential pressure monitors.

How should these sources represent these monitors in the monitoring plan? How should they report flow data and calibration records?

Answer: In the monitoring plan, identify each separate flow monitor as a component in the primary flow system. If each monitor alone will be used as a redundant backup flow system, also define each redundant backup system containing a single flow monitor.

For example, a utility may install two flow monitors (Components 00A and 00B) on a single stack. Three systems (one primary and two redundant backups) could be listed in the monitoring plan using these two flow monitors. The primary system (P01) would contain both monitors (Components 00A and 00B) where the average flow value observed from these components is reported as the flow from this primary system. Then, Component 00A could also be listed as a component of redundant backup System B01, and Component 00B could be a component of redundant backup System B02.

For certification purposes and ongoing quality assurance, each monitoring system (P01, B01, and B02) must pass the RATA based on the monitored flow values produced by that system. Therefore, report three sets of RATA and bias test data and results: one for system P01 (the average of components 00A and 00B), one for system B01, and one for system B02. Note that one set of reference method test data could be used to calculate the relative accuracy and bias for all three systems as long as data from all three systems can be recorded separately during the reference testing.

For daily quality assurance, report one set of calibration and interference records for each of the flow monitor components in the <DailyTestSummaryData> record of the quarterly emissions report using only the component IDs.

Note also that for certifications where a 7-day calibration error test is required, conduct the 7-day calibration error test on each of the flow monitor components separately. Report the 7-day calibration error test data and results under the appropriate component ID (00A and 00B) separately for each component (see ECMPS Quality Assurance and Certification Reporting Instructions, Section 2.1).

Finally, report the average hourly flow value in the <MonitorHourlyValueData> record using only the system ID and leave the component ID blank for hours where the primary system with two flow monitoring components is used. Otherwise, when either of the backup systems (B01 or B02) are used, report both the System ID and the Component ID as appropriate for the system that was used.

References: Appendix A; ECMPS Quality Assurance and Certification Reporting Instructions, Section 2.1; and ECMPS Emission Reporting Instructions, Section 2.2 and 2.5.1

Question 3.3

Topic: Length of Reference Method 2 Test Runs

Question: Must a Method 2 flow run be 30 to 60 minutes long?

Answer: No. Method 2 only requires a run to be long enough to obtain a stable reading at each traverse point. The EPA recommends that flow run times be consistent with the run time for a gas RATA run (21 minutes). Flow runs shorter than 21 minutes are acceptable, but runs must be at least five minutes long.

References: 40 CFR Part 60, Appendix A (RM 2); 40 CFR Part 75, Appendix A, Section 6.5.7

Question 3.4

Topic: Flow Monitor Interference Check

Question: Must quarterly reports include daily interference check results for stack gas flow monitors, regardless of type of flow monitor?

Answer: Yes. Part 75, Appendix A, Section 2.2.2.2 details the interference check requirements for three types of flow monitors. The EPA has received questions specifically asking whether ultrasonic flow monitors must perform the interference check. For ultrasonic flow monitors, as well as thermal and differential pressure flow monitors, you must perform the daily interference check. For example, for an ultrasonic flow monitoring system you would record in the <DailyTestSummaryData> record of the quarterly emissions data report that a daily (or more frequent) interference check was passed indicating that the transducer purge air is working correctly. Conversely, a failure would be recorded in the event that the transducer purge air is not working correctly.

References: Appendix A, Section 2.2.2.2, ECMPS Emission Reporting Instructions, Section 2.2

Question 3.5

Topic: Accuracy of Flow Monitoring and Reference Methods

Question: Are the SO_2 emissions data reported under the Acid Rain Program high due to inaccuracy in the reference method for volumetric flow (EPA Test Method 2)? If it is uncertain, what is EPA doing to resolve the issue?

Answer: The evidence amassed to date does not indicate a clearly consistent pattern. Claims of overestimation are counterbalanced by evidence of little or no overestimation. The results appear to be highly dependent on site-specific flow patterns, particularly whether the emission flow is axial, going straight out the stack, or off-axial (i.e., swirling out the stack).
In addition, many of the claims appear to be based on a comparison between flow rates derived from fuel factors and fuel sampling-based heat input and flow rates derived from continuous emission monitoring systems (CEMS) as required by Part 75. Concluding that SO_2 measurements are incorrect because the monitored flow rates are higher than the fuel-factor-derived flow rates is questionable.

The frequency of measurement (hourly) and quality assurance (daily) is generally much higher with the Acid Rain certified CEMS than with fuel sampling. Estimating flow over short periods of time from fuel factors and heat input also depends on a high degree of consistency in the fuel supply, which is rarely the case at coal-fired boilers.

In response to the concerns of the regulated community and because of the importance of accurate emission measurements for environmental protection, and for the effective operation of the SO_2 allowance market, EPA developed three test methods (Reference Methods 2F, 2G, and 2H) for measuring volumetric flow. These test methods were published in the Federal Register and became effective on July 13, 1999.

Method 2F measures the axial velocity, taking into account both the yaw and pitch angles, using a three-dimensional probe, such as a prism-shaped, five-hole probe (commonly called a DA or DAT probe) or a five-hole spherical probe.

Method 2G is a variant of existing Method 2, which uses a Type S pitot tube or a three-dimensional probe to determine the flue gas velocity in a stack or duct, taking into account the yaw angle of flow. Method 2G does not account for the pitch angle of flow.

In a stack or duct with flowing gas, the gas velocity will approach zero near the stack or duct wall. Method 2H can be used in conjunction with existing Method 2 or new Methods 2F or 2G to account for this velocity drop-off when determining volumetric flow rate.

Questions 3.10 through 3.20 and 3.23 through 3.34 in this manual provide implementation guidelines for the flow methods.

References: 40 CFR Part 60, Appendix A (RMs 2, 2F, 2G, and 2H)

Question 3.6

Topic: Interference Checks when Unit is Operating

Question: Must interference checks be performed when the unit is operating?

Answer: Yes. Appendix A, Section 2.2.2.2 requires the owner or operator of an affected unit to demonstrate non-interference from moisture, and to perform a daily test to detect pluggage and/or malfunction of each resistance temperature device (RTD), transceiver or equivalent. Flow monitors commonly employ a purge across the transceiver or out the sampling ports or periodic heating of RTDs to meet the above requirements. Because all of these are active measures utilizing mechanical/electrical devices, they may be susceptible to changes in temperature and pressure observed during unit operation. Therefore, the interference check should be performed during unit operation.

References: Appendix A, Section 2.2.2.2; Appendix B, Section 2.1.2

Question 3.7

Topic: Interference Checks on Differential Pressure Flow Monitors

Question: Must interference checks performed on differential pressure flow monitors be capable of detecting pluggage during a purge?

Answer: Part 75, Appendix A, Section 2.2.2.2 states in part: "Design and equip each flow monitor with a means to detect, on at least a daily basis, pluggage of each sample line and sensing port. . . ." Because differential pressure flow monitor purge cycles are generally performed at least daily, performing the interference check during the purge may make sense. Regardless of whether the interference check is performed during a purge, the interference check must be performed so that any pluggage is detected and reported at least daily. In practice, this means that if no pluggage of any sample line or sensing port is present, a passed interference check would be reported; if pluggage is present, a failed interference check would be reported. Also, please refer to Question 3.4.

References: Appendix A, Section 2.2.2.2

Question 3.8

Topic: Moisture Content Determination

Question: My pollutant concentration is measured on a dry basis and the flow rate is measured on a wet basis. Can I use the wet bulb-dry bulb technique to determine the moisture content of the stack gases?

Answer: It depends upon the use of the moisture data. The wet bulb-dry bulb technique may not be used when converting dry pollutant concentration to a wet basis for the calculation of pollutant emission rate. Either Reference Method 4 in Appendix A-3 of 40 CFR Part 60 or the approximation method described in Section 6.2 of Method 4 (midget impinger technique) must be used to convert gas concentrations from a dry to wet basis. A 1978 EPA field study has demonstrated that the midget impinger technique is capable of giving results within one percent H_2O of the reference method (see Reference 1 in the Bibliography of Reference Method 6A).

Method 4 allows the use of other approximation methods, such as the wet bulb-dry bulb technique to provide estimates of percent moisture to aid in setting isokinetic sampling rates prior to a pollutant emission measurement run. For the Part 75 Program, you may use the wet bulb-dry bulb technique when determining the molecular weight of the stack gas for the purpose of calculating the stack gas volumetric flow rate.

References: 40 CFR Part 60, Appendix A-3 (RM 4)

Question 3.9

Topic: Re-linearization of Flow Monitor During Pre-RATA Testing

Question: If a flow monitor is re-characterized or re-linearized during pre-RATA testing, do we need to use missing data for flow between the time the flow monitor was re-characterized and the time it passes the RATA?

Answer: Not necessarily. According to Section 2.3.2(b)(3) of Appendix B, you have two data validation options following a major adjustment or re-linearization of a flow monitor: (1) invalidate all data from the monitor from the hour of the re-linearization of the instrument until a subsequent hands-off RATA is passed; or (2) invalidate data from the monitor from the hour of the re-linearization of the instrument until a subsequent probationary calibration error test is passed and then use the conditional data validation procedures of § 75.20(b)(3). When the second option is chosen, if the subsequent RATA is passed hands-off, data from the monitor are considered quality-assured, back to the time of completion of the probationary calibration error test.

References: § 75.20(b)(3); Appendix B, Section 2.3.2(b)(3)

Question 3.10

Topic: Test Methods 2F, 2G, and 2H -- Application

Question: How do I implement Test Methods 2F, 2G, and 2H? In particular, what adjustments can be made to the flow monitor in preparation for performing a RATA using Methods 2F, 2G, and 2H?

Answer: The *recommended* procedures for implementing these flow rate methods are as follows:

(1) First, decide which flow reference method or combination of methods will be implemented (e.g., Methods 2 and 2H with a default wall adjustment factor (WAF), Methods 2F and 2H with a calculated WAF, etc.)

(2) Second, perform whatever diagnostic testing and wall effects measurements are necessary to establish new parameter values or to adjust existing parameter values that will be programmed into the flow monitor to make the monitor readings agree with the selected reference method(s). (This process is analogous to the set-up or characterization of the flow monitor that was done prior to initial certification, to make the monitor readings agree with Method 2.) If Method 2F or 2G is

selected as a reference method, establish the new parameter values or parameter value adjustments at three load or operating levels (low, mid, and high). If Method 2H will be used to obtain calculated WAFs, characterize separate WAFs at each of the three load or operating levels. If Method 2H is used with a default WAF, no wall effects measurements are needed. In that case, apply a constant parameter adjustment of either 0.5% or 1.0% (as appropriate to the type of stack) at each load or operating level.

(3) Third, incorporate the new parameter values or parameter value adjustments, determined in the second step, above, into the flow monitor and then perform a follow-up 3-load (or 3-level) RATA using the selected reference method(s). For the follow-up RATA, use the data validation procedures in Section 2.3.2 of Appendix B (note especially paragraph (b)(3)).

(Note: The procedures described above are recommended, not required, because EPA recognizes that there may be situations in which the owner or operator desires to use the new flow rate methods for reference method testing without making any adjustments to the polynomial coefficients or K-factor(s) of the flow monitor. For example, if a particular flow monitor installed on a brick stack was originally characterized or set up using regular Method 2, and if the monitor has a one percent bias adjustment factor (BAF) with respect to Method 2, the owner or operator may elect to perform the next RATA of the flow monitor cold (i.e., without changing any coefficients or K-factors) and to use a combination of regular Method 2 and Method 2H (using the one percent default wall effects adjustment factor allowed under Method 2H) to try to eliminate the BAF.)

References: 40 CFR Part 60, Appendix A (RMs 2, 2F, 2G, and 2H); 40 CFR Part 75, Appendix B, Sections) 2.3.2(b)(1), 2.3.2(b)(2) and 2.3.2(b)(3)

Question 3.11

Topic: Test Method 2H -- Applying the Default Wall Effects Adjustment Factor (WAF)

Question: Can I apply the default WAF to data reported by my flow monitor?

Answer: The WAF is applied only to the reference method value obtained by Method 2, 2F, or 2G in the RATA, not to the values reported by the flow monitor. However, immediately before performing this RATA, new parameter values or parameter value adjustments may be programmed into the flow monitor to make the flow monitor readings agree with the selected reference method(s). See Question 3.10 for a more detailed discussion of these adjustments.

References: 40 CFR Part 60, Appendix A-2 (RM 2H); 40 CFR Part 75, Appendix B, Sections 2.3.2(b)(1), 2.3.2(b)(2) and 2.3.2(b)(3)

Question 3.12

Topic: Test Method 2H -- Minimum Acceptable Calculated Wall Effects Adjustment Factor (WAF)

Question: If I calculate the WAF based on a Method 1 traverse consisting of more than 16 traverse points, do the minimum acceptable wall effects adjustment factors of 0.9800 for a partial traverse and 0.9700 for a complete traverse still apply?

Answer: Yes. These limits always apply. The likely results of using more than 16 Method 1 traverse points are twofold: (1) a lower average velocity; and (2) a WAF that is greater than or equal to 0.9800 for a partial traverse and 0.9700 for a complete traverse.

References: 40 CFR Part 60, Appendix A-2 (RM 2H, Section 12.6)

Question 3.13

Topic: Test Method 2H -- Frequency of Performing Wall Effects Testing

Question: If I want to use a calculated wall effects adjustment factor (WAF) to account for velocity decay near the stack or duct wall, how frequently does Test Method 2H need to be performed? May I use the WAF from last year's annual flow RATA?

Answer: Perform Method 2H and recalculate the WAF every time a flow monitor relative accuracy test audit is performed. You may not use a calculated WAF from a previous flow RATA.

References: 40 CFR Part 60, Appendix A-2 (RM 2H, Section 12.7.2); 40 CFR Part 75, Appendix B, Section 2.3.1.1

Question 3.14

Topic: Test Method 2H -- Wall Effects Adjustment Factors (WAFs) and Load or Operating Levels

Question: When performing Method 2H, can I obtain a calculated wall effects adjustment factor at one load or operating level and apply it to all load or operating levels of a multi-level RATA?

Answer: No. A calculated wall effects adjustment factor can only be applied at the load level at which it was obtained. At other load levels you must either take measurements to derive a separate calculated WAF for that load level or use the default WAF applicable for your particular stack or duct.

References: 40 CFR Part 60, Appendix A-2 (RM 2H, Section 12.7.2)

History: First published in October 1999 Revised Manual; revised in October 2003 Revised Manual

Question 3.15

Topic: Test Method 2H -- Discarding Wall Effects Adjustment Factors (WAFs)

Question: If I perform Method 2H and obtain a calculated WAF, must I use it?

Answer: Even after performing Method 2H, you are free to decide not to make use of the resulting calculated WAF. However, unless you can document technical reasons for invalidating a specific calculated WAF, you cannot discard one calculated WAF and use another calculated WAF in its place. If any calculated WAF is applied, it must be derived from all the calculated WAFs that were obtained using Method 2H.

For example, suppose a 9-run RATA is performed using Method 2G, and Method 2H is used to obtain calculated WAFs on Runs 1, 3, and 6. You are free to decide not to apply any calculated WAF to the Method 2G flow values. However, if a calculated WAF is applied to these flow values, it must be the arithmetic average of all three calculated WAFs obtained using Method 2H.

References: 40 CFR Part 60, Appendix A-2 (RM 2H, Section 12.7.2)

Question 3.16

Topic: Test Method 2, 2F, 2G, and 2H -- Determining Wall Effects Adjustment Factors (WAFs) as Part of the RATA

Question: Must I determine my calculated wall effects adjustment factor (WAF) from measurements taken during one or more runs of the same RATA to which the resulting WAF will be applied?

Answer: Yes. Section 12.7.2 of Test Method 2H requires that a WAF that is applied to runs in a RATA must be obtained from wall effects measurements performed during one or more runs in that RATA. It should be noted that to be considered part of the same RATA, the runs in which the WAF measurements were made must have been completed within the RATA time period requirements in Part 75, Appendix A, Section 6.5(e). Similarly, for single run tests, Section 12.7.1 of Test Method 2H requires that any wall effects measurements must be obtained during the same traverse in which the unadjusted velocity for the WAF calculation was obtained.

References: § 75.22; 40 CFR Part 60, Appendix A-2 (RM 2H)

Question 3.17

Topic: Test Method 2, 2F, and 2G -- Using Different Test Methods at Different Load or Operating Levels

Question: Do I need to use the same flow test method (Test Method 2, 2F, or 2G) at each load or operating level of a multi-level relative accuracy test audit?

Answer: No. You may use different flow test methods at different load or operating levels (e.g., Method 2F at high load and Method 2 at low and mid load). However, the same flow test method must be used for each run within a particular load or operating level. In the example presented above, all runs at the high load level would have to be performed using Method 2F and all runs at the mid and low load levels would have to be performed using Method 2.

References: 40 CFR Part 60, Appendix A-2 (RMs 2, 2F, and 2G); 40 CFR Part 75, Appendix B, Section 2.3.1.3

Question 3.18

Topic: Test Method 2H -- Applicability of Notes Regarding Stack Diameters in Sections 8.2.3(b) and 8.2.3(c)

Question: Do the stack diameters given in the notes in Sections 8.2.3(b) and 8.2.3(c) of Method 2H hold for Method 1 traverses with more than 16 traverse points?

Answer: No. The dimensions shown in these sections only apply to a Method 1 traverse consisting of 16 points.

Section 8.2.3(b) says that for stacks or ducts with diameters greater than 15.6 feet, the interior edge of the Method 1 equal area is farther from the wall than 12 inches (i.e., d_b is greater than 12 inches). Section 8.2.3(c) says that for a complete wall effects traverse the distance between d_{rem} and d_{last} will be less than or equal to 1/2 inch for stacks or ducts with diameters less than 16.5 feet. These conditions apply to Method 1 traverses consisting of 16 traverse points. Other dimensions would apply to Method 1 traverses consisting of more than 16 traverse points.

References: 40 CFR Part 60, Appendix A-2 (RM 2H, Sections 8.2.3(b) and 8.2.3(c))

Question 3.19

Topic: Test Method 2H -- Typographical Error in Headers of Columns D and E of Form 2H-2

Question: Is there an error in the headers of columns D and E in Form 2H-2, the form used to calculate wall effects replacement velocity values when performing a Method 1 traverse consisting of 16 or more traverse points? The algebraic expressions in the column headers do not agree with the instructions appearing in Section 12.4.2 and Equation 2H-8 of Method 2H.

Answer: Yes. There is a typographical error in these column headers. The multiplier in the algebraic expressions should be 1/4, not 2/p. The expression above column D should be:

$$\frac{1}{4}\pi[r\text{-}d+1]^2$$

And the expression above column E should be:

$$\frac{1}{4}\pi[r\text{-}d]^2$$

References: 40 CFR Part 60, Appendix A-2 (RM 2H)

Question 3.20

Topic: Test Method 2H -- Using Default Wall Effects Adjustment Factor (WAF) After Deriving a Calculated WAF

Question: After taking wall effects measurements and obtaining a calculated WAF may I use the appropriate default WAF instead of the calculated WAF I obtained?

Answer: Yes. You may use the appropriate default WAF instead of the calculated WAF, but you must report both the calculated and default WAFs, as follows:

(1) When using Method 2F or 2G, in report the calculated WAF in the <CalculatedWAF> field of the <FlowRATARunData> record. Leave the <CalculatedWAF> field of the <RATASummaryData> record blank (since you have elected not to use the calculated WAF), and report the default WAF in the <DefaultWAF> field of the <RATASummaryData> record; or

(2) When regular Method 2 is used and you elect to apply a default WAF instead of using the calculated WAF, report the appropriate default

value used in the <DefaultWAF> field of the <RATASummaryData> record to indicate which default WAF value has been applied to the RATA runs. Do not report any <FlowRATARunData> records when using regular Method 2 with a default WAF, as these records are incompatible with the reference method code "D2H" reported in the <RATASummaryData> record. Instead, report all calculated WAFs that were not used in the flow calculations in the <TestComment> field of the <TestSummaryData> record for the Method 2 RATA being reported. Also indicate in the <TestComment> field how many wall effects measurement points were tested at each sample port to derive each calculated WAF.

References: § 75.59, § 75.64; 40 CFR Part 60, Appendix A-2 (RM 2H); ECMPS Quality Assurance and Certification Reporting Instructions, Section 2.4

Question 3.21

Topic: Stack Flow-to-load Test

Question: Please provide more details about the quarterly stack flow-to-load ratio test. A comparison of hourly flow-to-load assumes that they are related, but that is not always true.

Answer: During the rulemaking process, EPA had extensive discussions with utility representatives concerning the flow-to-load ratio test and incorporated many of their suggestions into the May 26, 1999 final rule. One concern raised by the utilities was whether a straight flow-to-load ratio is a sufficiently reliable indicator of flow monitor performance. To address this concern, the final rule allows an alternative to the straight flow-to-load comparison. The quarterly flow rate data may instead be analyzed using the gross heat rate (GHR), which includes a correction for the diluent gas concentration. In many instances, using the GHR appears to be a more satisfactory way of evaluating the data, especially for common stacks. Also note that the tolerance band for the flow-to-load ratio or GHR test is rather wide. For a further discussion of the rationale behind the flow-to-load ratio test, see the preamble to the May 21, 1998 proposed revisions to Part 75 (63 FR 28061).

References: Appendix B, Section 2.2.5

Question 3.22

Topic: Hourly Averages for Abbreviated Flow-to-load Test

Question: An abbreviated flow-to-load ratio diagnostic test is performed for a non-peaking unit using six to twelve consecutive hourly average flow rates. What kind of hourly averages are these? Is the answer the same for a peaking unit (using three to twelve hours)?

Answer: These hourly average flow rates are the ones required under § 75.10(d)(1), and are calculated in the same way for peaking and non-peaking units.

References: § 75.10(d)(1); Appendix B, Section 2.2.5.3

Question 3.23

Topic: Test Method 2H -- Restrictions on Use of Default Wall Effects Adjustment Factors (WAFs)

Question: Can the default WAF specified in Section 8.1 of Method 2H be applied to the average velocity unadjusted for wall effects obtained from a Method 1 traverse regardless of the number of points in the Method 1 traverse?

Answer: The default WAF may only be applied to the average velocity unadjusted for wall effects obtained from a Method 1 traverse consisting of 12 or 16 traverse points. A default WAF may not be applied to the average velocity obtained from a Method 1 traverse consisting of more than 16 traverse points.

The default WAF values specified in Method 2H (i.e., 0.9900 for brick and mortar stacks and 0.9950 for all other types of stacks) were derived based on field data from 16-point Method 1 traverses. Consistent with the provisions of Section 12.7.2, these default WAFs may be applied to the average velocity unadjusted for wall effects "obtained from runs in which the number of Method 1 traverse points sampled does not exceed the number of traverse points in the runs used to derive the wall effects adjustment factor." That is, the default WAF may be used with Method 1 traverses consisting of 12 or 16 points, but not with Method 1 traverses consisting of more than 16 points.

Without this restriction, velocity decay would be double-counted in traverses consisting of more than 16 points (once in the additional Method 1 traverse points close to the wall and then again when the default wall effects adjustment factor is applied to the results of the Method 1 traverse).

References: 40 CFR Part 60, Appendix A-2, Method 2H, Sections 8.1 and 12.7.2

Question 3.24

Topic: Test Method 2H -- Qualification for Default Value

Question: For use of the default wall effects adjustment factor (WAF) values under Method 2H, do we have to do anything to qualify?

Answer: No, just report the default WAF value in the <DefaultWAF> field of the <RATASummaryData> record, and if you are using the 0.9900 default value, you must report that you have a brick or mortar stack in the monitoring plan in the <MaterialCode> field of the <MonitoringLocationAttributeData> record.

References: 40 CFR Part 60, Appendix A-2, Method 2H

Question 3.25

Topic: Test Method 2H -- Gunite Stack

Question: To use the 0.9900 default wall effects adjustment factor (WAF) value in Method 2H, does the entire stack have to be brick or mortar or just the lining? What about gunite?

Answer: To use the 0.9900 default WAF, the stack lining must be brick or mortar. Gunite is not considered to be brick or mortar.

References: 40 CFR Part 60, Appendix A-2, Method 2H

Question 3.26

Topic: Use of Spherical Probes for Flow Test Methods

Question: What is the advantage of using the spherical probe for the new flow methods?

Answer: In low pitch angle applications, a spherical probe may be easier to read than a DA or DAT probe. This is likely to be less of a consideration, however, if an electronic manometer is used to read the pitch angle pressure, as recommended in Section 6.4 of Method 2F.

References: N/A

Question 3.27

Topic: Calibration of Probe

Question: If, under Method 2F or 2G, we calibrate a probe in a wind tunnel at 60 and 90 fps, can we use it at any velocity?

Answer: When using a three-dimensional probe (i.e., DA, DAT, or spherical) either under Method 2F or in yaw-determination mode under Method 2G, you may use the probe at any average velocity greater than or equal to 20 fps if it has been calibrated at 60 and 90 fps. That is, a three-dimensional probe may not be used under Method 2F or 2G if the average velocity is less than 20 fps.

Under Method 2G, if you calibrate a Type S probe at 60 and 90 fps, you may use the probe at any average velocity greater than or equal to 30 fps. A Type S probe under Method 2G may be used at average velocities less than 30 fps, but only if one of the two velocity settings used when calibrating the probe is less than or equal to the average velocity encountered in the field. This must be verified in accordance with the procedures specified in Section 12.4 of Method 2G. Also, the QA/QC requirements in Sections 10.6.12 through 10.6.14 of Method 2G for calibration coefficients must be met at the chosen calibration velocity settings.

References: 40 CFR Part 60, Appendix A-2, Methods 2F and 2G

Question 3.28

Topic: Use of Three-dimensional Probe for Methods 2F and 2H

Question: If we use a three-dimensional probe for Method 2F, must we use a three-dimensional probe for the WAF measurements under Method 2H?

Answer: No. You may, for example, use a Type-S pitot tube to measure the wall effects.

References: 40 CFR Part 60, Appendix A, Methods 2F and 2H

Question 3.29

Topic: Use of WAF for Square and Rectangular Stacks

Question: Has EPA expanded the use of the WAF to square and rectangular stacks or ducts? Why can't we just use a default value?

Answer: EPA allows the use of Conditional Test Method CTM-041 to characterize wall effects for rectangular (and square) stacks or ducts. In addition to providing procedures to measure wall effects, CTM-041 allows the use of a site-specific default WAF. If you wish to use CTM-041, you should follow the instructions presented on our web site: http://www.epa.gov/airmarkets/emissions/rect-wall-ducts.html.

References: Conditional Test Method -- Determination of Volumetric Gas Flow in Rectangular Duct or Stacks Taking Into Account Velocity Decay Near the Stack or Duct Walls (http://www.epa.gov/ttn/emc/ctm.html), and 40 CFR Part 60, Appendix A-2, Method 2H

Question 3.30

Topic: Test Method 2H -- Traverse Points

Question: How many Method 1 traverse points must we use when a calculated wall effects adjustment factor (WAF) is determined using Method 2H?

Answer: You must perform a Method 1 velocity traverse of at least 16 points for each run used in the calculation of the WAF.

References: 40 CFR Part 60, Appendix A-2, Method 2H, sections 3.16, 8.2

Question 3.31

Topic: Minimum WAF

Question: Under Method 2H, what if a source finds that it is getting a calculated wall effects adjustment factor (WAF) less than 0.9700 (i.e., more than a three percent reduction in the velocity calculated without Method 2H)? Can you do more than sixteen Method 1 traverse points and use a WAF value of less than 0.9700?

Answer: You may use more than sixteen Method 1 traverse points when a Method 2H calculated WAF is used. However, no matter how many Method 1 traverse points are used, you may not apply a calculated WAF that is less than 0.9700 for a complete wall effects traverse or 0.9800 for a partial wall effects traverse to the runs of a flow RATA.

It should be noted, however, that the actual calculated value of the WAF is reported in column 109 of RT 614.

For example, suppose that for a particular RATA run, you calculate a WAF of 0.9600, based on a complete wall effects traverse. You would report this measured WAF in column 109 of RT 614. However, you could *not* apply the WAF of 0.9600 to the runs of the RATA, because when a complete wall effects traverse is performed, the lowest WAF that you are allowed to use is 0.9700. Report the actual WAF applied to the RATA runs (in this case, 0.9700) in column 115 of RT 614.

Also see Question 3.12.

References: 40 CFR Part 60, Appendix A-2, Method 2H

Question 3.32

Topic: Test Methods 2 and 2H

Question: Isn't the wall effects adjustment factor (WAF) derived in Method 2H within the error band of Method 2?

Answer: By applying the WAF allowed by Method 2H, you are reducing potential systematic error that may result under Method 2 if velocity decay at the wall is not taken into account. The error band about the mean measured stack gas velocity characterizes the random error in Method 2 and is unrelated to the systematic error addressed by the WAF.

References: 40 CFR Part 60, Appendix A, Methods 2 and 2H

Question 3.33

Topic: Flow Measurement in Rectangular Stacks or Ducts

Question: If I use Method 2F to perform a flow RATA in a rectangular stack or duct, Part 75 requires me to report additional data to support each RATA run. Specifically, the stack diameter and the stack or duct cross-sectional area at the test port location are to be reported in the <RATASummaryData> record. How do I satisfy these reporting requirements for a rectangular duct?

Answer: For a rectangular stack or duct, the cross-sectional area reported in the <StackArea> field of the <RATASummaryData> record is simply the product of the stack or duct length times the width. To determine the appropriate diameter to report in the <StackDiameter> field, use the following equation:

$$Ds = \sqrt{\frac{4As}{\pi}}$$

Where:

Ds = Equivalent circular stack diameter (ft)
As = Area of the rectangular duct (ft^2)

Note that you should not use the equation in Section 12.2 of EPA Method 1 to determine the "equivalent diameter" of the rectangular stack or duct. The Method 1 equation should only be used for its intended purpose, which is to estimate the number of stack or duct diameters upstream and downstream of the measurement location, in order to determine the minimum number of Method 1 points for the velocity traverse.

References: 40 CFR 60, Appendix A-2, Methods 1, 2, 2F, and 2G

Question 3.34

Topic: Reporting of Support Records for Flow RATA's

Question: Please clarify the reporting requirements for the new flow RATA support records.

Answer: First, note that the <RATAData>, <RATASummaryData>, and <RATARunData> records are required for all flow RATAs, whether the tests are done for initial certification, recertification, or on-going quality assurance. However, the flow RATA support records (<u>i.e.</u>, the <FlowRATARunData> record, and the <RATATraverseData> record) are required to be reported only as follows:

(1) <u>When Method 2 is used for the RATA:</u>

Report the <ReferenceMethodCode> in the <RATASummaryData> record as "2" and do not report any <FlowRATARunData>, or <RATATraverseData> records.

(2) <u>When Methods 2 and 2H (Default WAF) are used:</u>

When regular Method 2 is used for the flow RATA and you elect to apply a default WAF to all runs of the RATA (as allowed by Method 2H), report the <ReferenceMethodCode> in the <RATASummaryData> record as "D2H" and do not report any <FlowRATARunData>, or <RATATraverseData> records. Instead report the default WAF used in the <DefaultWAF> field of the <RATASummaryData> record.

(3) <u>When Methods 2 2H (Measured WAF) are used:</u>

When regular Method 2 is used for the flow RATA and a WAF is measured with Method 2H, report the <ReferenceMethodCode> in the <RATASummaryData> record as "M2H" and report the <FlowRATARunData>, and <RATATraverseData> records only for RATA runs in which Method 2H is used to derive a calculated WAF from the run data and the run is used in the relative accuracy calculations. Do not report <FlowRATARunData>, or <RATATraverseData> records for RATA runs which are not used to measure wall effects.

For example, suppose that you use Method 2 to perform a 3-load flow RATA and make wall effects measurements during one run per load level using Method 2H (with 16 Method 1 velocity traverse points for each wall effects run). Suppose further that you use all of the RATA runs in the relative accuracy calculations and decide to apply the calculated WAF values at the mid and high load levels, but to use a default WAF at the low load level. In this case, you would report only two <FlowRATARunData> records, one each for the mid-level and high-level runs at which a WAF was determined by measuring the wall effects and 32 point-level <RATATraverseData> records, 16 for each of these same two runs. In this case, you would not report any <FlowRATARunData>, or <RATATraverseData> records for the low load level, since you have elected to apply a default WAF at that level -- rather, you would report the default used in the <DefaultWAF> field of the <RATASummaryData> record for the low load level (see (2), above).

(4) When either Method 2F or 2G is used:

Report the <ReferenceMethodCode> in the <RATASummaryData> record as either "2F", "2FH", "2G", or "2GH" as appropriate and report <FlowRATARunData> records, and <RATATraverseData> records, as required. One <FlowRATARunData> record is required for each RATA run that is used in the relative accuracy calculations (i.e., each run with a <RunStatusCode> of "1", and one <RATATraverseData> record is required for each Method 1 traverse point in each of these runs.

For example, if Method 2F is used for a 3-load flow RATA and if 12 runs are performed at each load level, using 16 traverse points per run, but only 9 of the 12 runs at each level are used in the relative accuracy calculations, you would report a total of 27 run-level <FlowRATARunData> records (9 runs/load level X 1 <FlowRATARunData> record/run X 3-load levels) and 432 point-level <RATATraverseData> record (16 points/run X 1 <RATATraverseData> record/point X 9 runs/load level X 3-load levels).

(5) The following Table summarizes the reporting requirements:

SUMMARY OF REPORTING REQUIREMENTS FOR FLOW RATA SUPPORT RECORDS

Case No.	Case Description	Reference Method(s) Used	Reference Method Code <RATASummaryData>)	Required Records	
				<RATAData>, <RATASummaryData>, <RATARunData>	<FlowRATARunData>, <RATATraverseData>[1]
1	Method 2, with no wall effects adjustments	2	2	Y	N
2	Method 2 with default WAF	2 and 2H	D2H	Y	N
3	Method 2 with calculated WAF	2 and 2H	M2H	Y	Y[2]
4	Method 2F, with no wall effects adjustments	2F	2F	Y	Y
5	Method 2F with calculated or default WAF	2F and 2H	2FH	Y	Y
6	Method 2G, with no wall effects adjustments	2G	2G	Y	Y
7	Method 2G with calculated or default WAF	2F and 2H	2GH	Y	Y

[1] When <FlowRATARunData> and <RATATraverseData> records are required, report them only for RATA runs that are used in the relative accuracy calculations (when the <RunStatusCode> field in the <RATARunData> record = "1").

[2] For reference method code "M2H," report <FlowRATARunData> and <RATATraverseData> records for a particular RATA run only if the run is both: used in the relative accuracy calculations (if the <RunStatusCode> field in the <RATARunData> record = "1") and that run is used to derive a calculated WAF.

References: 40 CFR Part 60, Appendix A-2, Methods 2, 2F, 2G, and 2H; EDR Version 2.1/2.2 Reporting Instructions

Question 3.35

Topic: Flow-to-load Ratio Test -- Multiple Stacks

Question: How do I report the reference flow-to-load ratio or gross heat rate (GHR) in EDR RT 605 for a unit with a multiple stack (or duct) exhaust configuration?

Answer: Submit a separate <FlowToLoadReferenceData> record for each monitoring system installed on each of the multiple stacks (or ducts). Report the reference flow-to-load ratio or GHR value in the <ReferenceFlowToLoad> or <ReferenceGrossHeatRate> field of the <FlowToLoadReferenceData> record (as applicable).

A reference flow-to-load ratio may either be determined separately for each stack (i.e., using the ratio of the flow through the stack to the unit load), or a single reference ratio may be determined on a combined basis (i.e., using the ratio of the combined flow through all stacks to the unit load).

Note that when the flow-to-load ratio is determined on a combined basis, the reference ratio or GHR value will be *the same* in each <FlowToLoadReferenceData> record. For further guidance, see the latest version of the ECMPS Quality Assurance and Certificaton Reporting Instructions, Section 2.5.

References: Appendix A, Section 7.7; ECMPS Quality Assurance and Certificaton Reporting Instructions, Section 2.5

Question 3.36

Topic: Flow-to-load Ratio Test -- Multiple Stacks

Question: For a unit with a multiple stack configuration, if primary flow monitors (but no redundant backup monitors) are installed on each stack, please clarify how to perform the data analysis and report the test results for the quarterly flow-to-load ratio or gross heat rate (GHR) test.

Answer: For a multiple stack configuration, Section 2.2.5(a) in Appendix B to Part 75 allows the flow-to-load ratio or GHR test to either be done on a combined basis or on an individual stack basis. Perform the test and report the results in the following way:

(1) Identify all of the candidate hours for the flow-to-load analysis (all hours in the quarter for which the unit load was within ten percent of L_{avg}, the average load during the last normal load flow RATA (if the flow-to-load analysis is done on an individual stack basis) or RATAs

(if the flow-to-load analysis is done on a combined basis). For a more complete explanation of how to determine L_{avg} when the flow-to-load analysis is done on a combined basis, see the ECMPS Quality Assurance and Certificaton Reporting Instructions, Section 2.5.2, specifically noting the field descriptions instructions for the <AverageReferenceMethodFlow> field of the <FlowToLoadReferenceData> record.

(2) Select from among the hours identified in (1), and count all hours in which a quality-assured flow rate value was obtained and recorded (in the <MonitorHourlyValueData> record for stack flow) at the stack (if the analysis is done on individual stack basis) or at all of the multiple stacks (if the analysis is done on a combined basis). Call this number of hours "n."

(3) If n < 168, then there is not enough data for the combined flow-to-load test and you should report "FEW168H" in the <TestResultCode> field of the <TestSummaryData> record, as the test result for all monitoring systems. If n ≥ 168, you may either analyze all of the data or claim the allowable exclusions (see Appendix B, Section 2.2.5(c)) and then analyze the remaining data. If you claim exclusions and there are < 168 hours of data remaining after the exclusions, report "EXC168H" as the test result for all monitoring systems. If you choose not to claim exclusions or if you have at least 168 hrs of valid data remaining after claiming allowable exclusions, proceed to step (4).

(4) Perform the flow-to-load analysis as follows.

(a) If the analysis is done on an individual stack basis:

- For each candidate hour that was not excluded under (3), above, use the hourly flow rates and the corresponding hourly unit loads, in conjunction with the reference flow-to-load ratio and Equations B-1 and B-2 in Appendix B, to calculate E_f, the average percentage deviation of the hourly ratios from the reference ratio.

(b) If the analysis is done on a combined basis:

- For each candidate hour that was not excluded under (3), above, determine the combined flow rate by adding together the individual hourly stack flow rates.

- Combine the hourly flow rates together on a consistent basis throughout the quarter (i.e., combine the bias-adjusted stack flow rates or the unadjusted flow rates for each hour).

- Use the combined hourly flow rates and the corresponding hourly unit loads, in conjunction with the reference flow-to-load ratio and Equations B-1 and B-2 in Appendix B, to calculate E_f, the average percentage deviation of the hourly ratios from the reference ratio.

(5) If the flow-to-load ratio test is done on a combined basis, you will obtain a single flow-to-load test result to be applied to each of the flow monitoring systems at each of the stacks in the multiple stack configuration. Therefore, in this case, you must report this test result in a Flow-to-Load Test record for each flow monitoring system separately (once under each flow monitoring system ID associated with each of the multiple stacks).

(6) If you elect to use the gross heat rate (GHR) option instead of the flow-to-load ratio, you would use hourly unit heat input rates (reported in the <DerivedHourlyValueData> record for the unit) instead of hourly flow rates, use the reference GHR value instead of the reference flow-to-load ratio, and use Equation B-1a instead of Equation B-1 in the data analysis.

References: Appendix B, Sections 2.2.5(a)(1) and 2.2.5(a)(3); ECMPS Quality Assurance and Certificaton Reporting Instructions, Sections 2.5 and 2.6; and ECMPS Emissions Reporting Instructions, Section 2.5.

Question 3.37

Topic: Flow-to-load Ratio Test -- Multiple Stacks

Question: For a multiple stack configuration, if both primary and redundant backup flow monitors are installed on each stack, how do I perform and report the results of the quarterly flow-to-load ratio or GHR test?

Answer: For purposes of illustration, assume that the unit has two stacks (A and B). Stack A has a primary flow monitor (A_p) and a backup flow monitor (A_b). Stack B has a primary flow monitor (B_p) and a backup flow monitor (B_b). To meet the flow-to-load or GHR test requirements, submit separate "F2LREF" and "F2LCHK" test records for each primary and each redundant backup flow monitoring system, as follows:

(1) The reference information in the "F2LREF" test record for the stack A monitoring systems (A_p and A_b) and for the stack B systems (B_p and B_b) will, of course, be different if the data analysis is done on an individual stack basis. However, the reference information will be the same in the "F2LREF" test records for stacks A and B if the reference flow-to-load ratio or GHR is derived on a combined basis, using data from the most recent normal load flow RATAs at the individual stacks.

(2) Perform the flow-to-load or GHR data analysis either on an individual stack basis or on a combined basis (as described in Question 3.36).

- If the analysis is done on an individual stack basis, perform separate flow-to-load or GHR evaluations of the primary and backup monitoring systems on each stack (e.g., A_p and A_b).

- However, if the analysis is done on a combined basis, separate analyses of the individual primary and backup monitoring systems is not feasible, since the primary system may be in use at stack A while the backup system is in service on stack B (or vice-versa). Therefore, when the analysis is done on a combined basis, you will only obtain a single flow-to-load or GHR test result and will apply this one test result to all of the primary and backup monitoring systems on both stacks, with one exception: if none of the data used in the quarterly flow-to-load data analysis was generated by a particular monitoring system (e.g., if none of the data used in the analysis came from backup monitor B_b), report a result of "FEW168H" in the <TestResultCode> field of the <TestSummaryData> record for that monitoring system.

References: Appendix B, Section 2.2.5; ECMPS Quality Assurance and Certificaton Reporting Instructions, Section 2.5 and 2.6

Question 3.38

Topic: Flow-to-load Ratio Test -- Multiple Stacks

Question: For a multiple stack configuration, if I elect to perform the flow-to-load ratio or GHR test on a combined basis, what happens if normal load flow RATAs are performed at the individual stacks in the same calendar quarter, but the RATAs are not performed simultaneously? May I exclude any hours "prior to completion" of the RATAs (as described in Section 2.2.5(c)(5) of Appendix B) from the quarterly flow-to-load data analysis?

Answer: You may exclude from the quarterly flow-to-load analysis all hours preceding the normal load flow RATA with the latest completion date and time.

References: Appendix B, Section 2.2.5(c)(5)

Question 3.39

Topic: Flow-to-load Ratio Test -- Multiple Stacks

Question: For a unit with a multiple stack configuration, if I elect to perform the flow-to-load ratio or GHR test on a combined basis, what happens if there is a documented monitor repair of the flow monitor on one stack during a particular quarter, followed by a successful abbreviated flow-to-load test? May I exclude any hours "prior to completion of the abbreviated flow-to-load test" (as described in Section 2.2.5(c)(6) of Appendix B) from the quarterly flow-to-load data analysis?

Answer: Yes. You may exclude all of the hours preceding completion of the successful abbreviated flow-to-load test from the quarterly flow-to-load analysis, even though a flow monitor repair was made at only one stack.

References: Appendix B, Section 2.2.5(c)(6)

Question 3.40

Topic: Flow-to-load Ratio Test -- Exemptions

Question: Is there any way to obtain an exemption from the quarterly flow-to-load ratio test?

Answer: Yes. First, units that do not produce electrical or steam load (e.g., cement kilns) are exempted from flow-to-load testing under Section 7.8 of Appendix A. For a load-based unit with a complex exhaust configuration, if you can document (by means of historical CEMS data, operating log information, etc.) that the flow-to-load test is infeasible, either from a technical or practical standpoint, you may petition EPA under Section 7.8 of Appendix A for an exemption from the test. Any such petition would have to demonstrate convincingly that the flow-to-load ratio is either unquantifiable or excessively variable.

References: Appendix A, Section 7.8

Question 3.41

Topic: Converting Volumetric Flow Data to Standard Temperature and Pressure

Question: How should the correction to standard pressure be performed for the "average volumetric flow rate for the hour (scfh)" reported in the <UnadjustedHourlyValue> field of the <MonitorHourlyValueData> record for flow? Specifically, must local, real time, hourly barometric pressure be used, or can an annual or multi-year average pressure for the local area, corrected to the elevation of the flow monitor, be used in the P_{stack} term in Section 6 of Appendix F, Part 75?

Answer: To convert from actual flue gas volumetric flow rate to the required flue gas volumetric flow rate at standard temperature and pressure, use the equation in Part 75, Appendix F Section 6: $F_{STP} = F_{Actual} (T_{Std}/T_{Stack}) (P_{Stack}/P_{Std})$. For the barometric pressure portion of P_{Stack} (P_{Stack} = barometric pressure at the flow monitor location + flue gas static pressure), EPA recommends that you use an on-site pressure sensor. Inexpensive, electronic pressure sensors are commercially available. The pressure sensor should be calibrated according to the manufacturer's instructions. If the pressure sensor is located at a different elevation than the flow monitor, the pressure output should be corrected to the flow monitor elevation (in the lower atmosphere, pressure changes about minus one inch Hg per 1,000 feet increase in elevation).

References: Appendix F, Section 6; ECMPS Emissions Reporting Instructions, Section 2.5

[This page intentionally left blank.]

SECTION 4
NO_x MONITORING

Page

4.1 NO_x Emission Rate System Availability 4-1

4.2 NO_x CEMS -- Probe Location 4-2

4.3 Substitute Data for NO_x Emission Rate When the Moisture Value is Unavailable... 4-2

[This page intentionally left blank.]

Question 4.1

Topic: NO_x Emission Rate System Availability

Question: How is the percent monitor data availability of a NO_x-diluent monitoring system determined?

Answer: For any CEM system, the percent monitor data availability (PMA) represents a ratio of quality-assured monitor operating hours (i.e., "monitor available hours") to unit operating hours, over a specified period of time.

For a unit equipped with a NO_x-diluent monitoring system, § 75.33(c) states that a valid NO_x emission rate (i.e., lb/mmBtu) must be obtained for each unit operating hour; otherwise, the missing data procedures apply, decreasing the PMA of the monitoring system. Since the hourly NO_x emission rate is a derived (i.e., calculated) value that depends upon two valid monitor readings, one from a NO_x monitor and the other from a diluent (CO_2 or O_2) monitor, the PMA of a NO_x-diluent system also depends on the validity of these two readings. If either hourly reading is invalid (or if both readings are invalid), the NO_x emission rate for that hour is also invalid, and the system PMA decreases.

The hourly lb/mmBtu value from a NO_x-diluent monitoring system is considered to be invalid if: (1) an insufficient number of valid data points are obtained for either the NO_x monitor or the diluent monitor -- see § 75.10(d)(3); or (2) either monitor fails a daily calibration error test -- see Appendix B, Section 2.1.4(a); or (3) either monitor fails a quarterly linearity check -- see Appendix B, Section 2.2.3(e); or (4) the system fails a RATA -- see Appendix B, Section 2.3.2(e).

References: § 75.10(d)(3), § 75.33(c), Appendix B, Sections 2.1.4(a), 2.2.3(e), and 2.3.2(e)

Question 4.2

Topic: NO_x CEMS -- Probe Location

Question: What measurement site and sample point location criteria should be used for an installed NO_x CEMS?

Answer: To determine an acceptable CEMS measurement site, follow the guidelines in Sections 8.1, 8.1.1, 8.1.2 of Performance Specification No. 2 (PS No. 2) in Appendix B to 40 CFR 60. Then, use the following guidelines to locate the measurement point(s) or path. For point CEMS (single point or path that is less than ten percent of the equivalent stack diameter), you should locate the probe in accordance with Part 75, Appendix A, Section 1.1.1. For path CEMS, (covering a path which is greater than ten percent of the equivalent stack diameter), you should locate the probe in accordance with Part 75, Appendix A, Section 1.1.2. For multi-point probes, select representative points at a suitable location, such that the CEMS will be able to pass the RATA. Some experimentation with different probe locations and measurement points may be necessary. Candidate measurement points may include the reference method traverse points specified in Section 8.1.3 of PS No. 2.

References: 40 CFR Part 60, Appendix B (PS 2, §§ 8.1, 8.1.1, 8.1.2, 8.1.3); Part 75, Appendix A, Sections 1.1.1, 1.1.2, 6.5

Question 4.3

Topic: Substitute Data for NO_x Emission Rate When the Moisture Value is Unavailable

Question: If a source uses Equation 19-3 to calculate NO_x emission rate in lb/mmBtu, and for a particular hour, quality-assured average NO_x concentration and O_2 concentration values are available, but a quality-assured average percent moisture value is unavailable, should the source use substitute data for NO_x emission?

Answer: No, because the moisture monitor is not a component of the NO_x-diluent monitoring system. Therefore, report the calculated NO_x emission rate as quality-assured and determine the appropriate substitute data value for percent moisture and use this value in Equation 19-3 to calculate the NO_x emission rate.

References: ECMPS Emissions Reporting Instructions, Section 2.5.2

SECTION 5
OPACITY MONITORING

Page

5.1 Opacity Data Reporting 5-1

5.2 Opacity Requirements 5-1

5.3 Opacity Data Recordkeeping 5-2

5.4 Opacity Monitor Certification 5-2

5.5 Opacity Monitoring 5-3

5.6 Opacity Monitoring -- Exemption 5-3

[This page intentionally left blank.]

Question 5.1

Topic: Opacity Data Reporting

Question: The requirements for the submittal of opacity data are unclear. Does the data need to go only to the state agency?

Answer: In accordance with the provisions of § 75.65, excess emissions of opacity data, recorded under § 75.57(f), are to be reported to the applicable state or local air pollution control agency. Pursuant to § 75.64(a)(2), do not include opacity data in the quarterly electronic reports submitted to the Administrator. The opacity recordkeeping requirements in § 75.57(f) state that opacity data are to be recorded as specified by the state or local air pollution control agency. Section 75.57(f) also details the opacity information to be recorded by the owner or operator if the state or local air pollution control agency does not specify the recordkeeping requirements for opacity.

References: § 75.57(f), § 75.59(a)(8), § 75.64(a)(2), § 75.65

Question 5.2

Topic: Opacity Requirements

Question: If monitoring and reporting for opacity are in compliance with state requirements, will this be considered as satisfying the requirements in Part 75?

Answer: Yes, in general. Compliance with state opacity monitoring and reporting requirements would satisfy the requirements of Part 75 since § 75.65 specifies that opacity reporting be performed in a manner specified by an applicable state or local pollution control agency. In addition to complying with the reporting requirements in § 75.65, however, owners or operators are also subject to specific opacity monitoring requirements (§ 75.14) that require opacity monitoring systems to meet design, installation, equipment, and performance specifications in Performance Specification (PS) 1 in Appendix B to 40 CFR Part 60. Therefore, in states where opacity monitoring systems are not subject to the requirements in PS 1, owners and operators must still ensure that opacity monitoring systems meet the PS 1 requirements, even though these monitoring requirements may be beyond those in the applicable state or local regulations.

An owner or operator should continue reporting opacity information according to the requirements contained in the state implementation plan. Opacity information can be submitted according to the reporting and recordkeeping requirements of Part 75; however, where a conflict occurs between existing requirements and Part 75, follow the existing requirements of the state implementation plan.

References: § 75.65, § 75.14

Question 5.3

Topic: Opacity Data Recordkeeping

Question: If an existing state CEM program already requires recordkeeping and quarterly electronic data submittal for opacity, does the company have to keep an additional set of opacity records in the format prescribed by § 75.57(f)?

Answer: No. If a utility is subject to existing state or local requirements, opacity records may be stored in that format. Section 75.57(f) provides a default record format which must be used only in cases where there are no recordkeeping and reporting formats specified by the applicable state or local agency.

References: § 75.57(f), § 75.65

Question 5.4

Topic: Opacity Monitor Certification

Question: For certification or recertification of an opacity monitor, which version of Performance Specification 1 (PS 1) does § 75.14 refer to -- the one in existence on the effective date (February 10, 1993) of Part 75, or the most current version (the one in effect on the day the monitor will be certified or recertified).

Answer: The most current version. That is, the version of PS 1 in effect at the time of certification or recertification of the opacity monitor pursuant to Part 75.

References: § 75.14

Question 5.5

Topic: Opacity Monitoring

Question: If a unit is exempted from opacity monitoring under § 75.14(b), would opacity monitors still be required to meet other existing state and Federal monitoring regulations?

Answer: Yes. An exemption from opacity monitoring under the provisions of § 75.14(b) is applicable only to opacity monitoring requirements in the Acid Rain Rule and does not supersede monitoring requirements in other rules. Therefore, if opacity monitoring is required under other regulatory programs (e.g., New Source Performance Standards or State Implementation Plans), a waiver of opacity monitoring under the Acid Rain Rule would not constitute a waiver of the requirements in other applicable rules.

References: § 75.14(b)

Question 5.6

Topic: Opacity Monitoring -- Exemption

Question: For a unit with a wet flue gas pollution control system, § 75.14(b) allows an exemption from the requirement of § 75.14(a) to install, certify, operate and maintain a continuous opacity monitoring system (COMS), if the owner or operator can "demonstrate that condensed water is present in the exhaust flue gas stream and would impede the accuracy of opacity measurements." What is suggested for such a demonstration?

Answer: Alternatives for Opacity Monitoring in the Presence of Condensed Water Vapor

Section 75.14(a) requires that a coal- or oil-fired unit install, certify and operate a COMS and that each COMS "meet the design, installation, equipment, and performance specifications in Performance Specification 1 in Appendix B to part 60 of this chapter." Part 60, Appendix B, Performance Specification 1, § 8.1 allows alternative COMS locations, (e.g., after the electrostatic precipitator (ESP) but before the scrubber), if approved by the Administrator. Thus, if an affected unit has an ESP preceding the scrubber, a source owner or operator could perform the § 75.14(a) required opacity monitoring after the ESP and before the scrubber and avoid the potential problem of condensed water and impeding accuracy of the COMS altogether. Furthermore, this approach would be consistent with Part 60 requirements.

Requesting an Exemption under § 75.14(b)

However, if an owner or operator wants an exemption from the COMS requirement under § 75.14(a), the designated representative should submit a petition under § 75.66 for an exemption to the Director of the Clean Air Markets Division (CAMD). We recommend that the petition include: (a) a written statement, certified by the designated representative, that the unit has a wet flue gas pollution control system, and (b) the results of the procedure, described below, demonstrating that the stack gas contains liquid water droplets. The Director of the Clean Air Markets Division would determine whether the petition satisfies the recommended criteria discussed in this guidance or is otherwise acceptable and whether to exempt the unit under § 75.14(b) from the COMS requirement of § 75.14(a). This guidance is not binding and does not represent EPA's final determination on how any particular demonstration must be made to satisfy § 75.14(b). While this guidance does not recommend specific alternative approaches to demonstrating the presence of condensed water or impeding COMS accuracy, it may be possible to make such showings by methods other than the one described below. Any demonstration that either follows or departs from this guidance will be considered on its own merits.

Demonstration of Presence of Condensed Water

To demonstrate whether liquid water droplets are present in the gas stream, a source owner or operator could perform the procedures described in Sections 4.1, 11.0, and 12.1.7 of EPA Method 4 (see Appendix A-3 to 40 CFR Part 60) to demonstrate that the effluent gas stream is saturated. To be most accurate, these procedures for demonstrating saturation should be performed at sampling points representative of the stack gas stream, and under conditions representative of normal operations (e.g., normal load, normal fuel, common weather conditions, and normal control equipment operation) and at the COMS location or, if no COMS is currently installed, at the location that would meet the requirements of Performance Specification 1 in Appendix B of 40 CFR Part 60, except for measurement location condition (3) in § 8.1(2)(i). Under Method 4, applicants make a determination of moisture content for the same time period using two procedures: (1) the reference method (with impingers) specified under Section 11.0 of Method 4; and (2) using a temperature probe along with either a psychrometric chart or saturation vapor pressure tables with measured stack gas temperature as specified under Section 4.1 of Method 4. Section 12.1.7 provides for two calculations of stack gas moisture content, one calculation for each of these two procedures. If the moisture content from procedure (1) is greater than the moisture content from procedure (2) (at an appropriate level of numerical precision), then the stack gas is saturated and is assumed to have condensed water present.

Demonstration of Impeding Accuracy of Opacity Measurements

EPA would generally continue to consider the demonstration of the presence of condensed water, following the above procedure, sufficient to show impedance of accuracy of opacity measurements, unless the circumstances of a particular case indicate additional information is needed. In which case, EPA may ask for a more conclusive demonstration that moisture actually interferes with opacity measurement.

In addition, the Agency is awaiting the completion of additional tests relating to the use of wet stack opacity monitoring technology. Should such technology be adequately demonstrated, EPA may determine that the exemption authority of § 75.14(b) is of no further utility, and propose to amend or delete § 75.14(b) and thereby require the use of wet stack opacity monitoring technology in all wet stack situations.

Non-Part 75 COMS Requirements May Still Apply

EPA notes that, if a unit is exempted from the § 75.14(a) COMS requirement through an approved petition under §§ 75.14(b) and 75.66, a COMS or an alternative may still be required by another Federal or state program. For example, § 60.47a(a) does not allow a subject source to be exempted from a COMS, except where gaseous fuel is the only fuel combusted or if the Administrator approves (separate from a § 75.66 petition) monitoring of alternative parameters because of COMS interferences. In contrast, Part 75 allows a unit to fire oil for up to 15% of its annual heat input and still be considered gas-fired and exempt from the COMS requirement. (Note that in some cases, "the Administrator" refers to the EPA Regional Office and in other cases, where new source performance standards (NSPS) enforcement authority has been delegated, it refers to the state or local agency). The regional, state, or local office should decide, on a case-by-case basis, whether the information submitted with the application adequately demonstrates that an alternative monitoring approach is justified. To ensure national consistency in such demonstrations, the regional, state, and local offices should consult with EPA Headquarters.

Units Previously Exempted from COMS

For a unit exempted from installing a COMS under any previous version of this policy, the current policy does not trigger a requirement for resubmission of a request for exemption.

References: § 75.14(b), § 75.66; 40 CFR 60.13(i)(1); 40 CFR Part 60, Appendix A-3, Method 4; 40 CFR Part 60, Appendix B, Performance Specification 1; 40 CFR 60.11; 40 CFR Part 60, Appendix A-4, Method 9.

[This page intentionally left blank.]

SECTION 6
CO_2 MONITORING

Page

6.1 Appendix G Method ... 6-1

6.2 Fuel Sampling ... 6-1

6.3 Missing Carbon Content Data ... 6-1

6.4 Negative CO_2 Readings ... 6-2

6.5 Use of Diluent Cap with High Percent Moisture ... 6-2

[This page intentionally left blank.]

Question 6.1

Topic: Appendix G Method

Question: Regarding § 75.13(b), what is required to satisfy the Administrator when choosing to use the Appendix G method for estimating daily CO_2 mass emissions?

Answer: If an owner or operator chooses to use the procedures in Appendix G to estimate CO_2 emissions, adherence to applicable calculation and analytical procedures is sufficient and no additional justification for the use of Appendix G is necessary.

References: § 75.13(b)

Question 6.2

Topic: Fuel Sampling

Question: If the recording and reporting of the percent carbon in fuel for use in Equation G-1 is not required, why do we sample for it? Could the value not be based on off plant records?

Answer: Section 2.1 of Appendix G requires that the carbon content be determined using fuel sampling and analysis. This does not require a separate sample if the utility (or fuel supplier) has already performed a sample according to the specified procedures.

References: Appendix G, Section 2.1

Question 6.3

Topic: Missing Carbon Content Data

Question: Is there any procedure that applies when percent carbon is missing?

Answer: When carbon content data are missing, report a default value from Table G-1.

References: Appendix G, Section 5.2.1

Question 6.4

Topic: Negative CO_2 Readings

Question: During start up, the CO_2 readings are often very low or negative in value. According to EPA guidance on negative emissions readings, the negative values for CO_2 are to be switched to zeros. Thus, the heat input result is zero for the hour. Should 0.0 mmBtu/hr be reported even though there is heat input?

Answer: No, in all cases where 0.0 mmBtu/hr is calculated as the heat input for a unit that is operating, report the heat input as 1.0 mmBtu/hr using an MODC code of "26" to indicate that the calculated Heat Input was either zero or negative, and thus replaced by 1.0 mmBtu/hr.

References: Appendix F, Section 5.2.3

Question 6.5

Topic: Use of Diluent Cap with High Percent Moisture

Question: When using the diluent cap with Equations 19-3, 19-5, F-14A or F-17 it is possible to have unrepresentative or negative results if the percent moisture is high. How do I use these equations with the diluent cap?

Answer: The Agency has developed special variations of Equations 19-3 and 19-5 for use with the diluent cap, which are included in Table 29 of the ECMPS Monitoring Plan Reporting Instructions in Section 9.0. These equations (19-3D and 19-5D) are to only be used during any hour in which the diluent cap is used in place of Equations 19-3, and 19-5. When these equations are used, include each equation in a <MonitoringFormulaData> record and assign a unique formula ID as described in the reporting instructions. Use the correct formula ID when reporting the hourly NO_x emission rate data in the <DerivedHourlyValueData> record to show when these special formulas are used in lieu of the main equations that would be used in non-diluent cap hours.

Prior to January 24, 2008, the Agency had also allowed the use of special variations of equations F-14A and F-17. However, on January 24, 2008 Part 75 was revised to no longer allow the use of the diluent cap in calculations other than for determining NO_x emission rate. Instead, for instances where the use of either equations F-14A, or F-14B results in a negative CO_2 concentration or whenever the use of equation F-17 results in a heat input rate less than or equal to 0.0 mmBtu/hr, substitute for the calculated value as follows:

- If you use Equation F-14A to determine percent CO_2 from percent O_2, and the calculated result is a negative value, replace the calculated value with 0.0% CO_2 and report an MODC of "21" for that hour in the <DerivedHourlyValueData> record.

- If you use Equation F-17 for heat input, and the calculated result is less than or equal to zero, replace the calculated value with 1.0 mmBtu/hr and report an MODC of "26" for that hour in the <DerivedHourlyValueData> record.

References: Appendix F, § 4.4.1 , and § 5; 40 CFR Part 60, Appendix A, RM 19

[This page intentionally left blank.]

SECTION 7
BACKUP AND PORTABLE MONITORING

Page

7.1 Portable Gas Analyzers 7-1

7.2 Backup Reference Method -- Valid Hour 7-2

7.3 Reference Method and Backup Monitoring 7-2

7.4 Reference Methods -- Single-Point Sampling 7-3

7.5 Use of Non-Redundant Backup Monitors 7-4

7.6 Data Validity -- Backup Monitoring Systems 7-4

7.7 Monitor Location -- Certification Requirements 7-4

7.8 Primary and Backup Designations 7-5

7.9 Backup Monitoring -- Valid Data 7-5

7.10 Redundant Backup Monitoring 7-6

7.11 Linearity Check Requirements for Non-redundant Backup Systems or a Temporary Like-kind Replacement Analyzer 7-7

7.12 Testing Requirements for Time-shared Backup Systems 7-8

7.13 Definition of Like-kind Replacement Analyzer 7-9

[This page intentionally left blank.]

Question 7.1

Topic: Portable Gas Analyzers

Question: Can portable gas analyzers be used as backup or temporary replacement monitors at multiple locations? Describe what constraints or limitations may apply.

Answer: There are two ways that portable gas analyzers may be used as backup or temporary replacement monitors at multiple unit or stack locations:

(1) The portable analyzers may be operated as reference method backup monitoring systems (i.e., operated according to EPA Method 3A, 6C, or 7E). Detailed guidance on the use of reference method backup monitors is given in Section 19 of this Policy Manual; or

(2) The analyzers may be used either as "regular non-redundant backup monitoring systems" or as temporary "like-kind replacement analyzers" (see § 75.20(d)).

A "regular non-redundant backup monitoring system" uses a different probe and sample interface from the primary monitoring system. Regular non-redundant backup monitoring systems must be certified at each location where they will be used. All certification tests in § 75.20(c) are required, except for the 7-day calibration error test.

If the portable analyzers qualify as "like-kind replacement analyzers" (see Question 7.13), you may use them on a short-term basis (e.g., when maintenance is being performed on the primary analyzers), by connecting them to the same probe and interface as the primary gas monitors. Initial certification of a temporary like-kind replacement analyzer is not required.

For both regular non-redundant backup monitoring systems and temporary like-kind replacement analyzers, a linearity check is required each time that the backup system or replacement analyzer is brought into service.

Regular non-redundant backup monitoring systems must be identified in the electronic monitoring plan required under § 75.53 as separate monitoring systems with unique system ID numbers.

In each quarter that a temporary like-kind replacement analyzer is used for data reporting, it must be represented in the electronic monitoring plan as a component of the primary monitoring system, and must be assigned a component ID that begins with the letters "LK" (e.g., "LK3"). Hourly data from the like-kind replacement analyzer are reported under the primary monitoring system ID number, and a method of determination code (MODC) of "17" must be reported. Part 75 allows manual entry of both the component ID and the MODC for temporary like-kind replacement analyzers.

The use of regular non-redundant backup monitoring systems or temporary like-kind replacement analyzers is limited to 720 hours per year per parameter (i.e., 720 hours each for SO_2, NO_x, CO_2, or O_2) at each unit or stack location. To use a regular non-redundant backup monitoring system more than 720 hours per year at any location, a RATA is required. To use a temporary like-kind replacement analyzer more than 720 hours per year at a particular unit or stack location, the monitoring plan must be updated, redesignating the analyzer as a component of a regular non-redundant backup system, and a RATA must be passed at that unit or stack location.

References: § 75.20(d)

Question 7.2

Topic: Backup Reference Method -- Valid Hour

Question: When providing backup monitoring with reference method testing, are two data points per hour in separate 15-minute quadrants acceptable?

Answer: The criteria that § 75.10(d)(1) specifies for primary monitoring data also apply to reference method backup monitoring data; during periods other than calibration, maintenance, or quality assurance activities, an hourly average is not valid unless it is calculated from data collected in each of the four successive 15-minute periods in the hour. During calibration, maintenance, or quality assurance, hourly averages are considered valid if they are calculated from data collected in at least two of the four successive 15-minute periods in the hour (see also Question 19.15).

References: § 75.10(d)(1)

Question 7.3

Topic: Reference Method and Backup Monitoring

Question: Please clarify the rule requirements concerning the use of reference method backup monitors and certified backup monitors.

Answer: The owner or operator has three principal options for obtaining data when a primary monitor is not operating: (1) the use of an applicable reference method backup monitor; (2) the use of a certified redundant backup monitor; or (3) the use of a non-redundant backup monitor.

For a discussion of the use of reference method backup systems, see Section 19 of this Policy Manual. For a discussion of redundant backup monitors, see Question 7.10. For a discussion of non-redundant backup monitors, see Question 7.1.

In general, EPA does not consider routine maintenance activities identified in the QA/QC Plan for the monitor to be activities that require recertification. Additional guidance regarding the types of changes to a monitoring system that necessitate recertification is provided in Section 12 of this Policy Manual. Whenever it is unclear whether a specific change necessitates recertification testing, contact the appropriate EPA Regional Office for clarification.

References: § 75.20(b) and (d)

Question 7.4

Topic: Reference Methods -- Single-Point Sampling

Question: If we can demonstrate non-stratification of stack gases, would we be allowed to apply single point sampling for Reference Methods 3A, 6C, and 7E?

Answer: Yes, if the following conditions are met:

(1) If the reference methods are used as backup monitoring systems for obtaining Acid Rain Program data, single-point monitoring is allowed in accordance with the guidelines in Question 19.12.

(2) If the reference methods are used for Part 75 RATA applications, Section 6.5.6 of Appendix A allows single-point sampling if stratification is demonstrated to be absent at the sampling location. A 12-point stratification test is required prior to each RATA. To qualify for single point sampling for a particular gas, Section 6.5.6.3(b) specifies that the concentration at each traverse point must deviate by no more than 5.0% from the arithmetic average concentration for all traverse points. The results are also acceptable if the concentration differs by no more than three ppm or 0.3% CO_2 (or O_2) from the average concentration for all traverse points. For each pollutant or diluent gas, if these criteria are met, a single sampling point, located along one of the traverse lines used during the stratification test and situated at least 1.0 meter from the stack wall, may be used for the reference method sampling.

References: 40 CFR Part 60, Appendix B, PS 2 (3.2)

Question 7.5

Topic: Use of Non-Redundant Backup Monitors

Question: Does the 720 hours per year of allowable use of a non-redundant backup monitor or monitoring system apply to each such monitor or monitoring system at a facility?

Answer: No. The 720 hours of allowable use of non-redundant backup monitors applies to the unit or stack location, not to any particular monitor or monitoring system (see Question 7.1). Therefore, it is possible for a non-redundant backup monitor or monitoring system which is used at more than one unit or stack location to accumulate more than 720 hours of use per year (e.g., 500 hours at Stack #1 and 500 hours at Stack #2).

References: § 75.20(d)

Question 7.6

Topic: Data Validity -- Backup Monitoring Systems

Question: During backup monitoring, are data considered valid?

Answer: Data collected by a backup monitor during primary monitor downtime would be valid if: (1) the data are obtained using a reference method backup monitor, a certified redundant backup monitor or a non-redundant backup monitor; and (2) the backup monitor is in-control, with respect to all of its applicable quality assurance requirements.

References: § 75.10(e), § 75.32(a)

Question 7.7

Topic: Monitor Location -- Certification Requirements

Question: Will a certification on a single location for a backup CEM system be applicable to other previously approved monitoring locations?

Answer: No. A back-up monitor which is certified at a particular unit or stack location is classified as a regular non-redundant backup monitoring system (see Question 7.1). This type of monitoring system must be separately certified at each location where it is used to obtain data.

References: § 75.20(d)

Question 7.8

Topic: Primary and Backup Designations

Question: Can a primary monitor on one unit be used as a backup monitor on another unit, and vice-versa?

Answer: Yes. Section 75.10(e) provides that a particular monitor may be designated both as a certified primary monitor for one unit and as a certified redundant backup monitor for another unit. An example of this would be an SO_2 analyzer which is *continuously* time-shared between Units 1 and 2. If Unit 2 has its own separate primary SO_2 monitoring system, the time-shared analyzer could then be designated both as the primary SO_2 monitoring system for Unit 1 and as a redundant backup SO_2 monitoring system for Unit 2.

References: § 75.10(e)

Question 7.9

Topic: Backup Monitoring -- Valid Data

Question: Suppose that a company has both a certified primary and a certified redundant backup NO_x emission rate monitoring system. Also suppose that the primary system consists of a NO_x analyzer [component ID # N01] and a diluent analyzer [component ID # D01], and that the redundant backup system consists of a NO_x analyzer [component ID # N02] and a diluent analyzer [component ID # D02]. What would happen if either the primary NO_x analyzer <u>or</u> the primary diluent monitor (but not both) were to go down -- could the backup NO_x monitor [component ID # N02] be used with the primary diluent monitor [component ID # D01] or vice-versa (<u>i.e.</u>, could the backup diluent monitor [component ID # D02] be used with the primary NO_x analyzer [component ID # N01])?

Answer: Not unless these additional combinations [<u>i.e.</u>, component ID # N02 with D01; and component ID # N01 with D02] are also included in the company's monitoring plan as additional redundant backup NO_x systems and that these systems have also been certified as such.

References: § 75.20(d), § 75.30(b)

Question 7.10

Topic: Redundant Backup Monitoring

Question: We are planning to install completely redundant CEM systems on all of our emission stacks. These systems will be on hot standby. In other words, our backup systems will be certified and will undergo all of the same QA/QC procedures and testing that our primary systems do. The backup monitors will operate continuously as if they were our primary monitors.

We plan to use the backup data when our primary monitor is out of service or the primary data is invalid. This will minimize our use of the missing data procedures.

It is our understanding that because our backup system will be on hot standby it will not be necessary to run a linearity check before using the data. Please confirm.

Answer: Your understanding is correct. Section 75.20(d) states that before a *non-redundant* backup monitor is used, it must undergo a linearity check. This requirement applies when the backup analyzer has been on the shelf and would need to be calibrated before being placed in service. However, for a *redundant* backup system, which is certified, operated, calibrated and maintained in the same manner as a primary system there is no need to perform a linearity check each time the backup system is brought into service.

A redundant backup system must comply with the primary CEM quality assurance and quality control requirements in Appendix B (one of which is to perform quarterly linearity checks), with the exception that daily calibration error tests are only required to validate data when the redundant backup system is actually used to report Acid Rain Program data. Provided that the certified redundant backup monitor is operating in-control with respect to all of its daily, quarterly, semiannual, and annual QA requirements, it may be used to generate quality-assured data whenever the primary monitor is down.

<u>Note:</u> A redundant backup monitoring system is designated as "RB" in the electronic data reporting format under the data element "Primary/Backup Designation" in RT 510.

References: § 75.20(d)

Question 7.11

Topic: Linearity Check Requirements for Non-redundant Backup Systems or a Temporary Like-kind Replacement Analyzer

Question: When must a linearity check of non-redundant backup systems or a Temporary Like-kind Replacement Analyzer be performed?

Answer: In general, a linearity check must be passed each time a "regular non-redundant backup monitoring system" or a temporary "like-kind replacement analyzer" is brought into service.

Data from the monitoring system or analyzer are considered invalid until the linearity test is passed, unless a probationary calibration error test is performed and passed when the system or analyzer is brought into service. In that case, data from the system or analyzer may be considered "conditionally valid" for up to168 unit or stack operating hours (beginning at the hour of the probationary calibration error test), provided that a successful linearity test is completed within the 168 operating hour window.

When conditional data validation is used, if the linearity test is passed within the 168 unit or stack operating hour window, then all of the conditionally valid emissions data, from the hour of the probationary calibration error test until the hour of completion of the linearity test, are considered to be quality-assured data, suitable for reporting. However, if, during the 168 hour window, the linearity test is either failed or aborted due to a problem with the monitor, then all of the conditionally valid data recorded up to that point are invalidated. Following corrective actions, the conditionally valid data status may be re-established by performing another probationary calibration error test *provided that* the 168 operating hour window of the original probationary calibration error test (i.e., the one that was performed when the monitor was first brought into service) has not expired. If the original 168 operating hour window expires without a successful linearity check having been completed, then the monitor may not be used for reporting until a linearity test is passed.

References: § 75.20(d)

Question 7.12

Topic: Testing Requirements for Time-shared Backup Systems

Question: Two affected units discharge to a common stack. The required SO_2, NO_x, and CO_2 monitoring is done in the individual ducts leading to the common stack, using separate primary dilution systems for each unit. However, the monitoring systems are configured in such a way that the Unit 2 analyzers can serve as backups for Unit 1 (and vice-versa) by time-sharing the analyzers between the two units. What are the certification and QA requirements for the backup monitoring systems in this configuration?

Answer: In the electronic monitoring plan, it is necessary to define each system including the probe component in order to distinguish one system from another. In the case described above, the backup monitoring systems should be classified as non-redundant backups in the monitoring plan, and not as redundant backups, since they can serve as backups. This implies that they will operate only occasionally. For example, the Unit 2 analyzer is not *continuously* time-shared between Units 1 and 2 (as was the case in Question 7.8), but time-sharing is done only when the Unit 1 analyzer is out of service.

Use the following guidelines to determine how many and what types of initial certification tests are required for each non-redundant backup monitoring system:

(1) A linearity check of each non-redundant backup monitor is required, without exception.

(2) A cycle/response time test is required in the time-shared mode to ensure that at least one data point will be obtained every 15 minutes from each unit. Report the result of this test for each system.

(3) A RATA and bias test are required for each non-redundant backup system; and a bias test of each backup system is required. If, for each unit, the RATAs are conducted in the time-shared mode, separate RATAs and bias tests for the primary systems in the normal sampling mode are not required.

(4) A 7-day calibration error test is not required.

For on-going quality assurance (QA) activities, each time that a non-redundant backup monitoring system is brought into service for measuring emissions, it must pass a linearity check. If a non-redundant backup system is used for one or more days, the system must pass a daily calibration error test on each day on which it is used to report data. If its usage continues from one calendar quarter into the next, it becomes subject to the same quarterly linearity requirements as a primary monitoring system. A RATA of each non-redundant backup system must be performed, at a minimum, once every eight calendar quarters.

References: § 75.20(d); Appendix A; Appendix B

Question 7.13

Topic: Definition of Like-kind Replacement Analyzer

Question: What constitutes a like-kind replacement analyzer, as described in § 75.20(d)(2)(ii)?

Answer: A like-kind replacement analyzer is one that uses the same method of sample collection (dilution-extractive, dry extractive, or in-situ) and analysis (for example, pulsed fluorescence, UV fluorescence, chemiluminescence) as the analyzer that it replaced. The like-kind replacement analyzer described in § 75.20(d)(2)(ii) must also use the same probe and interface as the primary system and have the same span value. The full-scale range need not be identical, but must meet the guidelines in Section 2.1 of Appendix A.

References: § 75.20(d)(2)(ii); Appendix A, Section 2.1

[This page intentionally left blank.]

SECTION 8
RELATIVE ACCURACY

Page

8.1 Quality Assurance RATAs 8-1

8.2 Dual-range Monitor RATA 8-2

8.3 RATA Frequency Incentive 8-2

8.4 RATA Testing Frequency Limitation -- Bias Adjustment 8-2

8.5 Bias Test -- Retesting 8-3

8.6 Flow RATAs -- Traverse Points 8-3

8.7 Flow RATAs 8-4

8.8 NO_x RATA 8-4

8.9 RATA Procedure 8-5

8.10 RATA -- Use of BAF 8-5

8.11 Concurrent Runs for Moisture, CO_2, and O_2 with Flow 8-6

8.12 Timing Requirements for Flow RATAs 8-7

8.13 Reporting Requirements for Failed RATAs 8-7

8.14 Rounding RATA Results to Determine RATA Frequency 8-7

8.15 RATA Load Requirements for Common Stacks 8-8

8.16 Reduced RATA Frequency Standard for Low NO_x Emitters 8-9

8.17 Schedule of Tests 8-9

8.18 RATA Schedule for Flow Monitors 8-9

		Page
8.19	Reference Method Procedures	8-10
8.20	Reference Method Procedures	8-11
8.21	Bias Adjustment for Flow Monitor RATAs	8-11
8.22	Use of Short RM Measurement Line after Wet Scrubber	8-12
8.23	Peaking Unit Annual Flow RATA	8-13
8.24	Reference Flow-to-load Ratio	8-13
8.25	QA Operating Quarter -- Calendar Quarter Deadline	8-13
8.26	Time per RATA Run	8-14
8.27	RATA Frequency (Grace Period Test)	8-15
8.28	SO_2 RATA Exemption	8-16
8.29	Range of Operation	8-16
8.30	Load Analysis	8-17
8.31	Relative Accuracy and BAF Calculations -- Rounding Conventions	8-17
8.32	RATAs of Multiple Stack Configurations	8-18
8.33	RATAs for Time-shared Systems	8-18
8.34	RATAs for Time-shared Systems	8-19
8.35	RATAs for Time-shared Systems	8-19
8.36	Use of Multi-hole Sampling Probes	8-20

Question 8.1

Topic: Quality Assurance RATAs

Question: Following successful certification, when is the first RATA required?

Answer: According to Section 2.3 of Appendix B to 40 CFR Part 75, the requirement to conduct semiannual or annual relative accuracy test audits (RATAs) is effective as of the calendar quarter following the quarter in which the monitor is provisionally certified (the date when certification testing is completed). Therefore, depending upon whether or not the relative accuracy measured during the initial monitor certification qualifies the monitor for an annual RATA frequency, the *projected* deadline for the next RATA would either be the second or fourth calendar quarter following the quarter during which the monitor is provisionally certified. However, as explained in the following paragraphs, the *projected* RATA deadline may not be the *actual* deadline, depending on how much a unit operates and what type of fuel is combusted.

The May 26, 1999 revisions to Part 75 changed the method of determining RATA deadlines from a calendar quarter basis to a QA operating quarter basis. A QA operating quarter is a calendar quarter in which there are $\geq$ 168 unit or stack operating hours. Partial operating hours are counted as full hours in determining whether a quarter is a QA operating quarter (see definitions of unit operating hour and stack operating hour in § 72.2).

If a CEMS obtains a semiannual RATA frequency, the next RATA is due by the end of the second QA operating quarter following the quarter in which the RATA is completed. Similarly, an annual RATA frequency means that the next RATA is due by the end of the fourth QA operating quarter following the quarter in which the RATA is completed.

For units that consistently operate more than 168 hours in each quarter, there will be little or no difference between the calendar quarter and QA operating quarter methods of determining RATA deadlines. However, for units that operate infrequently in a calendar quarter (< 168 unit operating hours), a one quarter extension is given. Also, for units that burn only very low sulfur fuel (as defined in § 72.2) during a particular calendar quarter, a one quarter extension of the SO_2 monitor RATA deadline may be claimed. Note that there is an upper limit on all such RATA deadline extensions. The deadline may not be extended beyond the end of the eighth calendar quarter following the quarter in which a RATA was last performed.

If unforeseen circumstances prevent a RATA from being completed by the deadline, the grace period provision in Section 2.3.3 of Appendix B may be used.

References: Appendix B, Section 2.3

Question 8.2

Topic: Dual-range Monitor RATA

Question: Do RATAs need to be done for both ranges of a dual-range monitor?

Answer: No. In accordance with Section 6.5(c) of Appendix A, simply do the RATA on the range that is considered normal. For units with add-on SO_2 or NO_x controls, the low range is considered normal. When separate monitor ranges are used for different fuel types (e.g., low sulfur and high sulfur fuels), both ranges are considered normal. In such cases, perform the RATA on the range in use at the time of the scheduled test.

References: Appendix A, Section 6.5(c)

Question 8.3

Topic: RATA Frequency Incentive

Question: If we fail our first RATA, and pass a second time, may we repeat the test to qualify for a lower test frequency?

Answer: Yes. Section 2.3.1.4 in Appendix B of Part 75 allows as many RATA attempts as are needed to obtain the desired percent RA or BAF. The only condition is that the data validation procedures in Section 2.3.2 of Appendix B must be followed.

References: Appendix B, Sections 2.3.1.4 and 2.3.2

Question 8.4

Topic: RATA Testing Frequency Limitation -- Bias Adjustment

Question: In Appendix B, how many tests are allowed to reduce the bias adjustment factor?

Answer: Whereas the original Part 75 rule limited the owner or operator to two RATA attempts to obtain a more favorable relative accuracy percentage or bias adjustment factor (BAF), Section 2.3.1.4 in Appendix B of the revised rule (May 26, 1999) allows as many RATA attempts as are needed to obtain the desired percent RA or BAF. The only condition is that the data validation procedures in Section 2.3.2 of Appendix B must be followed.

References: Appendix A, Section 7.6.5

Question 8.5

Topic: Bias Test -- Retesting

Question: Section 75.61(a)(1)(iii) allows the owner or operator to retest immediately, without notification, in cases of a failed certification test. Does this apply in the case of bias tests as well as RATAs? Are there any restrictions as to how soon retesting should commence?

Answer: If a certification test results in a requirement that a bias adjustment factor be used, then the owner or operator of the affected unit may retest immediately. EPA does not intend to place restrictions on the timing of retests performed in order to eliminate the need for the use of a bias adjustment factor. In many cases, the failure of a bias test will be known when stack testing personnel are still on site, and requiring a pretest notification for testing performed to improve bias test results would cause needless and costly delays in the testing.

References: § 75.61(a)(1)(iii)

Question 8.6

Topic: Flow RATAs -- Traverse Points

Question: After alternative site verification with a directional probe traverse of 40 points (or 42 points for rectangular ducts) according to 40 CFR Part 60, Appendix A, Method 1, Section 11.5.2, should subsequent flow Relative Accuracy Test Audits (RATAs), which may use S-type probes, be based on Method 1, Section 11.2.2 traverse point criteria (e.g., 16 points) or the initial 40 (42) point criteria specified in Method 1, Section 2.5.2?

Answer: Either traverse point selection criteria specified in Method 1 (i.e., either 16 points or 40 (42) points) is acceptable for subsequent flow RATAs.

Part 75, Appendix A, Section 1.2 recommends the use of the flow profile procedures in 40 CFR Part 60, Appendix A, Test Method 1, Section 2.5 (which specifies the 40 (42) point traverse) to determine the acceptability of the potential flow monitor location. (The potential flow monitor location is acceptable if the resultant angle is $\leq$ 20° and the standard deviation is $\leq$ 10°.) Note that 40 CFR Part 60, Appendix A, Test Method 1, has been revised so that Section 2.5 is now Section 11.5 in the most current version.

Following an acceptable flow profile study, the flow monitor must pass all the required performance tests for certification and QA/QC, including flow RATAs. The selection of traverse points for subsequent flow RATAs, according to Part 75, Appendix A, Section 6.5.6, need only meet the requirements of 40 CFR Part 60, Appendix A, Test Method 1, and not Section 11.5.2 specifically.

References: 40 CFR Part 60, Appendix A (RM 1); 40 CFR Part 75, Appendix A, Section 6.5.6

Question 8.7

Topic: Flow RATAs

Question: May an electronic manometer be used as the differential pressure gauge when performing a relative accuracy test audit (RATA) on a volumetric flow monitor using 40 CFR Part 60, Appendix A, Method 2? If so, what should the averaging period be?

Answer: Yes. However, if regular Method 2 is used for the flow RATA, the electronic manometer must be calibrated according to the procedures in 40 CFR Part 60, Appendix A, Method 2, Section 6.2. The Δp readings from the electronic manometer should be compared to those of a gauge-oil manometer before and after the test series at a minimum of three points, approximately representing the range of Δp values in the stack. If, at each point, the values of Δp as read by the differential pressure gauge and gauge-oil manometer agree to within five percent, the differential pressure gauge shall be considered to be in proper calibration.

If Method 2F (three-dimensional probe) or Method 2G (two-dimensional probe) is used for the flow RATA, calibrate the electronic manometer as described in Section 10.3 of those methods. A minimum averaging period of one minute at each traverse point is recommended when an electronic manometer or transducer is used. The same averaging period should be used for each traverse point in the run.

References: 40 CFR Part 60, Appendix A (RM 2)

Question 8.8

Topic: NO_x RATA

Question: May I perform a RATA if I'm not using normal burner configuration? For example, one pulverizer is down and therefore one bank of burners cannot be used.

Answer: No. RATAs must be performed under normal operating conditions.

References: Appendix A, Section 6.5

Question 8.9

Topic: RATA Procedure

Question: Suppose that during the RATA we determine that there is a problem after three or four runs. May we continue the test without counting the three or four runs in the total runs for certification?

Answer: It depends on the nature of the problem. If the reason for discontinuing a RATA is unrelated to the performance of the CEMS being tested (e.g., problems with the reference method or with the affected unit(s)), any valid test runs that were completed prior to the occurrence of the problem may either be used as part of the official RATA or the runs may be disregarded and the RATA re-started. However, if a RATA is aborted due to a problem with the CEMS, the test is considered invalid and must be repeated. In such cases, none of the runs in the aborted test may be used as part of the official RATA and the aborted test may *not* be disregarded (since it affects data validation), but must be reported in the electronic quarterly report.

References: § 75.20(b)(3); Appendix A, Section 6.5.9; Appendix B, Section 2.3.2

Question 8.10

Topic: RATA -- Use of BAF

Question: If a unit has been using a bias adjustment factor since its last RATA, should the measurements obtained in the next RATA be multiplied by the adjustment derived from the earlier RATA?

Answer: No. The bias test is designed to determine if the measured values from the CEMS are systematically low relative to the reference method. This can only be determined by using the unadjusted values from the CEMS.

References: Appendix A, Section 7.6.5; Appendix B, Section 2.3

Question 8.11

Topic: Concurrent Runs for Moisture, CO_2, and O_2 with Flow

Question: Are separate Method 3 (CO_2/O_2) and Method 4 (moisture) runs required for each Method 2 (flue gas velocity) run when performing a flow RATA?

Answer: No, provided that the only reason for measuring moisture or CO_2/O_2 is to determine the stack gas molecular weight. In this case, it is sufficient to collect one sample from Method 3 and Method 4 for every clock hour of a flow RATA or every three successive velocity traverse runs. Alternatively, moisture measurements used solely for the determination of molecular weight may be performed before and after a series of flow RATA runs at a particular load or operating level, provided that the time interval between the two moisture measurements does not exceed three hours. If this option is selected, the results of the before and after moisture measurements are to be averaged, and this average moisture value is to be applied to the data for all runs of the flow RATA.

Since stack gas velocity varies with the square root of one over the stack gas molecular weight (see Equation 2-7 in Method 2), relatively large variations in O_2, CO_2, and moisture will have a fairly small impact on the calculation of gas velocity. Therefore, if gas composition and moisture data are only used for calculating stack gas molecular weight, collecting Method 3 and Method 4 samples with each Method 2 run is not necessary.

For gas monitor RATAs, however, moisture results are sometimes needed to convert CEM and reference method data to the same basis. In such instances, a one percent change in flue gas moisture content causes a one percent change in the CEM or reference method results. Since changes in stack gas moisture content can create a significant impact on corrected results and the outcome of performance tests, Method 4 samples must be collected with each set of reference method samples when the Method 4 results are used to correct CEM and reference method results to the same moisture basis. Note that if two gas RATA runs are able to be completed within the same hour (60 minute period), the results of a single Method 4 run, taken during the 60 minute period, may be applied to both RATA runs.

References: 40 CFR Part 60, Appendix A (RMs 2, 3, and 4)

Question 8.12

Topic: Timing Requirements for Flow RATAs

Question: In what time-frame must a multiple-load flow RATA be completed?

Answer: Section 6.5(e) of Appendix A, states that each single-load RATA should be completed within 168 consecutive unit or stack operating hours. For multi-load flow RATAs, up to 720 consecutive unit or stack operating hours are allowed to complete the testing at all load levels.

References: Appendix A, Section 6.5(e)

Question 8.13

Topic: Reporting Requirements for Failed RATAs

Question: Must I report a failed or discontinued RATA?

Answer: The results of all completed and aborted RATAs which affect data validation must be reported. For example, when a RATA is aborted due to a problem with the CEMS, that RATA must be reported because the monitoring system is considered to be out-of-control as of the hour in which the test is discontinued. However, do not report tests that are discontinued for reasons unrelated to the monitors' performance (e.g., due to process upsets, unit outages, or a problem with the reference method used). Rather, keep records of these tests onsite with the justification for why the test was invalidated.

Furthermore, for a monitoring system already out-of-control with respect to a failed or aborted RATA, subsequent RATA attempts that are failed or aborted need not be reported. Again, keep records of these tests onsite as part of the test records and maintenance logs for the CEMS.

References: Appendix B, Section 2.3.2

Question 8.14

Topic: Rounding RATA Results to Determine RATA Frequency

Question: If the results of a NO_x RATA, reported to two decimal places, come out to 7.51% relative accuracy (RA), does the monitoring system qualify for reduced RATA frequency?

Answer: Yes. Section 2.3.1.2 of Appendix B to Part 75 allows annual, rather than semiannual, RATA frequency when the RA is 7.5% or less. The RA specification is to one decimal place. Therefore, a RA of 7.51% qualifies for the annual RATA frequency because, by the normal rules of rounding off, 7.51, to the nearest tenth, is 7.5. If the second decimal place in the reported RA had been five or greater, this would have rounded off to 7.6% and the monitoring system would not have qualified for the reduced RATA frequency.

References: Appendix B, Section 2.3.1.2

Question 8.15

Topic: RATA Load Requirements for Common Stacks

Question: Our company has a plant with three units using a common stack. One of those units experienced an unscheduled outage during the last quarter in which we should perform an annual flow RATA at three load levels. Should we wait to perform the RATA for flow until all three units are operating again?

Answer: Every effort should be made to perform the relative accuracy test audit by the end of the required quarter. Section 6.5.2.1 of Appendix A defines the range of operation for a unit or common stack. For common stacks, the range of operation extends from the minimum safe, stable load of any unit using the stack to the highest sustainable load with all units in operation. Section 6.5.2.1 further defines the low, mid, and high load levels as 0 – 30%, 30 – 60%, and 60 – 100% of the range of operation, respectively. Therefore, in the present example, if a load level of at least 60% of the range of operation could be attained with two units in operation, this would suffice for the high level flow RATA. The mid and low flow tests could then be done at 35% and 10% of the operating range, respectively (note that Section 6.5.2 of Appendix B requires a minimum separation of 25% of the operating range between adjacent load levels). If, however, a true high level data point is not attainable with only two units in operation, then if it is expected that all three units will be back in service soon after the end of the quarter, perform the high-level flow RATA within the 720 unit operating hour grace period allowed under Section 2.3.3 of Appendix B. If it is expected that all three units will *not* be back in service within the 720 unit operating hour grace period, contact your EPA monitoring analyst.

References: Appendix A, Sections 6.5.2 and 6.5.2.1; Appendix B, Sections 2.3.1 and 2.3.3

Question 8.16

Topic: Reduced RATA Frequency Standard for Low NO_x Emitters

Question: There are a number of gas and oil fired turbines that have extremely low NO_x concentrations when their controls are functioning (less than ten ppm). Is there an alternative approach for determining reduced RATA frequency for these CEMS?

Answer: Yes, if a unit qualifies as a low emitter for NO_x (where the reference method emission rate is < 0.200 lb/mmBtu), it can qualify for the reduced RATA frequency where the average emission rate from the CEMS during the RATA is within 0.015 lb/mmBtu of the average reference method emission rate.

References: Appendix B, Section 2.3.1.2

Question 8.17

Topic: Schedule of Tests

Question: Is it possible to move an annual RATA from the fourth calendar quarter following the last test to the third or second calendar quarter?

Answer: Yes. You may perform the RATA any time before the end of the projected RATA deadline (i.e., two or four calendar quarters following your last test). Therefore, you may adjust your RATA schedule as necessary. If you reschedule your RATA, the next RATA deadline is based on the date and time of completion of the rescheduled RATA.

References: Appendix B, Section 2.3 and 2.4 (b)

Question 8.18

Topic: RATA Schedule for Flow Monitors

Question: How do I determine when to perform my next flow RATA?

Answer: For a flow monitor, the percent relative accuracy obtained determines when the next test must be performed.

If a flow monitor passes a RATA and the relative accuracy at any load or operating level tested is > 7.5 percent and ≤ 10.0 percent, then the next flow RATA must be performed on a semiannual basis (i.e., within the next two QA operating quarters). If the relative accuracy is ≤ 7.5 percent at all loads or operating levels tested then the next flow RATA must be performed on an annual basis (i.e., within the next four QA operating quarters).

Each time that a 2-load or 3-load flow RATA is completed and passed, the frequency (semiannual or annual) of the next flow RATA is established or re-established. Note, however, that a single-load (normal load) flow RATA may *not* be used to establish or re-establish the RATA frequency, except when: (1) the single-load RATA is specifically required under Section 2.3.1.3(b) of Appendix B (for flow monitors installed on peaking units and bypass stacks; and for flow monitors that qualify for single-level RATAs under section 6.5.2(e) of appendix A); or (2) a single-load RATA is allowed under Section 2.3.1.3(c) of Appendix B, for a unit which has operated at a single load level (low, mid, or high) for ≥ 85.0% of the time since the last annual flow RATA. Apart from these exceptions, the only way to establish or re-establish the RATA frequency for a flow monitor is to perform a 2-load or 3-load flow RATA.

References: Appendix A, Section 6.5.2(e); Appendix B, Sections 2.3.1.1, 2.3.1.2, 2.3.1.4, and 2.4

Question 8.19

Topic: Reference Method Procedures

Question: In 40 CFR Part 60, Appendix A, Test Method 2, do Figure 2-6 and the Average Stack Gas Velocity (Equation 2-7) require the square root of the average differential pressure or the average of the square roots of the differential pressures?

Answer: Method 2 requires the average of the square roots of the differential pressures. It has come to our attention that some test companies have been incorrectly calculating this average. Sources must ensure that current submittals to EPA are calculated correctly.

References: 40 CFR Part 60, Appendix A (RM 2)

Question 8.20

Topic: Reference Method Procedures

Question: When using Equation 4-3 in Test Method 4, should the factor: (delta H)/13.6 (i.e., the average pressure differential across the orifice meter divided by 13.6) in Equation 5-1 of Test Method 5 be used to correct the sample volume?

Answer: Under the Acid Rain Program when Test Method 4 is required, either Equation 4-3 or Equation 5-1 may be used to correct the sample volume.

References: 40 CFR Part 60, Appendix A-3 (RM 4)

Question 8.21

Topic: Bias Adjustment for Flow Monitor RATAs

Question: When a single, normal load flow RATA is required (or allowed) to be performed on a flow monitor, should a utility do the bias test on these data? If so, should the data from the normal level be used to calculate a new bias adjustment factor?

Answer: Yes. Perform a bias test for each single load flow RATA required or permitted under Part 75. If the flow monitor passes the bias test, apply a bias adjustment factor (BAF) of 1.000 for all flow data until the next successful flow RATA. If the monitor fails the bias test, calculate a BAF from the normal level RATA and apply this revised bias adjustment factor to each hour of flow rate data, beginning with the hour after the hour in which the RATA testing is completed.

References: Appendix A, Sections 7.6.4 and 7.6.5; Appendix B, Section 2.3.2

Question 8.22

Topic: Use of Short RM Measurement Line after Wet Scrubber

Question: Section 6.5.6 in Appendix A of Part 75 states that the Reference Method (RM) traverse points for gas RATA tests must meet the location requirements of Performance Specification # 2 (PS 2) in Appendix B of 40 CFR 60. Section 8.1.3.2 of PS 2 specifies that downstream of wet scrubbers, the RM traverse points must be located on a long measurement line, with points at 16.7%, 50%, and 83.3% of the stack diameter. Use of the alternative short RM measurement line, with points located 0.4 m, 1.0 m and 2.0 m from the stack wall is disallowed in such instances. However, for large-diameter stacks, use of a long measurement path is difficult and presents many logistical problems. Is it possible for the owner or operator of a scrubbed unit to conduct a test or demonstration in order to be allowed to use the short RM measurement line?

Answer: Yes. Part 75 includes provisions in Section 6.5.6 of Appendix A which allow the short measurement line to be used following a wet scrubber, provided that, just prior to each RATA, stratification is demonstrated to be minimal at the sampling location.

To demonstrate this, an initial 12-point stratification test is required at the sampling location (see Section 6.5.6.1 of Appendix A). Reference Methods 6C, 7E, and 3A are used to measure SO_2, NO_x, and CO_2, respectively. Sampling is required for at least two minutes at each traverse point. A stratification test is also required for each subsequent RATA at the sampling location. However, for the subsequent RATAs, in lieu of repeating the initial 12-point test, an abbreviated 3-point or 6-point stratification test may be done (see Section 6.5.6.2 of Appendix A).

For each pollutant or diluent gas, Section 6.5.6.3(a) of Appendix A specifies that stratification is considered to be minimal if the concentration at each traverse point is within ± 10.0 % of the mean concentration value for all the points. The results are also acceptable if the concentration at each traverse point differs by no more than five ppm or 0.5% CO_2 or O_2 from the average concentration for all traverse points. If stratification is found to be minimal, the short RM measurement line may be used for the RATA tests.

The data and calculated results from all stratification tests are to be kept on file at the facility, available for inspection, with the rest of the RATA information.

References: Appendix A, Sections 6.5.6, 6.5.6.1, 6.5.6.2, and 6.5.6.3; 40 CFR Part 60, Appendix B (PS 2)

Question 8.23

Topic: Peaking Unit Annual Flow RATA

Question: Peaking units are only required to do an annual flow RATA at normal load. Must units meet the definition of a peaking unit in Part 72 in order to qualify for this reduced testing?

Answer: Yes. Report the peaking unit status in <MonitoringQualPercentData> in the monitoring plan.

References: Appendix B, Section 2.3

Question 8.24

Topic: Reference Flow-to-load Ratio

Question: For the quarter, in which we do a flow RATA, should we use the data from that RATA for establishing the reference flow-to-load ratio for that same quarter or should we use data from the previous RATA?

Answer: Always base R_{ref} on the most recent normal load flow RATA, even if the RATA was performed in the quarter being evaluated. Note that for any quarter in which a normal load flow RATA is performed and passed, flow rate data recorded prior to the RATA may be excluded from the quarterly flow-to-load ratio data analysis. See Sections 2.2.5(a)(5) and 2.2.5(c)(5) of Appendix B.

References: Appendix B, Section 2.2.5

Question 8.25

Topic: QA Operating Quarter -- Calendar Quarter Deadline

Question: If a unit extends the deadline for a quarterly linearity check or RATA because of a lack of QA operating quarter as defined in Section 72.2 quarters, will the unit have to start up just to do testing when it reaches the calendar quarter deadline (i.e., a linearity is required at least every four calendar quarters and a RATA is required at least every eight calendar quarters)?

Answer: No. In addition to the quarterly linearity check exemptions and RATA deadline extensions that may be claimed on the basis of non-QA operating quarters, there are also grace periods for missed tests. Grace periods allow required tests to be completed within a certain number of unit or stack operating hours after the end of the quarter in which the QA test was due. The two cases are as follows:

(1) For linearity checks: Appendix B to Part 75 states in Section 2.2.3(f) that "If a linearity test has not been completed by the end of the fourth calendar quarter since the last linearity test, then the linearity test must be completed within a 168 unit operating hour or stack operating hour "grace period"...following the end of the fourth successive elapsed calendar quarter, or data from the CEMS (or range) will become invalid."

(2) For RATAs: Appendix B to Part 75 states in Section 2.3.1.1(a) that "If a RATA has not been completed by the end of the eighth calendar quarter since the quarter of the last RATA, then the RATA must be completed within a 720 unit (or stack) operating hour grace period...following the end of the eighth successive elapsed calendar quarter or data from the CEMS will become invalid."

References: 40 CFR Part 72.2; 40 CFR Part 75, Appendix B, Sections 2.2.3 and 2.3.1.1

Question 8.26

Topic: Time Per RATA Run

Question: For a Part 75 RATA, what is the minimum acceptable time per run?

Answer: Section 6.5.7 in Appendix A to Part 75 specifies that the minimum RATA run time is 21 minutes for a gas monitoring system or moisture monitoring system RATA and five minutes for a flow RATA. Note that the 21-minute run time for moisture system RATA appears to conflict with Sections 8.1.1.2 and 8.2.2 of EPA Reference Method 4 (RM4) in Appendix A of 40 CFR 60. On one hand, Section 8.1.1.2 of RM4 requires collection of a minimum sample volume of 21 scf at a rate no greater than 0.075 scfm, when regular Method 4 is used, which equates to a sampling time of 28 minutes. On the other hand, when Approximation Method 4 (midget impinger technique) is used, Section 8.2.2 of RM 4 caps the sample volume at approximately 30 liters of gas, collected at a rate of two liters/min, which equates to a sample time of 15 minutes. The Acid Rain Program allows either regular Method 4 or Approximation Method 4 to be used as the reference method for moisture RATA testing. Therefore, when RM 4 is used for Acid Rain Program applications, determine the appropriate sample collection time (21 minutes, 28 minutes, or 15 minutes) as follows:

(1) When regular Method 4 is used for a Part 75 moisture monitoring system RATA, the minimum acceptable time per RATA run is 21 minutes, as stated in Section 6.5.7 of Appendix A to Part 75. To meet this requirement, concurrent data must be collected with the CEMS and with the Method 4 sampling train for at least 21 minutes. The Method 4 sample collection time of 21 minutes, although less than the 28 minutes specified in Section 8.1.1.2 of Method 4, is consistent with

Section 8.4.3.1 of Performance Specification No. 2 (PS No. 2) in Appendix B to 40 CFR 60, which states, in reference to reference method sampling for RATA applications, "...For integrated samples (e.g., Methods 6 and 4), make a sample traverse of at least *21 minutes*, sampling for an equal time at each traverse point...".

(2) When Approximation Method 4 is used for a Part 75 moisture monitoring system RATA, the minimum acceptable time for each RATA run is also 21 minutes. Collect the RM and CEMS data concurrently, with the understanding that in this case only the CEMS data can be collected for the full 21 minute period, because the recommended sampling time for Approximation Method 4 (as specified in Section 3.2.2 of Method 4) is about 15 minutes.

(3) When Reference Method 4 data are used for gas monitoring system RATAs, to correct pollutant and diluent concentrations for moisture, either perform the moisture sampling concurrently with the pollutant and diluent concentration measurements as described in (1) or (2), above, or follow the guideline in Section 6.5.7 of Appendix A to Part 75, which allows non-concurrent collection of the pollutant/diluent data and auxiliary data such as moisture, provided that for each RATA run, all necessary data are obtained within a 60 minute period. However, if the moisture data and the pollutant/diluent data are collected non-concurrently, the moisture sample collection time must be in accordance with Section 8.1.1.2 or 8.2.2 of Method 4, as applicable.

References: 40 CFR Part 60, Appendix A (RM 4, Sections 8.1.1.2 and 8.2.2), Appendix B (PS 2, Section 8.4.3.1); 40 CFR Part 75, Appendix A, Section 6.5.7

Question 8.27

Topic: RATA Frequency (Grace Period Test)

Question: If I usually do RATA testing in the second quarter but one year I use the grace period and do the RATA in the third quarter, should I do the next RATA in the second or third quarter the following year?

Answer: For a RATA completed during a grace period that meets the relative accuracy requirement for an "annual" RATA frequency the deadline for the next test is to be three QA operating quarters after the quarter in which the grace period test was completed. If the grace period RATA qualifies for the standard "semi-annual" RATA frequency, the deadline for the next test is to be two QA operating quarters after the quarter in which the grace period test was completed.

Also, note that RATAs are required at least once every eight successive calendar quarters.

Therefore, assuming that in this case that the unit operates more than 168 operating hours each quarter and the RATA results allow an "annual" frequency, then the next RATA would be due in the second quarter of the following year.

References: Appendix B, Section 2.3.3(d)

Question 8.28

Topic: SO_2 RATA Exemption

Question: Our facility is permitted to combust #6 oil however we burn only natural gas. Can we take advantage of the SO_2 RATA exemption?

Answer: Yes. You may claim either: (1) an on-going exemption from SO_2 RATAs if your Designated Representative certifies that you never burn fuel with a sulfur content higher than "very low sulfur fuel" (as defined in § 72.2); or (2) a conditional exemption from SO_2 RATAs if you keep the usage of oil to 480 hours or less per year. You must submit a <TestExentionExemptionData> record to claim this exemption.

References: § 75.21(a)(6) and (a)(7)

Question 8.29

Topic: Range of Operation

Question: The range of operation as defined in Section 6.5.2.1 of Appendix A to Part 75 extends from the "minimum safe, stable load" to the "maximum sustainable load." What is meant by the "minimum safe, stable load"?

Answer: The minimum safe, stable load is not precisely defined in either Part 72 or Part 75 of the Acid Rain rules. In the absence of such a definition, use the following guidelines: the minimum safe, stable load is the lowest load at which a unit is capable of being held for an extended period of time, without creating an unsafe or unstable operating condition. If the boiler manufacturer recommends that the unit not be operated below a certain load level, this may be used as the minimum safe, stable load. If such a recommendation is unavailable, you may use sound engineering judgment, based on knowledge of the historical operation of the unit, to estimate the minimum safe, stable load. In making this determination, you may exclude low unit loads recorded during startup or shutdown while the unit is "ramping up" or "ramping down," unless these loads are able to be sustained and safely held for several hours at a time.

References: Appendix A, Section 6.5.2.1(b)

Question 8.30

Topic: Load Analysis

Question: The historical load analysis described in Appendix A, Section 6.5.2.1(c) requires us to use the "past four representative operating quarters" in the analysis. Does this refer to complete calendar quarters only, or can we use a calendar year of data (365 days) that begins and ends in the middle of a quarter? If we perform the analysis in the fourth quarter of the year, can we simply use the data from the time we perform the analysis back to the beginning of that calendar year?

Answer: The historical load analysis must include the four most recent complete operating quarters that represent typical operation of the unit. If you perform the analysis in the middle of a quarter, you may include data from the current quarter; however, the historical look back must include load data from the previous four complete, representative operating quarters. In some cases, a facility may need to consider more than the past four quarters of data to identify four complete operating quarters that are representative of typical operation.

References: Appendix A, Section 6.5.2.1(c)

Question 8.31

Topic: Relative Accuracy and BAF Calculations -- Rounding Conventions

Question: When performing the bias test described in Section 7.6.5 of Appendix A or when calculating the percentage relative accuracy (% RA) or bias adjustment factor (BAF) for a CEMS, should we use in our calculations the rounded values of the "Arithmetic Mean of CEMS values," "Arithmetic Mean of Reference Method Values," "Arithmetic Mean of the Difference Data," "Standard Deviation of Difference Data," and "Confident Coefficient," as reported, in the <RATASummaryData> record for the RATA test?

Answer: No. These parameters are intermediate values in a calculation sequence that leads to final values of percent relative accuracy (% RA) and the BAF. These intermediate values are rounded off solely for EDR reporting purposes. The rounded values should not be used to perform the bias test or to calculate the % RA or the BAF. Rather, when performing the bias test or when calculating the relative accuracy and the BAF, you should retain the maximum decimal precision supported by the computer used (a minimum of seven decimal places) in all of the intermediate parameters. This is in keeping with accepted professional standards and practice. (For example, American Society for Testing and Materials (ASTM), "Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications," #E29-90, Section 7.3, states "When calculating a test result from test data, avoid rounding intermediate quantities. As far as practicable with the calculating device or form used, carry out calculations with the test data exactly and round only the final result.") The use of rounded intermediate quantities in a calculation sequence is likely to produce cumulative rounding errors.

References: Appendix A, Section 7.6.5; ECMPS Quality Assurance and Certification Reporting Instructions

Question 8.32

Topic: RATAs of Multiple Stack Configurations

Question: For a unit with a multiple stack configuration, are RATAs of the monitors on the individual stacks required to be done simultaneously?

Answer: For multiple stack configurations, Part 75 does not require simultaneous RATAs of the monitors installed on the individual stacks. However, if you elect to perform the quarterly flow-to-load test on a combined basis (see Questions 3.35 through 3.39), EPA recommends that the flow RATAs either be done simultaneously or as close in time as practicable, at approximately the same operating conditions (e.g., load, diluent concentration, etc.). This helps to ensure that a representative reference flow-to-load ratio is obtained.

References: Appendix A, Section 6.5; Appendix B, Section 2.2.5; Policy Manual Questions 3.35, 3.36, 3.37, 3.38, and 3.39

Question 8.33

Topic: RATAs for Time-shared Systems

Question: If the source has a time-sharing continuous emissions monitoring system (CEMS) which alternates sampling between two or more emission points, should the RATA be performed with the CEMS in time-share mode?

Answer: Yes. Because it is not possible to detect system bias introduced by the time-share process when the CEMS is not in the time-share mode, the RATA should be performed while the system is in time-share mode. There are two options available to determine the CEMS emission average while performing the RATA in time-share mode: 1) the runs can be 21 minutes long and the CEMS average computed from whatever data is recorded by the CEMS for the emission point tested during the 21 minutes; or 2) the runs can be extended up to one hour to capture two or more CEMS sampling cycles for the emission point being tested.

References:

Question 8.34

Topic: RATAs for Time-shared Systems

Question: Does the reference method have to be performed simultaneously at each of the emission points being monitored by the time-shared CEMS?

Answer: No. Although a RATA should be performed for each of emission points being monitored by a time-shared CEMS, only one emission point needs to be sampled by the reference method at a time.

References:

Question 8.35

Topic: RATAs for Time-shared Systems

Question: How should RATA and CEMS data be collected for the RATA calculations when testing time-shared CEMS?

Answer: When conducting separate RATAs for each emission point which time-share a CEMS, for each run period, separate the CEMS data generated for the emission point being challenged from the data collected by the system for any other emission point. For each run, compare the average concentration value from the CEMS at the challenged emission point to the average Reference Method value.

When simultaneously conducting RATAs at multiple emission points which time-share a CEMS, separate the CEMS data collected by emission point, and match that data to the respective Reference Method data collected at each emission point. For each respective run, compare the average CEMS concentration value to the corresponding average Reference Method value.

References:

Question 8.36

Topic: Use of Multi-hole Sampling Probes

Question: Is the use of a multi-hole sampling probe permitted when conducting the RATA for an SO_2, NO_x, CO_2, or O_2 monitoring system, in lieu of physically moving a sampling probe to capture data at the required traverse points?

Answer: EPA intends to permit only certain configurations of multi-hole sampling probes to be used to conduct Part 75 RATAs, as discussed below under "Multi-hole Probes (EPA Evaluation)."

A. Background

For relative accuracy test audits (RATAs) of gas monitors, Part 75, Appendix A, § 6.5.6 defines the number and location of the required reference method sampling points. In general, three sampling points are used, unless the unit qualifies to use a single reference method point, as described in Appendix A, § 6.5.6(b)(4).

Sampling at multiple traverse points is usually necessary in a RATA, to ensure that the reference method results are representative of the average pollutant or diluent gas concentration in the flue gas stream and are not biased by any stratification that may exist within the flue. Then, if the CEMS passes the RATA, this confirms that the location of the CEMS sampling probe is appropriate, and that the CEMS will provide data representative of the average flue gas concentration.

The procedure for collecting the required reference method data during a gas RATA is to physically move the sample probe from traverse point to traverse point. The sampling rate is kept constant at each point, and each point is sampled for a set amount of time at each point (usually seven minutes) so that the volume of sample collected from each traverse point is equivalent to the next. The resultant value is a representative average of the pollutant or diluent gas concentration across the stack and is recorded as the run value. Probe movement can be accomplished by having a person manually move the probe during the testing or by using a mechanically automated probe, which is pre-programmed to sample at the specified traverse points sequentially.

Owners and operators have requested that EPA allow the use of multi-hole sampling probes for gas monitor RATAs, in lieu of physically moving the sampling probe as described above. Multi-hole sampling probes may serve to reduce the cost associated with RATA testing as well as to reduce the exposure time of the test personnel to the potentially hazardous conditions that may exist during RATA testing. However, as discussed in detail below, EPA has serious reservations concerning the ability of certain multi-hole probe configurations to provide representative measurements.

B. Types of Multi-hole Probes

EPA is aware of the following configurations of multi-hole sampling probes:

(1) Rake Probe: Multi-hole sampling probe configuration that consists of a single axial pipe serving as the probe, and which has multiple openings along its length through which a sample is drawn. This configuration is designed to sample multiple points simultaneously.

(2) Concurrent Sampling Bundle Probe (CSBP): Multi-hole sampling probe configuration that consists of multiple distinct sampling tubes bundled together into one probe system. Each sampling tube is of a different length to sample at one of the required traverse points. During a test run the sample is drawn through all of the tubes simultaneously and is combined into one composite sample prior to analysis. The gas flow rate through each tube could be monitored to assure that each traverse point is being sampled at an equivalent rate.

(3) Discrete Sampling Bundle Probe (DSBP): Multi-hole sampling probe configuration that consists of multiple distinct sampling tubes bundled together into one probe system. Each sampling tube is of a different length to sample at one of the required traverse points. During a test run, the sample is drawn through each of the distinct sampling tubes, one at a time.

C. Multi-hole Probes (EPA Evaluation)

EPA approves, without petition, the use of discrete sampling bundle probes, as described above, for Part 75 RATA testing. This configuration typically has three or more sampling tubes bound together to form one probe bundle. The sample tube positions are often adjustable in order to be applicable to various stack diameters. In this configuration each sampling tube is sampled individually, as controlled by a valve arrangement, and is analogous to the physical traversing of a stack with a probe. The total sample flow rate can be monitored and controlled at each point during the test to ensure that the volume of sample collected from each traverse point is equivalent to the next.

For sources that wish to use either the rake probe or concurrent sampling bundle probe configurations, the designated representative (or authorized account representative) should submit a petition to the Director of the Clean Air Markets Division (CAMD) under § 75.66. CAMD will then determine whether the petition should be approved. However, note that:

- EPA is not likely to approve the use of rake probes, as described in this policy, for Part 75 RATA testing. The representativeness of the samples taken using a rake probe is dependent on properly balancing the sample flow rates through each hole, so that an equal volume of sample is collected from each point. This balance is affected by the sizing of each hole, overall-sampling rate, and the specific flue gas characteristics of the stack matrix that is to be sampled. Flue gas characteristics that can affect this balance include molecular weight, temperature, pressure, and moisture content. In addition, any change to the diameter of the openings caused by plugging during a test may alter the sampling rate balance, possibly leading to collection of a non-representative sample. Furthermore, to date, EPA is not aware of any quality assurance procedures that could be monitored during the test to ensure that equivalent sample volumes are collected at each traverse point and therefore ensure a representative sample is collected. Without such assurance, EPA does not believe that the rake probe configuration is suitable for Part 75 RATA testing.

- EPA is also unlikely to approve the use of concurrent sampling bundle probes, as described above, for Part 75 RATA testing without quality assurance procedures that could be monitored during the test to ensure that equivalent sample volumes are collected at each traverse point.

Finally, the Agency notes that although approval of a petition to use a rake probe or a concurrent sampling bundle probe for Part 75 RATA testing is unlikely, as indicated above, this guidance does not represent EPA's final determination of whether a particular multi-hole probe configuration is approvable. Any petition that either follows or departs from this guidance will be considered on its own merits.

References: Appendix A, Section 6.5.6

SECTION 9
SPAN, CALIBRATION, AND LINEARITY

Page

9.1 Zero Air Material 9-1

9.2 Daily Calibration Test -- Zero-level Check 9-3

9.3 Calibration Gases 9-3

9.4 Calibration Error Test -- Differential Pressure Flow Monitors 9-4

9.5 Requirements Resulting from Span Changes 9-4

9.6 Rounding Conventions for NO_x and SO_2 Span 9-5

9.7 Reporting Requirements for Calibrations 9-6

9.8 Calibration of Oil Flowmeters 9-6

9.9 Daily Calibration Error Test -- Data Validation 9-7

9.10 Use of Instrument Air for Calibration 9-14

9.11 Monitor Ranges for Units with Low NO_x Burners 9-15

9.12 Appendix D and E Orifice Fuel Flowmeter Calibration 9-16

9.13 Interference Checks and Data Validation 9-17

9.14 Maximum Potential Concentration 9-17

9.15 Linearity Check for Dual Range Analyzer 9-17

9.16 Off-line Calibration Demonstration Test 9-18

9.17 Grace Period Linearity Check 9-18

9.18 Flow-to-load Test Failure -- Data Invalidation Period 9-18

Page

9.19 High Scale Range Exceedances 9-19

9.20 Dual Range Analyzers 9-20

9.21 Default High Range Value 9-22

9.22 Calibration Error Test Following Non-routine Calibration Adjustments 9-23

9.23 Linearity Check Following Span Adjustment 9-24

9.24 Diagnostic Linearity Check 9-25

9.25 Span and Range 9-25

9.26 MPV, MPF, MPC, MEC, Span and Range -- Annual Evaluation 9-26

9.27 Preapproval for Use of Mid-level Calibration Gas 9-27

9.28 Justification for Non-routine Calibration Adjustment 9-28

9.29 Effects of BAF on Full-scale Exceedance Reporting 9-28

9.30 Overscaling -- Adjustment of Span and Range 9-29

9.31 Zero-level gases for O_2 Analyzers 9-30

Question 9.1

Topic: Zero Air Material

Question: What is zero air material?

Answer: Zero air material is a calibration gas that may be used to zero an SO_2, NO_x or CO_2 analyzer. Zero air material has an effective concentration of 0.0% of the span value for the component being zeroed, and is free of certain other interfering gaseous species. Zero air material may be used for calibration error checks in lieu of a "zero-level" EPA Protocol gas (i.e., a gas standard with a concentration > 0.0%, but ≤ 20% of the span value for the gaseous component of interest -- see Question 9.31). According to 40 CFR § 72.2, zero air material includes the following:

(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 one 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 one 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.

Option (1) above describes a gaseous standard that is certified by the vendor not to contain the gaseous components listed (i.e., SO_2, NO_x, THC, CO, and CO_2) at concentrations exceeding the levels specified in the zero air material definition. A cylinder of high purity air meeting this requirement may be used as a universal zero standard for SO_2, NO_x, or CO_2 analyzers (but obviously *not* for O_2 analyzers, since air contains 20.9% oxygen -- see Question 9.2).

Option (2) allows the use of ambient air purified by a CEMS air clean-up system, where the CEM vendor provides a certification statement that the system design (which must include adequate quality assurance and quality control procedures) ensures that the purified ambient air used for the zero-level check will meet the specifications in the zero air material definition. Then, as long as the owner or operator implements the identified QA/QC procedures, purified ambient air may be used as a zero air material for SO_2, NO_x, or CO_2 analyzers.

Option (3) allows purified dilution air from a conditioning system to be used to zero a dilution-extractive type SO_2, NO_x, or CO_2 monitor. This option does not require the same level of certification as Option (1) or (2), since any background concentrations of the component being zeroed (or any potential interfering compounds) are also present during normal emission measurements. This effectively "zeros-out" any background effects. However, the dilution air purification system should be maintained and operated according to the manufacturer's instructions.

Finally, Option (4) allows you to use a multi-component gas mixture as zero air material[1], provided that:

(1) The concentration of the component being zeroed is certified by the vendor not to exceed the level specified in the zero air material definition; and

(2) None of the other components of the mixture is known to interfere with the analysis of the component being zeroed.

To facilitate the implementation of Option (4), you may assume that a multi-component EPA Protocol gas mixture is suitable for use as a zero air material if:

(3) The component being zeroed is not listed as a component of the gas mixture on the vendor's calibration gas certificate; <u>or</u>

(4) The component being zeroed is listed, its concentration does not exceed the level specified in the zero air material definition; <u>and</u>

(5) None of the other components of the mixture is known to interfere with the analysis of the component being zeroed.

[1] Note that for Protocol gas mixtures, the term "zero *air* material" is something of a misnomer. Such mixtures generally consist of pollutant or diluent gaseous species in an inert balance gas, which in some instances is air (<u>e.g.</u>, SO_2 in air), but often is *not* air (<u>e.g.</u>, NO_x in nitrogen).

For example, if you have a NO_x-diluent monitoring system consisting of a NO_x analyzer and a CO_2 analyzer, you may use a NO_x Protocol gas standard consisting of NO_x in nitrogen to zero the CO_2 analyzer, if:

(6) The certificate supplied by the vendor indicates either that CO_2 is not a component of the mixture or that the CO_2 concentration in the mixture is ≤ 400 ppm; and

(7) Neither NO_x nor N_2 is known to interfere with the CO_2 measurements.

References: § 72.2, Question 9.2

Question 9.2

Topic: Daily Calibration Test -- Zero-level Check

Question: Must a zero air material be used to perform the zero check required as part of the daily calibration test under Part 75?

Answer: Qualified no. A utility is only required to use a calibration gas that provides a zero-level *concentration* as specified by 40 CFR Part 75, Appendix A, Sections 5.2.1 and 6.3.1. A zero-level concentration can be anywhere from 0.0% to 20.0% of the span value. Therefore, a zero air material is not required unless the selected zero-level concentration is 0.0% of span. When the selected zero-level concentration is 0.0% of span, a zero air material that meets the definition in § 72.2 must be used (see Question 9.1). Note that under the revised definition, a zero air material may be an EPA Protocol gas mixture that does not contain the component being zeroed. For instance, a Protocol gas containing 200 ppm NO in N_2 could be used to provide a zero-level concentration for an SO_2 pollutant concentration monitor.

References: Appendix A, Sections 5.1.6, 5.2.1, and 6.3.1; Appendix B, Section 2.1.1

Question 9.3

Topic: Calibration Gases

Question: May I use my calibration gas from daily calibration error tests for a quarterly linearity check?

Answer: Yes. The same cylinder of calibration gas used for daily calibration error tests may be used for a quarterly linearity check.

References: Appendix A, Section 6.2; Appendix B, Section 2.2.1

Question 9.4

Topic: Calibration Error Test -- Differential Pressure Flow Monitors

Question: How should differential pressure flow monitors perform the calibration error test (Part 75, Appendix A, Section 2.2.2.1)?

Answer: In part, Appendix A, Section 2.2.2.1 states: "Design and equip each flow monitor to allow for a daily calibration error test consisting of at least two reference values: (1) Zero to 20% of span *or an equivalent reference value (e.g., pressure pulse or electronic signal)* and (2) 50 to 70% of span" (emphasis added). For differential pressure flow monitors, the above quote means that the 7-day and daily calibration error tests may be performed in units of Δ P (e.g., inches of water).

For initial certification or recertification of a differential pressure-type flow monitor, the allowable calibration error (in inches of H_2O) in a 7-day calibration error test is therefore 3.0% of the "calibration span value" (i.e., the Δ P value that is equivalent to the velocity span value (in wet, standard ft/min) from Section 2.1.4 of Appendix A to Part 75). The results are also acceptable if the absolute value of the difference between the flow monitor response and the reference signal value (i.e., $|R - A|$ in Equation A-6) does not exceed 0.01 inches H_2O.

The control limits for daily operation of a differential pressure-type flow monitor are ± 6.0% of the calibration span value (see Section 2.1.4 of Appendix B). The results of a daily calibration error test are also considered acceptable if the absolute value of the difference between the monitor response and the reference signal value does not exceed 0.02 inches H_2O.

References: Appendix A, Sections 2.1.4 and 2.2.2.1

Question 9.5

Topic: Requirements Resulting from Span Changes

Question: If I change the span value for a unit or common stack, how do I notify EPA of the change? What hardware tests should I perform and report for instruments if the span changes and if span changes affect the range of the instrument?

Answer: When you change the span associated with a unit or common stack you must submit a revised monitoring plan in electronic format to EPA Headquarters before submitting the quarterly emissions data for the quarter in which the change is made. Periodic evaluation of the reported emissions data is required (once a year, at a minimum), to ensure that the current span and range values are still appropriate (see Appendix A, Sections 2.1.1.5, 2.1.2.5, 2.1.3.2, and 2.1.4.3). If a span change is necessary, it must be made within 45 days of the end of the quarter in which the need to change the span is identified, except that up to 90 days after the end of the quarter are allowed in cases where the span change requires new calibration gases to be ordered.

Submit the electronic record of each span change to by submitting a revised monitoring plan, for the quarter in which the change is made. Also report any range adjustment associated with the span change. Clearly identify the effective date of the change by closing out the previous <MonitoringSpanData> record by entering the appropriate end date and hour and then adding a new <MonitoringSpanData> record with a new begin date and hour. The calibration gasses used for the daily calibration error tests for a given day and hour must be consistent with the span value listed for that date and hour in the monitoring plan data.

Whenever making a change to the span value, perform a diagnostic linearity check for gas concentration monitors (unless the span change is not great enough to require new calibration gases to be ordered) and perform a calibration error test for flow monitors. Use the data validation procedures in § 75.20(b)(3) for these diagnostic tests.

Some types of modifications to the monitor resulting from span and range adjustments will require full recertification of the CEMS. See Question 12.10.

References: § 75.20(b)(3); Appendix A, Sections 2.1.1.5, 2.1.2.5, 2.1.3.2, and 2.1.4.3

Question 9.6

Topic: Rounding Conventions for NO_x and SO_2 Span

Question: When a particular utility measured its NO_x emissions, the concentration was between 70 ppm and 247 ppm. One hundred twenty five percent of this value (i.e., of 247 ppm) gives a span concentration of 309 ppm. Appendix A would appear to require the span concentration to be rounded up to 400 ppm. However, the monitor range is 375 ppm. May the utility round up the span concentration to the nearest 10 ppm (310 ppm) instead of the nearest hundred ppm for such a low maximum potential concentration (MPC)?

Answer: Yes. The original Part 75 rule had required the span concentration to be rounded upward to the next highest multiple of 100 ppm, to obtain the span value. However, this was based upon the assumption that the MPC would be at least 400 ppm. Because this is not always true, subsequent revisions to Part 75 have clarified that when the span concentration is ≤

500 ppm, rounding upward to the next highest multiple of 10 ppm is acceptable.

References: Appendix A, Sections 2.1.1.3 and 2.1.2.3

Question 9.7

Topic: Reporting Requirements for Calibrations

Question: Must all Calibration Error Test Injections be submitted, if not under what conditions should Calibration Error Test data not be submitted in the quarterly report?

Answer: You must report the data for each calibration error test that affects data validation. Examples of such include failed or aborted calibration error tests where the validation status changes from in-control (IC) to out-of-control (OOC) or passed calibration error tests where the status changes from OOC to IC. Also, at least one successful calibration error tests must be reported every 26 clock hours in order to maintain data validation.

Incomplete calibration error tests (where the calibration sequence was not completed and the injection results for the partial calibration error test are within the applicable performance specification) do not need to be reported as they do not have any effect with regard to data validation. However, aborted tests (incomplete calibration error tests where the result of the first injection does not meet the applicable performance specification), must be reported whenever the data validation at the start of that calibration error test was considered to be IC. The validation status is required to be changed to OOC based upon the result of the aborted test.

When the CEMS data is considered OOC based upon a prior failed or aborted calibration error test, subsequent failed or aborted calibration error tests, (while the CEMS is OOC), need not be reported.

References: § 75.59, § 75.64; Appendix B, Sections 2.1.1 and 2.1.6, Section 2.2 and 2.2.1 of the ECMPS Emissions Reporting Instructions

Question 9.8

Topic: Calibration of Oil Flowmeters

Question: Has EPA approved any alternatives to ASME MFC-9M, "Measurement of Liquid Flow in Closed Conduits by Weighing Method" in calibration of Appendix D oil flowmeters?

Answer: Yes. The original January 11, 1993 version of Appendix D specified only one method, ASME-MFC-9M, by which to calibrate an oil flowmeter.

Since then, EPA has revised Appendix D several times. Included among these revisions has been the incorporation of a number of alternative procedures for oil fuel flowmeter calibration. Specifically, the following alternative procedures have been incorporated by reference into Section 2.1.5.1 of Appendix D, and may be used as applicable to the type of flowmeter being calibrated.

In addition to these regulatory alternatives, EPA has approved an NIST traceable Standing Start Finish weighing method as a specific alternative to ASME MFC-9M, in response to a petition under § 75.66.

References: § 75.66(c); Appendix D, Sections 2.1.5.1

Question 9.9

Topic: Daily Calibration Error Test -- Data Validation

Question: What is EPA's policy on validation of emissions data based on the daily calibration error test?

Answer: The following paragraphs summarize the provisions of Part 75 pertaining to data validation for daily calibration error tests (see Appendix B, Sections 2.1 through 2.1.5) and provide supplementary policy guidance for the implementation of those provisions.

Part 75 Rule Provisions

General Provisions: Daily calibration error tests of each continuous monitor used to report data under Part 75 are required. Additional calibration error tests are required whenever: (1) a calibration error test is failed; (2) a monitor returns to service after corrective maintenance or repair; and (3) following certain allowable calibration adjustments (see Section 2.1.3 of Appendix B).

A passed daily calibration test *prospectively* validates data from a continuous monitor for 26 clock hours (24 hours plus a two hour grace period), unless another calibration test is failed within that period or a maintenance event is conducted within that 26 hour period necessitating the completion of a calibration test to validate data following that event. Therefore, in order to report quality-assured data from a monitor, the data must be obtained within the 26 hour data validation window of a prior, passed daily calibration error test. Once a 26 hour data validation window has expired, data from the monitor are considered invalid until a subsequent calibration error test is passed. The only exception to this general rule is a grace period allowed for startup events (see discussion of grace period, below).

When a daily calibration test is failed, the data from that monitor are prospectively invalidated, beginning with the hour of the test failure and ending when a subsequent daily calibration test is passed.

<u>On-line vs. Off-line Calibration</u>: The basic requirement of Part 75 is that calibration error tests must be done on-line (<u>i.e.</u>, with the unit operating), at typical operating conditions (see Section 2.1.1.1 of Appendix B). However, if a monitor is able to pass an off-line calibration error test demonstration in accordance with Section 2.1.1.2 of Appendix B, then the limited use of off-line calibration error tests for data validation is permitted for that monitor if: (a) an on-line calibration error test has been passed within the previous 26 unit (or stack) operating hours; and (b) the 26 clock hour data validation window for the off-line calibration error test has not expired. If either of these conditions is not met, then the data from the monitor are invalid with respect to the daily calibration error test requirement. Data from the monitor shall remain invalid until the appropriate on-line or off-line calibration error test is successfully completed so that both conditions (a) and (b) are met.

This limited use of offline calibration error tests is particularly useful for those peaking units that are frequently operated for only a few hours at a time.

<u>Startup Grace Period</u>: An eight hour startup grace period may apply when a unit begins to operate after a period of non-operation. To qualify for a startup grace period, there are two requirements:

(1) Following an outage of one or more hours, the unit must be in a startup condition and a startup event must have begun, as evidenced in the <HourlyOperatingData> record by a change in unit operating time from zero in one clock hour to a positive unit operating time in the next clock hour.

(2) For the monitor used to validate data during the grace period, an *on-line* calibration error test of the monitor must have been completed and passed no more than 26 clock hours prior to the unit outage.

If both of the above conditions are met, then a startup grace period of up to eight clock hours is allowed before an on-line calibration error test of the monitor used to validate data during the grace period is required. During the startup grace period, data generated by the CEMS are considered valid. A startup grace period ends when either: (A) an on-line calibration error test of the monitor is completed; or (B) eight *clock* hours have elapsed from the beginning of the startup event, whichever occurs first.

If a unit shuts down during an eight hour grace period, when that unit resumes operations it does *not* qualify for a new eight hour grace period. Hours after resuming operations are considered invalid unless those hours are within the eight *clock* hour window following the initial startup after shutdown for which conditions (1) and (2) above are met.

In certain instances, one or more clock hours within the eight hour window of a start-up grace period may coincide (overlap) with clock hours that are within a 26-hour window associated with a previous on-line calibration error test. In such instances, CEM data validation is governed by whichever window (i.e., the eight hour grace period or the 26-hour calibration window) expires *last*.

Supplementary Policy Guidance

Use the following additional guidelines to implement the calibration error provisions of Part 75:

(1) A valid calibration error test consists of passing both a zero and an upscale calibration performed in sequence within the same clock hour or adjacent clock hours.

   (a) Do not report a partial calibration error test unless the partial test fails to meet the calibration error specification, in which case, treat it as a failed test and report it using the test result code of "Aborted".

   (b) If either the zero or upscale portion of a *completed* calibration error test fails, the monitor is considered to be out-of-control starting with the hour of the earliest failed injection (or calibration signal).

(2) If more than one calibration is reported in a given clock hour, report the calibrations in time order (the order in which the calibrations were conducted).

(3) A *passed* calibration error test may be used to *prospectively* validate data for the hour in which it is performed *only if*, after completion of the test, the minimum data requirements of § 75.10(d)(1) are met for the clock hour (i.e., following the calibration error test, at least one valid data point is obtained in each of two (or more) 15-minute quadrants of the hour).

(4) When a significant change is made to a monitoring system or when a monitor is repaired and additional recertification or diagnostic tests are required to demonstrate that the monitor is back in-control, a passed calibration error test may, in accordance with the provisions of § 75.20(b)(3), be used as a "probationary calibration error test" to initiate a period of "conditionally valid data" (see definitions in § 72.2) until the required recertification or diagnostic tests are completed. [See also similar provisions in § 75.20(d) and Section 2.2.5.3 of Appendix B.]

DETAILED EXAMPLES

The following examples illustrate data validation for *on-line* calibration error tests and the use of a start-up grace period. The examples assume that for the hour in which a calibration error test is passed, sufficient valid data are collected *after* the calibration error test to validate data for that hour. In other words, the hour in which the calibration error test is passed is considered to be the first hour in the 26 clock hour window of data validation associated with the calibration error test.

KEY FOR EXAMPLES:

P -- The monitor passed a particular zero or upscale calibration.

F -- The monitor failed a particular zero or upscale calibration.

Y -- Yes, the monitor passed the calibration error test.

N -- No, the monitor failed the calibration error test.

In examples 1 through 5 below, assume that the unit has been operating for some time, and that on *Day 1* a daily calibration was *passed at 7:00 a.m.*, (validating data from Day 1, Hour 7 through Day 2, Hour 8, and that no calibration error test is failed in that interval).

Example #	Day	Hour	Zero	High	Passed Test?	Data Validation Status
1	Day 2	Hour 7	P	P	Y	**VALID** (C.E. Test Passed) Day 2 Hr 7 thru Day 3 Hr 8
2	Day 2	Hour 7	P	--	--	**VALID** (within 26-hr window)
		Hour 8	--	P	Y	**VALID** (C.E. Test Passed) Day 2 Hr 8 thru Day 3 Hr 9
3	Day 2	Hour 7	F	--	N	**INVALID** (C.E. Test Failed) Report as an "Aborted" Test Invalidate Starting with Hr 7
		Hour 8	P	P	Y	**VALID** (C.E. Test passed) Day 2 Hr 8 thru Day 3 Hr 9
4	Day 2	Hour 7	F	--	N	**INVALID** (C.E. Test Failed) Report as an "Aborted" Test Invalidate Starting with Hr 7
		Hour 8	P	F	N	**INVALID** (C.E. Test Failed) *(Note: This test sequence does not need to be reported since status was OOC at start of the C.E. Test.)*
		Hour 8	--	P	N	**INVALID** (Incomplete C.E. Test) *(Note: Injections must be passed consecutively.)*
5	Day 2	Hour 7	P	--	--	**VALID** (within 26-hr window)
		Hour 8	--	P	Y	**VALID** (C.E. Test Passed) Day 2 Hr 8 thru Day 3 Hr 9
	Day 3	Hour 7	--	--	--	**VALID** (within 26-hr window)
		Hour 8	--	--	--	**VALID**
		Hour 9	--	--	--	**VALID**
		Hour 10	--	--	--	**INVALID** (26-hr window expired)
		Hour 11	--	--	--	**INVALID**
		Hour 12	P	--	--	**INVALID**
		Hour 13	--	P	Y	**VALID** (C.E. Test Passed) Day 3 Hr 13 thru Day 4 Hr 14
	Day 4	Hour 7	F	--	N	**INVALID** (C.E. Test Failed) Report as an "Aborted" Test Invalidate Starting with Hr 7
		Hour 8	P	P	Y	**VALID** (C.E. Test Passed) Day 4 Hr 8 thru Day 5 Hr 9

Assume for Examples 6 through 10, below that the unit has been off-line for several days, that the last on-line calibration error test was passed 18 hours before the hour of unit shutdown, and that the unit begins operation on Day 1 at 1:01 am, during Hour 1. The unit therefore qualifies for a start-up grace period:

Example #	Day	Hour	Zero	High	Passed Test?	Data Validation Status
6	Day 1	Hour 1	--	--	--	**VALID** (start-up grace period)
		Hour 2	--	--	--	**VALID**
		Hour 3	--	--	--	**VALID**
		Hour 4	--	--	--	**VALID**
		Hour 5	--	--	--	**VALID**
		Hour 6	--	--	--	**VALID**
		Hour 7	--	--	--	**VALID**
		Hour 8	P	P	Y	**VALID** (C.E. Test Passed) Day 1 Hr 8 thru Day 2 hr 9
7	Day 1	Hour 1	--	--	--	**VALID** (start-up grace period)
		Hour 2	--	--	--	**VALID**
		Hour 3	--	--	--	**VALID**
		Hour 4	--	--	--	**VALID**
		Hour 5	--	--	--	**VALID**
		Hour 6	--	--	--	**VALID**
		Hour 7	--	--	--	**VALID**
		Hour 8	--	--	--	**VALID**
		Hour 9	--	--	--	**INVALID** (grace period expired)
		Hour 10	P	P	Y	**VALID** (C.E. Test Passed) Day 1 Hr 10 thru Day 2 hr 11
8	Day 1	Hour 1	--	--	--	**VALID** (start-up grace period)
		Hour 2	--	--	--	**VALID**
		Hour 3	--	--	--	**VALID**
		Hour 4	--	--	--	**VALID**
		Hour 5	P	F	N	**INVALID** (C.E. Test Failed)
		Hour 6	F	--	N	**INVALID** (C.E. Test Aborted)
			P	--	--	**INVALID** (C.E. Test not yet completed)
		Hour 7	--	P	Y	**VALID** (C.E. Test Passed) Day 1 Hr 7 thru Day 2 Hr 8

Example #	Day	Hour	Zero	High	Passed Test?	Data Validation Status
9	Day 1	Hour 1	--	--	--	**VALID** (start-up grace period)
		Hour 2	--	--	--	**VALID**
		Hour 3	--	--	--	**VALID**
		Hour 4	--	--	--	**VALID**
		Hour 5	--	--	--	**VALID**
		Hour 6	--	--	--	**VALID**
		Hour 7	--	--	--	**VALID**
		Hour 8	--	--	--	**VALID** (end of grace period)
	Unit shuts down during Day 1 Hour 8, and unit restarts Day 2 Hour 1. On Day 2, the unit does not meet the criteria to receive an additional eight hour start up grace period because the original grace period ended on Day 1, Hour 8 and no valid on-line calibration error test was performed within 26 clock hours of the last hour of unit operation on Day 1.					
	Day 2	Hour 1	--	--	--	**INVALID** (no grace period)
		Hour 2	--	--	--	**INVALID**
		Hour 3	P	P	Y	**VALID** (C.E. Test Passed) Day 2 Hr 3 <u>thru</u> Day 3 Hr 4
10	Day 1	Hour 1	--	--	--	**VALID**[a]
		Hour 2	--	--	--	**VALID**
		Hour 3	Unit Trip (Off-line)[b]			**--**
		Hour 4	--	--	--	**VALID**
		Hour 5	Unit Trip (Off-line)[b]			**--**
		Hour 6	--	--	--	**VALID**[c]
		Hour 7	--	--	--	**VALID**
		Hour 8	--	--	--	**VALID**
		Hour 9	--	--	--	**INVALID**[d]
		Hour 10	P	F	N	**INVALID** (C.E. Test Failed)
		Hour 11	P	P	Y	**VALID** (C.E. Test Passed) Day 1 Hr 11 <u>thru</u> Day 2 Hr 12
	Unit shuts down during Day 1 Hour 11 and restarts Day 2 Hour 3.					

Example #	Day	Hour	Zero	High	Passed Test?	Data Validation Status
10 (cont.)	Day 2	Hour 3	--	--	--	**VALID**[a]
		Hour 4	--	--	--	**VALID**
		Hour 5	--	--	--	**VALID**
		Hour 6	--	--	--	**VALID**
		Hour 7	--	--	--	**VALID**
		Hour 8	--	--	--	**VALID**
		Hour 9	--	--	--	**VALID**
		Hour 10	--	--	--	**VALID**
		Hour 11	--	--	--	**VALID**[d]
		Hour 12	--	--	--	**VALID**
		Hour 13	--	--	--	**INVALID**[e]
		Hour 14	P	P	Y	**VALID** (C.E. Test Passed) Day 2 Hr 14 thru Day 3 Hr 15

[a] Qualifying start-up grace period begins.
[b] Unit operating time in RT 300 = "0."
[c] New start-up "event" begins (Unit operating time in RT 300 = positive). No new grace period (event begins within grace period of a previous event).
[d] Start-up grace period expired. However, on Day 2, the data are valid because the 26 clock hour window from the C.E. test on Day 1, Hour 11 has not expired.
[e] Twenty-six hour calibration window for the C.E. test on Day 1, Hour 11 has expired.

References: Appendix B, Sections 2.1 through 2.1.5

Question 9.10

Topic: Use of Instrument Air for Calibration

Question: May a utility use scrubbed instrument air, with an assumed O_2 concentration of 20.9% O_2, for calibration of an O_2 monitor?

Answer: Yes. However, the O_2 monitor span must be set greater than or equal to 21.0% O_2. Furthermore, the utility must document that the conditioned gas will not contain concentrations of other gases that interfere with instrument O_2 readings (a certification statement from the vendor of the gas scrubbing system or equipment will suffice). Also, in the QA/QC plan for the plant required by Appendix B, include routine maintenance and quality control procedures for ensuring that the instrument air continues to be properly cleaned.

References: § 72.2; Appendix A, Sections 2.1.3 and 5.2.4; Appendix B, Section 1

Question 9.11

Topic: Monitor Ranges for Units with Low NO_x Burners

Question: Are low NO_x burners installed at coal fired power plants considered to be add-on emission control devices? Would utilities with low NO_x burners in use be allowed to remove the high range of 0 – 1,000 ppm?

Answer: Low NO_x burners (LNB) are not considered add-on emission controls. However, as noted in Section 2.1.2.5(a) of Appendix A, installation of a low-NO_x burner is an example of a change that may require a span and range adjustment. To determine whether a new span and range are needed following the installation of a LNB, the owner or operator should examine the subsequent NO_x emission data in light of the guideline in Section 2.1 of Appendix A. Specifically, Section 2.1 states: "select the range such that the majority of the readings obtained during typical unit operation are kept, to the extent practicable, between 20.0 and 80.0 percent of the full scale range of the instrument." If the NO_x concentration readings do not consistently meet this guideline, then the span and range should be adjusted accordingly. If a span adjustment is necessary, base the maximum potential concentration (MPC) used to determine the new span value on the historical CEMS data (720 hours minimum) collected since the installation of the LNB. If the span and range are changed, provide a monitoring plan update according to Section 2.1.2.5 of Appendix A. For daily calibration and linearity tests, calibration gases must be used that are consistent with the new span value.

References: Appendix A, Sections 2.1, 2.1.2.4, and 2.1.2.5

Question 9.12

Topic: Appendix D and E Orifice Fuel Flowmeter Calibration

Question: A utility has an orifice fuel flowmeter system with three transmitters: a differential pressure transmitter; an absolute pressure transmitter; and a temperature transmitter. The absolute pressure and temperature transmitters are used to compensate for actual conditions. The signals from all three transmitters are combined to determine standard cubic feet per minute flow rate in order to determine the accuracy of the system.

Appendix D, Section 2.1.5 requires each fuel flowmeter to meet a flowmeter accuracy of ± 2.0% of the upper range value (URV). The utility finds it is very difficult to calibrate all three transmitters at the same time. The temperature can be as high as 300°F, the absolute pressure is 0 – 350 psig and the differential pressure is usually 0 – 100 inches of water (@3.5 psig).

So, how should the utility calibrate and calculate the accuracy of this fuel flowmeter system?

Answer: Check the calibration for the three transmitters separately. Calibrate each transmitter at the zero level and at least two other levels (e.g., mid and high), so that the full range of transmitter or transducer readings corresponding to normal unit operation is represented. The flowmeter accuracy specification of 2.0% of the URV must be met at each level tested.

If, at a particular level, the accuracy for each transmitter is less than or equal to 1.0% when calculated according to Equation D-1a in Appendix D, then the fuel flowmeter accuracy specification of 2.0% of the URV is considered to be met at that level. At each level tested, report the highest calculated accuracy for any of the transmitters in a <TransmitterTransducerTest> record and keep the results of the tests on the other transmitters on site.

If, at a particular level, the accuracy of one or more of the transmitters is greater than 1.0%, there are two alternative ways to demonstrate compliance with the fuel flowmeter accuracy specification of 2.0% of the URV: (1) If the sum of the calculated accuracies for the three transmitters is less than or equal to 4.0%, the results are considered acceptable; or (2) If the total fuel flowmeter accuracy is ≤ 2.0% when calculated according to Part 1 of American Gas Association Report No. 3, "General Equations and Uncertainty Guidelines," the results are considered acceptable.

If the required fuel flowmeter accuracy specification of 2.0% of the URV is not met at any of the levels tested, follow the applicable procedures in

Section 2.1.6.3 of Appendix D ("Failure of Transducer(s) or Transmitter(s)").

References: Appendix D, Sections 2.1.5 and 2.1.6

Question 9.13

Topic: Interference Checks and Data Validation

Question: Is there a startup grace period for the daily interference checks of a stack flow monitor?

Answer: Yes. Section 2.1.5.2 of Appendix B provides a startup grace period for both daily calibration error tests and for daily flow monitor interference checks.

References: Appendix A, Section 2.2.2.2; Appendix B, Section 2.1.5.2; Question 9.9

Question 9.14

Topic: Maximum Potential Concentration

Question: Can the SO_2 and NO_x maximum potential concentrations be adjusted by tracking the hourly values on a 30 day basis?

Answer: No, do not adjust the maximum potential concentrations each month based upon the concentrations during the last month. The maximum potential concentration (MPC) is considered to be a long term value that will change only if there are significant changes to the fuel being burned or to the manner of unit operation, or if a required annual evaluation of the span and range values or an audit by the regulatory agency shows that an improper span value (and hence an improper MPC value) has been selected.

References: Appendix A, Sections 2.1.1.5, 2.1.2.5, 2.1.3.2, and 2.1.4.3

Question 9.15

Topic: Linearity Check for Dual Range Analyzer

Question: Our unit has a dual range analyzer but we only used the low range this quarter. Must we do a linearity test on the high range of the analyzer even though we didn't use that range?

Answer: Not necessarily. A linearity check is only required on the range used during the quarter. Note however that there is an upper limit of four calendar quarters between linearities at each range, so even if one range was not used at all, a linearity check must be conducted on that range at least once every four quarters (see Appendix B, Section 2.2.3(f)). Also note that for SO_2 and NO_x, Part 75 provides an option for using a default high range value, in lieu of operating, maintaining and calibrating a high monitor range (see Appendix A, Sections 2.1.1.4(f) and 2.1.2.4(e)).

References: Appendix A, Sections 2.1.1.4(f) and 2.1.2.4(e); Appendix B, Section 2.2.3(f)

Question 9.16

Topic: Off-line Calibration Demonstration Test

Question: Is the off-line calibration demonstration a onetime test?

Answer: Yes, unless you are required to repeat the test as the result of an audit or other finding. (See ECMPS Quality Assurance and Certification Reporting Instructions Section 2.7 for the <OnlineOfflineCalibrationData> record.)

References: Appendix B, Section 2.1.1.2

Question 9.17

Topic: Grace Period Linearity Check

Question: If we utilize the grace period to perform a linearity check within the first 168 operating hours of the next quarter, does that grace period linearity check count for both quarters?

Answer: No. Each QA operating quarter has a separate linearity check requirement.

References: Appendix B, Section 2.2.4

Question 9.18

Topic: Flow-to-load Test Failure -- Data Invalidation Period

Question: If we fail a quarterly stack flow-to-load ratio test, what data are invalidated?

Answer: It depends. According to Section 2.2.5(c)(8) of Appendix B, when you fail a flow-to-load ratio or GHR test, you may either declare the flow monitoring system out-of-control, beginning with the first hour of unit operation in the quarter *following* the quarter for which the quarterly stack flow-to-load ratio test failed, or you may perform a probationary calibration error test and declare the flow rate data conditionally valid, pending the results of an investigation and follow-up diagnostic testing. Whichever alternative you choose, Section 2.2.5(c)(8) requires you to implement Option 1 in Section 2.2.5.1 or Option 2 in Section 2.2.5.2, to re-establish a "valid" status for data from the flow monitor. Sections 2.2.5.1 and 2.2.5.2 provide detailed data validation instructions to achieve this.

References: Appendix B, Sections 2.2.5(c)(8), 2.2.5.1, 2.2.5.2, and 2.2.5.3

Question 9.19

Topic: High Scale Range Exceedances

Question: Please clarify how data are to be reported when the full scale range of a monitor is exceeded and the exceedance is not caused by a monitor out-of-control period. Is an instantaneous reading or a one minute average or a 15 minute average above the range considered a full-scale exceedance?

Answer: Exceedances of the high range of a continuous monitor are addressed 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 an exceedance of the high range 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 options are outlined below:

<u>Option 1</u>

(1) Establish the shortest or fundamental averaging period for which data are continuously recorded by the monitor (<u>i.e.</u>, the time "x" required for one complete cycle of analyzing, reading, and data recording, where "x" may be five seconds, ten seconds, or sixty 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 high range of the analyzer then report 200% of the range for that hour and report an MODC of 20 to indicate a full scale range exceedance.

Option 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 five seconds, ten seconds, or sixty 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; or

(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 MODC 20 to indicate that a range exceedance occurred for at least part of the hour.

References: Appendix A, Sections 2.1.1.5, 2.1.2.5, and 2.1.4.3

Question 9.20

Topic: Dual Range Analyzers

Question: For a dual range analyzer defined as two separate components of a single monitoring system, which component ID do we report for an hour in which readings from both ranges are used to record data? How is the hourly average concentration determined?

Answer: For the case described (a dual range analyzer defined as two separate components of the same monitoring system), to calculate the average concentration and to determine which component ID (low scale or high scale) must be reported for an hour in which both ranges are used.

(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 five seconds, ten seconds, or sixty seconds, depending on the type of data collection used in the DAHS/CEMS).

(2) If, during a particular hour, one or more fundamental readings are recorded on the high range, calculate the hourly average as follows:

(a) For all of the quality-assured fundamental readings recorded on the low scale during the hour, use the readings directly in the calculation of the hourly average; and

(b) For the fundamental reading(s) recorded on the high range during the hour:

(i) If the high range is able to provide quality-assured data at the time of the reading (i.e., if the range is up-to-date with respect to its linearity check requirements and has passed a calibration error test within the last 26 clock hours), use the fundamental reading directly in the calculation of the hourly average; or

(ii) If the high range is not quality assured at the time of the reading, substitute the maximum potential concentration (MPC) for the reading and use the substitute value in the calculation of the hourly average (see Appendix A, Sections 2.1.1.5(b)(2) and 2.1.2.5(b)(2)).

(3) If the calculated hourly average from step (2) is less than or equal to the scale transition point, use the low range component ID to report data for the hour.

(4) If the hourly average from step (2) is greater than the scale transition point, use the high range component ID to report data for the hour.

For all dual range monitoring systems, if quality-assured data was available from the high range report the hourly average with an MODC code of "01" (or "02" for backup monitoring systems). However, if the high range was not quality assured, report an MODC of "18" to indicate that the MPC was used to determine the hourly average for the portion of the hour when the high range monitor was used, and use the low range component ID to report for the hour.

Note: The "scale transition point" is recorded in the <MonitoringSpanData> record of the monitoring plan. See the ECMPS Monitoring Plan Reporting Instructions, Section 11.0 for instruction on defining the "scale transition point."

References: Appendix A, Sections 2.1.1.4, 2.1.1.5, 2.1.2.4, 2.1.2.5

Question 9.21

Topic: Default High Range Value

Question: For units with dual span requirements, in lieu of operating and maintaining a high monitor range, Sections 2.1.1.4(f) and 2.1.2.4(e) of Appendix A to Part 75 allow the use of a default high range value of 200% of the MPC when the full-scale of the low range analyzer is exceeded. When the default high range option is selected, how is the hourly average SO_2 or NO_x concentration calculated? What happens when the full-scale of the low range analyzer is exceeded for only part of the hour?

Answer: To implement the default high range provision, you may use either of the following options:

Option 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 five seconds, ten seconds, sixty seconds, or some other time period, 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 full-scale of the low range analyzer, report 200% of the MPC for that hour (see exception in the Note below) and report a method of determination code (MODC) of "19" to indicate the use of the default high range value.

Option 2

(1) Establish the shortest or fundamental averaging period for which data are continuously recorded by the monitor, as described in paragraph (1) of Option 1, above.

(2) Calculate the hourly average pollutant concentration as the arithmetic average of all quality-assured fundamental data values recorded during the hour, in the following manner:

(a) If a fundamental reading is less than the full-scale of the low range analyzer, use the reading directly in the calculation of the hourly average; and

(b) If a fundamental reading indicates that the low range is "pegged" (i.e., the monitor output voltage indicates that the full-scale of the low range has been reached or exceeded), substitute 200% of the

MPC for that reading (see exception in the Note below) and use the substituted value in the calculation of the hourly average.

(3) Report the hourly average calculated in the manner described in step (2) above as the unadjusted pollutant concentration and report an MODC of "19" to indicate that the default high range value was used for at least part of the hour.

Note: For new combustion turbines, the June 12, 2002 revisions to Part 75 disallow the use of a NO_x MPC value of 50 ppm previously selected from Table 2-2 in Appendix A, after March 31, 2003 (see Appendix A, section 2.1.2.1(a), Option 2). After March 31, 2003, the MPC must be re-determined in accordance with section 2.1.2.1(a), and any appropriate span and range adjustments or, if applicable, adjustments to the default high range value, must be made.

References: § 75.57, Table 4A; Appendix A, Sections 2.1.1.4(f), 2.1.2.1(a), 2.1.2.4(e); EDR v2.1/2.2 Reporting Instructions, Sections III.B.(1) and III.B.(2)

Question 9.22

Topic: Calibration Error Test Following Non-routine Calibration Adjustments

Question: Section 2.1.3 of Appendix B to Part 75 requires an "additional" calibration error test to be performed whenever "non-routine" calibration adjustments are made to a monitor. Section 2.2.3 of Appendix B allows non-routine adjustments prior to quarterly linearity checks. Is it necessary to perform the additional calibration error test prior to the linearity test or can this calibration error test be performed immediately after the linearity check?

Answer: You may perform the additional calibration error test after the linearity check rather than prior to the check. However, you must follow the data validation rules in Sections 2.1.3(a) and (c) of Appendix B associated with this calibration error test. Sections 2.1.3(a) and (c) state that following non-routine adjustments, emission data from a monitor are considered to be invalid until an additional "hands-off" calibration error test has been completed and passed, which demonstrates that the monitor is operating within its performance specifications. Therefore, if you perform the additional calibration error test after a linearity check, you must invalidate any emission data collected in the time period beginning with the non-routine adjustment of the monitor and ending at the time of successful completion of the calibration error test. In order to validate the linearity test, the calibration error test must show the monitor to be operating within its performance specification band (± 2.5% of span). If the calibration error test shows that the monitor is not operating within its performance specification, the linearity check is invalidated and must be repeated. In this case, do not report the invalidated linearity check.

References: Appendix B, Sections 2.1.3 and 2.2.3

Question 9.23

Topic: Linearity Check Following Span Adjustment

Question: If a facility changes the span of a gas monitor, is a linearity check required?

Answer: It depends. Sections 2.1.1.5 and 2.1.2.5 of Appendix A to Part 75 require a diagnostic linearity check to be performed following a span adjustment of a gas monitor *only if* the span adjustment is so significant that the calibration gases currently used for daily calibration error tests and linearity checks are unsuitable for use with the new span value. For instance, suppose that the span of a NO_x monitor is 1000 ppm and the "low," "mid," and "high" calibration gases currently in use have concentrations of 250 ppm, 525 ppm, and 825 ppm, respectively. If, following a required annual span and range evaluation, the span is changed to 900 ppm, these calibration gas concentrations, expressed as percentages of the new span value, would be, respectively, 27.8%, 58.3%, and 91.6%. Since the calibration gases are still within the tolerance bands for low, mid, and high-level concentrations (i.e., 20.0 – 30.0% of span for low-level, 50.0 – 60.0% of span for mid-level, and 80.0 – 100.0% of span for high level), a diagnostic linearity check would not be required in this case. However, if the span had been lowered to 800 ppm or less, the current calibration gases would no longer be within the tolerance bands and a diagnostic linearity check would be required.

In cases where a span adjustment is required and the current calibration gases are unsuitable for use with the new span value, the owner or operator has up to 90 days after the end of the quarter in which the need to adjust the span is identified to implement the change (see Sections 2.1.1.5 and 2.1.2.5 of Appendix A). This allows time to purchase and receive the new calibration gases.

References: Appendix A, Section 2.1.1.5 and 2.1.2.5

Question 9.24

Topic: Diagnostic Linearity Check

Question: If, during a "QA operating quarter," a successful diagnostic linearity check is performed following a change to the span of a gas monitor, may this diagnostic linearity check be used to meet the quarterly linearity check requirement of Section 2.2.1 of Appendix B to Part 75?

Answer: Yes. This is consistent with Section 2.4 of Appendix B, which allows quality assurance tests to serve a dual purpose. In the example cited in Section 2.4, a single linearity check is used to meet a recertification requirement and to satisfy the routine quality assurance requirements of Appendix B.

See the ECMPS Quality Assurance and Certification Test Instructions Section 2.3 for more instruction on reporting linearity check data.

References: Appendix B, Sections 2.2.1 and 2.4; ECMPS Quality Assurance and Certification Test Instructions Section 2.3

Question 9.25

Topic: Span and Range

Question: If the maximum potential SO_2 concentration is 2,454 ppm, when multiplied by 1.25 (rounded up to the nearest 100 ppm), equals a span value of 3,100 ppm. In this case if the maximum possible span value of 3,100 ppm is selected, is the source allowed to use a full-scale range value of 3,000 ppm and if so, what value would the gas cylinder concentrations be based on?

Answer: No, the full-scale range of the instrument must be greater than or equal to the selected span value (See, Part 75 Appendix A §2.1.1.3). Thus, using a monitor with a full-scale range of 3,000 ppm (i.e., 100 ppm less than the reported span value) is not acceptable. However, if you desire to set the range of the monitor at 3,000 ppm you could choose to instead report the span as 3,000 ppm which is between 1.00 and 1.25 times the maximum potential SO_2 concentration.

References: Appendix A, Sections 2.1.1.3

Question 9.26

Topic: MPV, MPF, MPC, MEC, Span and Range -- Annual Evaluation

Question: What must I do to comply with the provisions of Sections 2.1.1.5, 2.1.2.5, and 2.1.4.3 of Appendix A to Part 75, which require an annual evaluation of the span and range of my continuous emission monitors? Are there any other times at which span and range evaluations would be required?

Answer: To comply with the annual span and range evaluation provisions of Part 75, you must examine your historical CEMS data at least once per year to see if the current span and range values meet the guideline in Section 2.1 in Appendix A. According to that guideline, the full-scale range of a monitor must be selected so that data recorded during normal operation are kept, to the extent practicable, between 20.0 and 80.0% of full-scale. Section 2.1 also describes several allowable exceptions to the "20-to-80 percent of range" criterion. These guidelines do not apply to: (1) SO_2 readings obtained during the combustion of very low sulfur fuel (as defined in § 72.2); (2) SO_2 or NO_x readings recorded on the high measurement range, for units with SO_2 or NO_x emission controls and two span values, unless the emissions controls are operated seasonally (for example, only during the ozone season); or (3) SO_2 or NO_x readings less than 20.0 percent of full-scale on the low measurement range for a dual span unit, provided that the maximum expected concentration (MEC), low-scale span value, and low-scale range settings have been determined according to Sections 2.1.1.2, 2.1.1.4(a), (b), and (g) of Appendix A (for SO_2), or according to Sections 2.1.2.2, 2.1.2.4(a) and (f) of Appendix A (for NO_x).

The annual evaluation may be done in any quarter of the year. At a minimum, the evaluation consists of examining all measured CEMS data (not substitute data) from the previous four calendar quarters, for each pollutant or parameter (i.e., SO_2 concentration, NO_x concentration, CO_2 concentration, and flow rate). You may also include data recorded in the quarter of the evaluation. For example, if the data analysis is performed in the fourth quarter of the year, the analysis must include all data from the fourth quarter of previous year through the third quarter of the current year, and may (at the discretion of the owner or operator) include additional data from the fourth quarter of the current year.

Determine the percentage of the data that fall between 20.0 and 80.0% of full-scale and the percentage of the data that fall outside this range. The introductory text to Sections 2.1.1.5, 2.1.2.5, and 2.1.4.3 of Appendix A makes it clear that data recorded during short-term, non-representative operating conditions (such as a trial burn of a different fuel) should be excluded from the data analysis. If the majority (> 50%) of the historical data are found to be within the 20.0 to 80.0% band, the current span and range values are acceptable and may continue to be used.

The results of the annual evaluation must be kept on-site, in a format suitable for inspection (see introductory text to Sections 2.1.1.5, 2.1.2.5, and 2.1.4.3 of Appendix A). Do not send these results to EPA.

If, for any pollutant or parameter, the results of the annual evaluation fail to meet the guideline in Section 2.1 of Appendix A, Sections 2.1.1.5(a), 2.1.2.5(a), and 2.1.4.3(a) of Appendix A, then you must adjust (as applicable) the MPV, MPF, MPC, MEC span and range. When adjustments are required, you have up to 45 days after the end of the quarter in which the need to adjust (as applicable) the MPV, MPF, MPC, MEC span and range is identified (in this case, the quarter of the evaluation) to implement the change, with one exception -- for MPV, MPF, MPC, MEC, span and range changes (as applicable) to a gas monitor that require new calibration gases to be purchased because the current calibration gases are unsuitable for use with the new span value, you have up to 90 days after the end of the quarter of the unsatisfactory evaluation to implement the changes (as applicable).

In addition to the annual evaluations, you may also have to conduct evaluations whenever you plan to change the manner of operation of the affected unit(s), such that the emissions or flow rates may change significantly (see Sections 2.1.1.5(a), 2.1.2.5(a), and 2.1.4.3 of Appendix A). For example, installation of emission controls may require certain monitors to be re-spanned and re-ranged. You should plan any MPV, MPF, MPC, MEC, span and range changes needed to account for such changes in unit operation, so that they are made in as timely a manner as practicable to coordinate with the operational changes.

References: Appendix A, Sections 2.1.1.5(a), 2.1.2.5(a), and 2.1.4.3(a)

Question 9.27

Topic: Preapproval for Use of Mid-level Calibration Gas

Question: If we use the provision allowing the use of mid-level calibration gas for daily calibration error tests, do we have to get preapproval from EPA?

Answer: Preapproval is not required.

References: Appendix A, Section 6.3.1

Question 9.28

Topic: Justification for Non-routine Calibration Adjustment

Question: What is an acceptable technical justification for a non-routine calibration adjustment? The rule states that such adjustments may be made prior to a RATA or linearity. May they also be made after any daily calibration?

Answer: Non-routine adjustments are allowed prior to RATAs and linearities because calibration gases are only guaranteed accurate to within two percent of the tag value. For daily calibrations, users of dilution-extractive systems that are very sensitive to ambient conditions, the revised rule allows an adjustment away from the tag value (but still within the performance specification band), when it is justified on technical grounds, such as an anticipated barometric pressure change, and is part of the QA plan for the CEMS. An additional calibration error test must be performed after non-routine adjustments to demonstrate that the analyzer is still operating within its performance specifications.

References: Appendix B, Section 2.1.3(c)

Question 9.29

Topic: Effects of BAF on Full-scale Exceedance Reporting

Question: When full-scale exceedances of a high-scale monitoring range occur, Part 75 requires a value of 200% of the range to be reported. If the full-scale range is exceeded for only part of the hour, Question 9.19 allows the hourly average to be calculated using a combination of real monitored data and the default value of 200% of the range. What happens if an hourly average SO_2 concentration calculated in this manner is multiplied by the bias adjustment factor (BAF), and gives a result greater than 200% of the range (e.g., if data are off-scale for 59 minutes of the hour and on-scale for one minute)? Will EPA's checking software give an error message?

Answer: If the calculated hourly average SO_2 concentration times the BAF gives a result less than or equal to 200% of the range, report this result as the bias-adjusted SO_2 concentration. If the calculated SO_2 concentration times the BAF gives a result higher than 200% of the range, report 200% of the range as the bias-adjusted concentration. This will ensure that no error message is generated.

Note that when a "default high range" SO_2 value of 200% of the MPC is used for exceedances of a low-scale monitor range (as allowed under Section 2.1.1.4 (f) of Appendix A to Part 75), similar considerations apply. If the calculated hourly average SO_2 concentration times the BAF gives a result less than or equal to 200% of the MPC, report this result as the bias-adjusted SO_2 concentration. If the calculated SO_2 concentration times the BAF gives a result higher than 200% of the MPC, report 200% of the MPC as the bias-adjusted concentration (see Question 9.21).

References: Appendix A, Sections 2.1.1.4(f), 2.1.1.5(b)

Question 9.30

Topic: Overscaling -- Adjustment of Span and Range

Question: Sections 2.1.1.5(b), 2.1.2.5(b), and 2.1.4.3(a) in Appendix A to Part 75 say that when "overscaling" occurs (when the full-scale of a "high" SO_2, NO_x, or stack gas flow measurement range is exceeded), you should "make appropriate adjustments (as applicable) to the MPF, MPC, span and range to prevent future full-scale exceedances." If I am using the Method 1 or Method 2 procedure described in Question 9.19 to calculate the hourly averages when overscaling occurs, how much overscaling is allowed before I have to make "appropriate adjustments" to the MPF or MPC and adjust the span and range of the monitor?

Answer: Use the following guidelines:

(1) When the Option 1 procedure described in Question 9.19 is applied, no adjustments to the MPC, span, and range are needed, provided that:

(a) For each operating hour in which overscaling occurs, a value of 200.0% of the range is reported for that hour; and

(b) In a given calendar quarter, overscaling does not occur in more than two percent of the unit operating hours or 20 unit operating hours (whichever is less restrictive).

If overscaling occurs more often than this, re-span and re-range the analyzer.

(2) When the Option 2 procedure described in Question 9.19 is applied:

(a) No adjustments to the MPF, MPC, span, or range are needed, provided that the following conditions are met on a quarterly basis:

(i) For each fundamental averaging period (e.g., minute average) in which emissions are off-scale, a value of 200.0% of the range is used in the hourly average calculation (see exception in the Note below); and

(ii) None of the calculated hourly averages exceed the MPF, MPC, the span value or the full-scale range.

(b) If, in a particular calendar quarter, one or more calculated hourly averages exceed the span and/or the MPF or MPC, but none of them exceeds the full-scale range value, adjust the MPF or MPC to be equal to the highest such hourly average and (if necessary) reset the span. However, do not adjust the full-scale range. If the hourly average is deemed to be invalid due to a technical reason, then adjustments to the span and range should not be made. In such cases, keep onsite records of the technical reason(s) for invalidating the hour and not making the adjustment to span and range. Also include a statement in the comment field of the quarterly emission report regarding the invalidation of such data.

(c) If, in a particular quarter, one or more calculated hourly averages exceed the full-scale range value, re-span and re-range the analyzer or flow monitor if the total number of such hourly averages exceeds two percent of the unit operating hours or 20 unit operating hours (whichever is less restrictive).

(3) If you must re-span or re-range the analyzer or flow monitor, make the changes no later than 45 days after the end of the quarter in which the need to re-span or re-range is identified or 90 days after the end of that quarter, if the calibration gases currently being used for daily calibration checks and linearity tests are unsuitable for use with the new span value (see Appendix A, Sections 2.1.1.5 and 2.1.2.5).

References: Appendix A, Sections 2.1.1.5, 2.1.2.5, 2.1.4.3, and Table 2-2

Question 9.31

Topic: Zero-level gases for O_2 Analyzers

Question: Question 9.1 describes "zero air material," which may be used in lieu of a zero-level EPA Protocol gas for daily calibrations of SO_2, NO_x and CO_2 monitors. However, "zero air material" is not appropriate for the zero-level calibration of an O_2 analyzer. What types of zero material(s) may be used to calibrate an O_2 analyzer?

Answer: The following calibration materials may be used to zero an O_2 analyzer:

(1) A "zero-level" EPA Protocol gas, consisting of O_2 (at a concentration > 0.0% but ≤ 20.0% of the span value) in nitrogen; or

(2) High-purity nitrogen, certified by the vendor to contain[1]:

- Concentrations of SO_2, NO_x, or total hydrocarbons ≤ 0.1 parts per million (ppm);
- A CO concentration ≤ 1 ppm;
- A CO_2 concentration ≤ 400 ppm; and
- An O_2 concentration < 500 ppm (0.05% O_2); or

(3) An EPA protocol gas cylinder containing NO_x in oxygen-free nitrogen. Note that the "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards" requires that nitrogen oxide standards be blended only with oxygen-free nitrogen containing < 0.5 ppm of oxygen; or

(4) Any other EPA Protocol gas mixture for which O_2 is either not listed as a component of the mixture on the vendor's certificate of analysis or, if listed, has a concentration < 500 ppm (0.05% O_2); and nitrogen, with a certified purity of 99.95% or better is used as the balance gas.

References: § 72.2; Question 9.1; "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards" (EPA-600/R-97/121; Research Triangle Park, NC; September, 1997)

[1] The specified maximum SO_2, NO_x, CO_2, THC and CO concentrations are the same as for "zero air material" under § 72.2.

[This page intentionally left blank.]

SECTION 10
OTHER QA/QC REQUIREMENTS

Page

10.1 QA/QC Plan 10-1

10.2 QA/QC Plan 10-1

10.3 Flow Temperature QA 10-1

10.4 Hands-off Requirement for QA Testing 10-2

10.5 QA Plan Format 10-2

[This page intentionally left blank.]

Question 10.1

Topic: QA/QC Plan

Question: What are the specific requirements for content of a QA/QC Plan?

Answer: The minimum requirements for a Quality Assurance/Quality Control (QA/QC) Plan are specified in Section 1 of Appendix B to 40 CFR Part 75.

References: Appendix B, Section 1

Question 10.2

Topic: QA/QC Plan

Question: Must the QA/QC plan be submitted to EPA?

Answer: Part 75 does not require that the QA/QC plan be submitted to EPA. Rather, the intent of the rule is that the QA/QC plan be maintained at the applicable plant site and that the Plan be updated as necessary.

References: § 75.57(a)(4)

Question 10.3

Topic: Flow Temperature QA

Question: How should we quality-assure temperature monitoring devices used by a flow monitor to determine temperature corrections?

Answer: The accuracy of measurements made with such devices is determined through periodic (semiannual or annual) relative accuracy test audits of the flow monitor and the quarterly flow-to-load ratio evaluations. Also, any QA/QC procedures specified by the manufacturer for the temperature measurement devices should be followed.

References: Appendix A, Sections 3, 6.5, and 7.2; Appendix B, Section 2.2.5

Question 10.4

Topic: Hands-off Requirement for QA Testing

Question: Please clarify what is meant by performing a QA test hands-off.

Answer: For daily calibration error tests, hands-off means that the zero and upscale calibrations are performed in succession, with no adjustments to the monitor. For linearity tests and RATAs, the hands-off requirement means that only *routine* calibration adjustments (as defined in Appendix B, Section 2.1.3) are allowed during the test. For example, if the linearity test for a peaking unit extends over more than one day and a routine daily calibration error test is performed before completing the linearity check, the monitor may be adjusted after the daily calibration error test, but only in a routine manner (i.e., so as to match (to the extent practicable) the calibration gas tag value). For flow RATAs, hands-off also means that the polynomial coefficients or K factor(s) must not be changed, either during the test at a particular load level or in-between load levels. The rule requires a 3-load flow RATA if the polynomials or K-factor(s) are adjusted.

References: Appendix B, Section 2.1.3

Question 10.5

Topic: QA Plan Format

Question: Does our QA Plan need to have a standard format? We refer to other documents, such as manuals provided by vendors, but the information in these documents is not included in the QA Plan. Do we need to retype/reword the information in the manual and include it in the QA Plan?

Answer: No standard format is required and it is not necessary to retype the information from the other manuals. The QA Plan reference the other documents these documents should be available on site. If it is in electronic format, it must be capable of being printed out at the time of inspection.

References: Appendix B, Section 1

SECTION 11
CERTIFICATION: ADMINISTRATIVE/PROCEDURAL

Page

11.1 Monitoring Plan 11-1

11.2 Pre-certification Requirements 11-1

11.3 Certification Applications 11-1

11.4 Timing of Tests 11-2

11.5 Certification Testing 11-2

11.6 Certification Application -- Paper Documentation 11-3

11.7 Certification Test Notification 11-3

11.8 Construction of a New Stack, Flue, SO_2 Scrubber, or Add-on NO_x Control -- Certification Timeline 11-4

11.9 Certification of Excepted Methods 11-4

11.10 7-day Calibration Error Test 11-5

11.11 Fuel Flowmeter Calibration Methods 11-6

11.12 Fuel Flowmeters -- Accuracy Information 11-6

11.13 Electronic Submittal of Part 75 Monitoring Plan and Certification/Recertification Test Results 11-7

[This page intentionally left blank.]

Question 11.1

Topic: Monitoring Plan

Question: When we prepared the initial monitoring plan, we did not know all of the details of the monitoring plan such as the monitor serial numbers. What do we report in the initial monitoring plan submittal?

Answer: Since the initial monitoring plan is submitted prior to the certification tests, the plan should reflect the information that is known prior to the monitoring plan submission. However, additional details should be filled in and submitted when they become available. And, if there should be a change in any of the assumptions used to determine the details of the monitoring plan prior to the testing, the owner or operator is required under § 75.53(b) to update the monitoring plan accordingly.

References: § 75.53

Question 11.2

Topic: Pre-certification Requirements

Question: Is there a required minimum run time ("conditioning period") for a Part 75 CEM system before initiating the required certification tests?

Answer: No minimum run time for the CEMS is required prior to initial certification. However, note that for gas monitoring systems, a period of sample line conditioning is advisable, to ensure that the RATA will be passed. You should prepare the monitoring system for testing according to the manufacturer's instructions and recommendations.

References: § 75.4, § 75.20(c)

Question 11.3

Topic: Certification Applications

Question: May a utility submit certification applications separately for different CEM systems (e.g., SO_2 and NO_x) at one unit? If the utility unit submits one certification application, will EPA issue partial approvals?

Answer: Yes. The utility may choose to conduct certification activities separately. The utility would have to give proper (21-day) advance notice for each battery of tests, and would have 45 days after completion of each series of tests to submit the results. The 120-day review time would apply individually to each submission.

EPA may also issue separate certification approvals in some cases where a utility submits one certification application for all the monitoring systems at one unit. For example, if EPA determines that all but one of the monitoring systems passed the certification requirements, then EPA would issue a disapproval only for the monitoring system (e.g., the SO_2 system) which failed, and would issue a certification approval for the rest (e.g., the NO_x-diluent system, flow monitor, CO_2 monitoring system, and opacity monitoring system).

References: § 75.20; Appendix A, Section 6.5

Question 11.4

Topic: Timing of Tests

Question: Must the 7-day calibration error test and the linearity test be conducted at the same time as the RATA?

Answer: No. In fact, EPA recommends that utility sources complete the required certification tests in the following order: the DAHS verification tests, the cycle/response time test, the linearity check, the 7-day calibration error test, and the RATA tests.

References: Appendix A, Section 6.1

Question 11.5

Topic: Certification Testing

Question: If a company has personnel on staff with stack testing expertise, is it permissible for the company to conduct their own CEMS certification tests, rather than hiring an outside testing firm?

Answer: Yes. Section 75.20(c) requires that the owner or operator conduct certification tests; the owner or operator may use either company personnel or hired personnel from an outside testing firm to conduct these tests.

References: § 75.20(c)

Question 11.6

Topic: Certification Application -- Paper Documentation

Question: It is easy to generate certification test results within a week or so in electronic format, but paper often takes much longer. Is there flexibility in the requirement for submission of the certification application 45 days after testing (especially for the extra paper copies)?

Answer: No. A complete application is due within 45 days. A unit will be out of compliance if it does not submit a complete application within 45 days. However, if a utility finds it cannot submit a complete application, then it would be prudent to submit the electronic data within the 45 day period and the hard copy information shortly thereafter. Note that EPA's 120 day review period will not begin until all paper documentation is received, thus completing the certification application. For recertification applications, the EPA Regional Office (and the applicable state and/or local agency) may waive the requirement to receive the hardcopy portion of the application. For both certification and recertification applications, the designated representative does not have to submit a hardcopy portion of the application to EPA Headquarters.

References: § 75.59, § 75.63

Question 11.7

Topic: Certification Test Notification

Question: From what date do we count back to determine the date of the certification testing notification? Is it based upon the date of the RATA?

Answer: Section 75.61 (a) requires that notification of testing be given twenty-one (21) days prior to the first day upon which the first certification test is begun. As a general rule, it is the date of the *first* test that matters, not the date of one particular test such as the RATA or 7-day calibration error test. However, if the regulatory agency is interested only in the date of the RATA (for purposes of observing the test), then, by mutual agreement between the Agency and the affected facility, the 21-day advance notification may be reckoned from the scheduled date of the RATA.

References: § 75.61(a)

Question 11.8

Topic: Construction of a New Stack, Flue, SO_2 Scrubber, or Add-on NO_x Control -- Certification Timeline

Question: How much time following a CEMS installation at a new stack, flue, SO_2 scrubber, or add-on NO_x control device do we have to certify the operation of the CEMS?

Answer: In accordance with the provisions of § 75.4(e), all certification testing of the CEMS installed at the new location must be complete within "90 unit operating days or 180 calendar days (whichever occurs first) after the date that the emissions first exit to the atmosphere through the new stack, flue, flue gas desulfurization system or add-on NO_x emission controls . . ." See Questions 15.4, 15.5, and 15.7 for further guidance on the installation of new stacks and control devices.

References: § 75.4(e)

Question 11.9

Topic: Certification of Excepted Methods

Question: How does the certification process work for the approved exceptions to CEMS in Appendices D and E of Part 75)?

Answer: The certification process for units using the "excepted" Appendix D and E methodologies is much the same as the CEMS certification process.

- The designated representative submits an initial *monitoring plan* at least 21 days prior to the date on which certification testing is scheduled to begin. That is:

  -- $\geq$ 21 days before the scheduled date of the Appendix E NO_x emission test (if the unit is using both Appendices D and E); or

  -- $\geq$ 21 days before the scheduled start date of the CEMS certification testing (if the unit uses Appendix D to measure heat input and uses CEMS for NO_x).

  The monitoring plan consists of two pieces -- electronic and hard copy. The electronic piece is sent to CAMD, via the ECMPS Client Tool. The hard copy piece goes to the state and to the EPA Regional Office. The essential elements of the monitoring plan are found in § 75.53(g) for the NO_x CEMS (if applicable) and in § 75.53(h) for Appendices D and E.

The designated representative also submits a *certification testing notification* to EPA and the state or local agency at least 21 days prior to the commencement of certification testing. Note that for Appendix D fuel flow meter calibrations, this notification is not required.

- Upon successful completion of all required certification tests, the Appendix D and E methodologies and (if applicable) NO_x CEMS are considered to be *provisionally certified*. At this point, the monitoring plan needs to be updated if there have been any changes from the initial submittal.

The designated representative must submit a *certification application* within 45 days after completing certification testing. This certification application includes the results of the Appendix D fuel flowmeter accuracy testing, the NO_x CEMS certification tests (if applicable), and (for Appendix E units only) the results of the required NO_x emission test(s). The certification application consists of an electronic piece, which is sent to CAMD via the ECMPS Client Tool, and a hard copy piece, which goes only to the state and EPA Regional offices.

- A *120 day period* is allotted for review of the certification application. The 120 day period starts upon Agency receipt of a complete certification application.

References: § 75.20(g), §§ 75.53(g) and (h), § 75.63, Appendices D and E

Question 11.10

Topic: 7-day Calibration Error Test

Question: Must a unit operate continuously for all 168 hours of the 7-day calibration error test during certification?

Answer: No. According to Section 6.1 of Appendix A, units must be operating when measurements are made. The same section of Appendix A of Part 75 specifies that units may be tested on non-consecutive calendar days (but the certification test must be performed on seven consecutive unit operating days). This allows certification testing of CEMS on peaking and intermediate load units at actual stack conditions and at conditions similar to those that will be encountered later after certification.

When a unit has been shutdown, the monitor readings may drift. In order to improve monitor accuracy when the unit is again operating and to allow the monitor to pass the 7-day calibration error test, it is permissible to check the calibration of the instrument and adjust it while the unit is still shutdown. Calibration tests during shutdown periods are not to be reported as part of the 7-day calibration error test data. When a unit comes back on-line after an outage, it is recommended that the 7-day calibration error test not be resumed until the unit operation has stabilized. This allows the monitor to measure while its probe is exposed to normal flue gas moisture and temperature conditions.

References: Appendix A, Section 6.1

Question 11.11

Topic: Fuel Flowmeter Calibration Methods

Question: Has EPA approved any calibration methods for fuel flowmeters besides the standards listed in Section 2.1.5.1 of Appendix D?

Answer: Yes. To obtain permission to use other methods, designated representatives should combine the information required for a petition under § 75.23 and § 75.66(c) with the monitoring plan and certification application. The Agency will then review the petition as part of the certification application.

References: § 75.20(g)(1)(i), § 75.23, § 75.66; Appendix D, Section 2.1.5.1

Question 11.12

Topic: Fuel Flowmeters -- Accuracy Information

Question: What information must I submit with my certification or recertification application to demonstrate accuracy of a fuel flowmeter?

Answer: Submit data and calculations to demonstrate that the fuel flowmeter meets an accuracy of 2.0% of the upper range value. When calibration is done using one of the allowable methods in Section 2.1.5.1 or by comparison against a reference flowmeter, as described in Section 2.1.5.2 of Appendix D, include:

(1) Range of the instrument at which calibration was conducted (usually expressed as a percentage of the upper range value). Data should include the full scale value and at least two other values.

(2) The upper range value -- URV (full scale).

(3) Readings from the flowmeter being tested (in lbs/min, scfh, or other appropriate units).

(4) Readings for the reference device (same units as the flowmeter).

(5) Error or accuracy calculations, as a percentage of URV.If possible, present data in a table, such as Table D-1 in Appendix D to Part 75.

When using a NIST traceable procedure, include certificates to show that equipment currently meets NIST standards.

For orifice, nozzle, and venturi-type flowmeters, you may certify by design. If you select this option, provide a certificate from the vendor showing that the fuel flowmeter meets the requirements of AGA Report No. 3. Also provide calibration data to indicate that the pressure, temperature, and differential pressure transmitters/transducers meet the 2.0% flowmeter accuracy requirement (see Section 2.1.6.1 of Appendix D). Provide this information with the certification or recertification application.

References: § 75.59(b), § 75.63; Appendix D, Section 2.1.6.1 and Table D-1

Question 11.13

Topic: Electronic Submittal of Part 75 Monitoring Plan and Certification/Recertification Test Results

Question: Part 75 specifies in various places that the electronic portions of monitoring plans and certification and recertification applications are to be sent to the Administrator. Please explain EPA's administrative process for receiving these electronic submittals.

Answer: EPA has posted the most current process for receiving electronic monitoring plan updates and the results of certification and recertification tests on the CAMD website under the topic of Part 75 Administrative Processes.

http://www.epa.gov/airmarkets/emissions/process.html.

References:

[This page intentionally left blank.]

SECTION 12
RECERTIFICATION

Page

12.1 Recertification with Backup Monitors 12-1

12.2 Monitoring Plan Requirements for Component/System Replacements 12-1

12.3 Monitoring Plan Requirements for DAHS Changes.............................. 12-1

12.4 Notification Requirements for Recertification Events........................... 12-2

12.5 Diagnostic and Recertification Tests for Flow Monitor Component Replacements 12-3

12.6 Flow Monitor Multiple Point Sensor Replacement 12-4

12.7 Reporting of Flow Monitoring Diagnostic Tests 12-4

12.8 Flow Monitoring Diagnostic Tests -- Reporting Conditionally Validated Data 12-5

12.9 Appendix E Retesting 12-5

12.10 Recertification and Diagnostic Testing.. 12-6

[This page intentionally left blank.]

Question 12.1

Topic: Recertification with Backup Monitors

Question: Can we use a certified backup monitor to recertify our primary monitor?

Answer: No unless certain conditions are met. A certified backup pollutant concentration or diluent monitor could be used to do the RATA test for recertification, provided that the certified backup monitor is used as an instrumental reference method (Methods 6C, 7E, 3A).

References: 40 CFR Part 60, Appendix A

Question 12.2

Topic: Monitoring Plan Requirements for Component/System Replacements

Question: If I replace the analyzer for an SO_2 or NO_x system, what are the requirements for assigning new component IDs or system IDs?

Answer: Whenever a new analyzer is brought into service at a monitoring location it must be assigned a new unique component ID. If an existing analyzer is removed and is later returned to service at the same monitoring location, in that case the original component ID should continue to be used.

System ID's do not need to be changed unless there is going to be overlap where the existing system will continue to be used to monitor and report data while a new system of monitoring components is being certified.

References: § 75.53, § 75.61, § 75.20 (b)(3)

Question 12.3

Topic: Monitoring Plan Requirements for DAHS Changes

Question: What are the requirements for assigning new system and component IDs for DAHS version upgrades and DAHS vendor or platform changes?

Answer: For minor DAHS upgrades (such as vendor patches) it is not necessary to change any monitoring system or component IDs. However, for DAHS vendor or platform changes you must close out the old DAHS component by adding and End date and hour to the existing <MonitoringSystemComponetData> records linking the old DAHS component to each monitoring system and then create a new <MonitoringSystemComponetData> record for each system pointing to the new DAHS component. You must use a new unique component ID that has never been used to define any other component at that monitoring location.

References: § 75.20, § 75.61

Question 12.4

Topic: Notification Requirements for Recertification Events

Question: Should a utility notify the state and EPA Regional Office of a recertification event? How much advance notice is required?

Answer: Yes, generally speaking, utilities must notify the state and EPA Regional Office of a recertification event. However, for partial recertifications, where less than a full battery of recertification tests is required, the state or Region (or both) may, in accordance with § 75.61(a)(1)(iv), issue a waiver from the notification requirement of § 75.61 (a)(1)(ii).

For recertifications, the notification requirements are as follows:

- For *full* recertifications (where a complete battery of recertification tests is required), § 75.61(a)(1)(i) states that the source must provide notification of testing at least 21 days prior to the first scheduled day of testing. Notification may be provided either in writing, by telephone, or by email. In cases of emergency, § 75.61(a)(1)(i) also provides that "in emergency situations when full recertification testing is required following an uncontrollable failure of equipment that results in lost data, notice shall be sufficient if provided within two business days following the date when testing is scheduled."

- For *partial* recertifications (where less than a full battery of recertification tests is required), § 75.61(a)(1)(ii) states that the source must notify the EPA Regional Office and the State Office in writing, by telephone, or by email at least seven days prior to the first scheduled day of testing. For emergency situations, § 75.61(a)(1)(ii) has the same notification provision as § 75.61(a)(1)(i).

Note that state and local environmental agencies may have notification requirements that differ from those in § 75.61(a), with which the utility must also comply.

References: § 75.20(b)(2), § 75.61(a)(1)(i), (ii) and (iv)

Question 12.5

Topic: Diagnostic and Recertification Tests for Flow Monitor Component Replacements

Question: What tests are required when a major component of a flow monitoring system is replaced?

Answer: A major component of a flow monitoring system is any part of the system that is involved in the direct sensing of the flow velocity or in calculating the total volumetric flow rate. Examples of major flow components include sensors, pitot tubes, transducers, thermal bridges, and microprocessors. Non-major components include power supplies, blower motors and other inactive components not involved in the direct sensing of flow or in the subsequent calculations.

When a major component of a flow monitoring system is replaced, the component replacement may significantly affect the monitor's ability to accurately measure flow rate, and recertification may be required in accordance with § 75.20(b) -- see also Question 12.10 below. For this reason, EPA recommends that, to the extent practicable, replacement of major flow system components be done at the time of scheduled semiannual or annual quality assurance RATAs, so that if recertification is necessary, a single RATA may be done for a dual purpose, i.e., to satisfy both the recertification and routine QA requirements.

When a major component is replaced, the owner or operator may either perform recertification testing of the flow monitor or may, instead, perform an abbreviated flow-to-load ratio diagnostic test, as described in Section 2.2.5.3 in Appendix B to Part 75. If the flow-to-load diagnostic test is passed, no further testing of the flow monitor is required. However, if the test is failed, RATA testing is required, in accordance with Section 2.2.5.3 (c).

When the abbreviated flow-to-load ratio diagnostic test is performed, operation at normal load is preferred. However, if normal load is unattainable at the time of the component replacement, the diagnostic may be performed at another load. If this becomes necessary, then the appropriate pre-replacement RATA information (mean reference method flow rate, load and, if necessary, % CO_2) must be obtained for that load level in order to perform the diagnostic test properly.

References: § 75.20(b)(1); Appendix B, Section 2.2.5.3

Question 12.6

Topic: Flow Monitor Multiple Point Sensor Replacement

Question: Suppose that a utility has a thermal or differential pressure-type flow monitor with multiple point sensors, and one of the sensors must be replaced. May the abbreviated flow-to-load ratio diagnostic test described in Question 12.3 be used to validate data from the flow monitoring system in the period extending from the removal of the bad sensor until a new sensor can be installed? After the new sensor is installed, does the diagnostic test have to be repeated?

Answer: If, following the removal of the bad sensor, a probationary calibration error test of the monitoring system is passed and the abbreviated flow-to-load ratio diagnostic test is performed and passed, then data from the flow monitor may be considered valid from the hour of the probationary calibration error test until the new sensor is installed. However, both the probationary calibration error test and the diagnostic test must be repeated following the sensor replacement, to verify that the new component is working and has not significantly affected the monitoring system's ability to accurately measure flow rate. If the post-replacement diagnostic test is failed, the flow monitor is considered to be out-of-control. Data from the monitoring system are invalidated back to the hour of the post-replacement calibration error test and a single-load or three-load RATA (as applicable) must be passed to bring the monitor back in-control (see Section 2.2.5.3(c) in Appendix B). Optionally, the utility may elect to conduct a two-load QA RATA in lieu of the single-load diagnostic RATA, and may use this RATA as the annual or semi-annual QA RATA. Data validation for the RATA shall be done in accordance with Section 2.3.2 of Appendix B. The RATA is considered to be a recertification unless the only change to the monitor required to bring it back into control is adjustment of the polynomial coefficients or K factor(s) (see § 75.20(b)).

References: § 75.20(b), (b)(1), and (b)(3); Appendix B, Sections 2.2.5.3 and 2.3.2

Question 12.7

Topic: Reporting of Flow Monitoring Diagnostic Tests

Question: When the flow-to-load ratio diagnostic test described in Question 12.3 is performed, what information, if any, must be reported to EPA, and what information can be kept on-site?

Answer: When a major flow monitoring system component is replaced and the diagnostic test described in Question 12.3 is performed, a <QACertificationEventData> record must be reported to EPA in the electronic emissions report for the quarter in which the diagnostic test is completed. For flow monitoring systems with multiple point sensors, if the diagnostic test is done twice (i.e., after removal of the bad sensor and after installation of the new sensor), submit a separate <QACertificationEventData> record for each test.

A record of each major flow component replacement must be kept on site in the maintenance log for the flow monitoring system, indicating the date and time of the replacement and the component replaced. The calculated results of the diagnostic test do not have to be reported to EPA but must be kept on site, suitable for inspection.

References: § 75.20(b)(1); Appendix B, Sections 1.1.3 and 2.2.5.3; EDR v2.1/2.2 Reporting Instructions

Question 12.8

Topic: Flow Monitoring Diagnostic Tests -- Reporting Conditionally Validated Data

Question: If the flow-to-load ratio diagnostic test described in Question 12.3 has not been completed by the reporting deadline for the quarter in which the change occurred, how should the period of conditional data be reported in the quarterly report?

Answer: If the diagnostic procedure described in Question 12.3, has not been completed by the time the quarterly report is generated for submission to the Agency, then the utility should submit a <QACertificationEventData> record defining the event that required the diagnostic test, the event Date and Hour, the date and hour that conditional data validation began as a result of completing the required probationary calibration. Leave the <CompletionTestDate> and <CompletionTestHour> fields blank and submit this record at the time of the quarterly report. Once the tests have been completed, you may resubmit the record by adding the appropriate dates in which the testing was completed and also submit the required test data.

References: § 75.20(b)(1), § 75.20(b)(3)(ix); EDR v2.1/2.2 Reporting Instructions

Question 12.9

Topic: Appendix E Retesting

Question: Appendix E testing must be re-done once every five years (20 calendar quarters). Is this considered a recertification?

Answer: No. This is a standard QA test and is not considered a recertification. As specified in § 75.61(a)(5), the appropriate EPA and state agency offices must be notified at least 21 days in advance of scheduled Appendix E re-testing.

References: Appendix E, Section 2.2, § 75.61(a)(5)

Question 12.10

Topic: Recertification and Diagnostic testing

Background: According to § 75.20(b), "whenever the owner or operator makes a replacement, modification, or change in the certified continuous emission monitoring system or continuous opacity monitoring system that may significantly affect the ability of the system to accurately measure or record the SO_2 or CO_2 concentration, stack gas volumetric flow rate, NO_x emission rate, percent moisture, or opacity, or to meet the requirements of § 75.21 or Appendix B to this part, the owner or operator shall recertify the continuous emission monitoring system or continuous opacity monitoring system according to the procedures in this paragraph."

Section 75.20(b) goes on to give the following examples of events which require recertification: "replacement of the analyzer; change in location or orientation of the sampling probe or site; and complete replacement of an existing continuous emission monitoring system or continuous opacity monitoring system. The owner or operator shall recertify a continuous opacity monitoring system whenever the monitor path length changes or as required by an applicable state or local regulation or permit."

Section 75.20(b)(1) states that "for all recertification testing, the owner or operator shall complete all initial certification tests in paragraph (c) of this section that are applicable to the monitoring system, except as otherwise approved by the Administrator."

Section 75.20(b) also states that "any change to a flow monitor or gas monitor for which a RATA is not necessary shall not be considered a recertification event. In such cases, any other tests that are necessary to ensure continued proper operation of the monitoring system (e.g., three-load flow RATAs following changes to flow monitor polynomial coefficients, linearity checks, calibration error tests, DAHS verifications, etc.) shall be performed as diagnostic tests, rather than as recertification tests."

Question: Can EPA provide guidance on recertification and diagnostic test events and the appropriate quality-assurance tests for each event?

Answer: The following Tables describe various events as either recertification events or diagnostic test events and outline the appropriate tests to be performed for each event. The Tables clarify which types of changes to a monitoring system may "significantly affect the ability of the system to accurately measure or record" emissions or flow rate and therefore require recertification testing and which types of changes require less rigorous diagnostic testing "to ensure continued proper operation of the monitoring system."

The recertification events listed in the Tables include the examples given in § 75.20(b) (i.e., analyzer replacements, complete monitoring system replacements, and changes in probe location). The Tables also identify other events that EPA believes are likely to have the potential to significantly affect the accuracy of the monitoring system and that EPA therefore intends to treat as recertification events in applying § 75.20(b). These events are: (1) changing from in-stack dilution methodology to out-of-stack dilution methodology; and (2) replacement of the critical orifice in a dilution extractive system with an orifice of a different size.

Section 75.20(b)(1) specifies that for recertification, the same battery of tests which was performed for initial certification must be repeated, unless otherwise approved by the Administrator. The Tables reflect EPA's intention to require, for most of the recertification events listed in the Tables, the full battery of certification tests to be repeated. However, note that in a number of instances, EPA intends to exercise its authority under § 75.20 (b)(1) to require less than the full battery of tests.

The diagnostic test events listed in the Tables are the types of component replacements and repairs which are most commonly done on continuous monitoring systems. The Tables reflect EPA's intention to require only certain tests for these events. The diagnostic tests listed for each event are consistent with case-by-case determinations previously made by EPA and are tests that EPA believes are likely to be necessary to ensure continued proper operation of the monitoring system. To reduce the testing burden, EPA is allowing two simplified diagnostic tests to be performed in lieu of more rigorous tests, in some cases. The simplified diagnostic tests (which are described in greater detail in the Addendum following the Tables) are as follows:

(1) Abbreviated Linearity Check -- This test may be performed in some instances, in lieu of a full linearity check. The test consists of a single sequence of injections of low (20 – 30% of span), mid (50 – 60% of span) and high (80 – 100% of span) calibration gases. The results of the test are acceptable if the linearity error (LE) does not exceed 5.0% of the reference gas tag value (or, alternatively, for low-emitters, if $|R - A|$ does not exceed five ppm), at all three gas levels. If these specifications are not met, a full "hands-off" linearity check must be performed; and

(2) Alternative System Response Check -- This test may be performed in some instances, in lieu of a cycle time test. The test can be done as part of a daily calibration error test, by using a timer (e.g., a

stopwatch) to determine how long it takes for the monitor reading to reach 95% of the upscale calibration gas tag value. The results are acceptable if the 15 minute cycle time specification in Part 75, Appendix A is met.

EPA notes that § 75.63(a)(2) requires, for all recertification events, submission of a recertification application no later than 45 days after completion of the required tests. However, the regulations do not require submittal of a formal application for approval after completion of diagnostic tests.

Sections 75.64(a)(2), 75.65 and 75.63 (a)(2)(iii) require that recertification test results and the results of diagnostic tests be submitted electronically in the appropriate quarterly EDR report. In accordance with § 75.64(d) and with Section 5.0 of the Quality Assurance and Certification Reporting Instructions, a <QACertificationEventData> record is used to identify such events requiring testing and what tests are required. This record also provides information regarding any data that is to be validated using the conditional data validation provisions of § 75.20(b)(3). However, note that a <QACertificationEventData> record is not required for events where the only required tests are daily calibration error checks and/or the simplified diagnostic tests described above.

EPA recognizes that this guidance cannot possibly address every situation that may arise and is not binding for situations that it does address. You may want to contact EPA concerning your specific situation, particularly in cases where:

(3) An event occurs that is not listed in the Tables, and you do not know which (if any) tests are required; or

(4) An event occurs which is listed in the Tables, but for which you believe, based on sound engineering judgment or other technical considerations, that the tests listed in the Tables may be inappropriate or unnecessary.

Note: EPA has not included a table for opacity monitors in this policy guidance. The proper recertification and diagnostic tests for a continuous opacity monitoring system (COMS) are the tests required by Performance Specification 1 (PS-1) in Appendix B of 40 CFR, Part 60 and by any other applicable state or Federal regulation(s).

References: § 75.20(b), § 75.21, Appendix B

Recertification and Diagnostic Test Policy for Dry-Extractive CEMS[1]

Description of Event	Event Status[2]	RATA	7 Day Cal Error[3]	Cycle Time Test	Linearity Check	Calibration Error Test[4]	Submit an Event Record	Comments
Permanently replace NO_x, SO_2, O_2 or CO_2 analyzer with like-kind analyzer as defined in Question 7.13	R	X	X		X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. EPA does not require the cycle time test in this case, since the analyzer is like- kind and the rest of the system is the same. Modify the Monitoring Plan as necessary.
Permanently replace NO_x, SO_2, O_2 or CO_2 analyzer with new analyzer which does not qualify as a like-kind analyzer	R	X	X	X	X	X	X	Modify the Monitoring Plan as necessary. The rule indicates that the permanent replacement of an analyzer is a recertification event. Thus, all tests are required.
Replace or repair any of the following components:								EPA will conditionally allow the abbreviated linearity check and the alternative system response check (see footnotes (5) and (6)). For repair or replacement of other major components that are not listed here (<u>e.g.</u>, major components of new monitoring technologies or monitoring technology not addressed in this policy), contact EPA for a case-by case ruling.
Photomultiplier	D				(5)	X	A	
Lamp	D				(5)	X	A	
Internal analyzer particulate filter	D			(6)		X	A	
Analyzer vacuum pump	D			(6)	(5)	X	A	
Capillary tube	D			(6)	(5)	X	A	
Ozone generator	D				(5)	X	A	
Reaction chamber	D				(5)	X	A	
NO_2 converter	D				(5)	X	A	
Ozonator dryer	D				(5)	X	A	
Sample Cell	D				(5)	X	A	
Optical filters	D				(5)	X	A	
Replace or repair circuit board	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5)).

Recertification and Diagnostic Test Policy for Dry-Extractive CEMS[1]

Description of Event	Event Status[2]	RATA	7 Day Cal Error[3]	Cycle Time Test	Linearity Check	Calibration Error Test[4]	Submit an Event Record	Comments
Replace, repair or perform routine maintenance (as specified in the QA/QC plan) on a minor analyzer component, including, but not limited to:								For repair or replacement of other minor components that are not listed here perform a diagnostic calibration error test.
PMT base	D					X		EPA recommends that each facility develop its own list of major and minor components and document this list within their QA/QC plan. If there is uncertainty whether a component is major or minor, contact EPA for a case-by-case ruling.
O-rings	D					X		
Optical windows	D					X		
High voltage power supply	D					X		
Zero air scrubber	D					X		
Thermistor	D					X		
Reaction chamber heater	D					X		
Photomultiplier cooler	D					X		
Photomultiplier cooler fins	D					X		
DC power supply	D					X		
Valve	D					X		
Display	D					X		
Replace or repair signal wiring in CEMS shelter	D					X		
Replace or repair sample tubing in CEMS shelter	D					X		EPA recommends performing both a pressure and vacuum leak check. The term "sample tubing" includes any sample or calibration tubing, the sample or calibration manifold, and the solenoid valve.
Replace or repair vacuum pump or pressure pump (not the analyzer pumps)	D					X		EPA recommends that a leak check be performed, also.
Replace or repair moisture removal system (chiller)	D					X		EPA recommends performing both a pressure and vacuum leak check.
Replace CEMS probe (same probe length and location)	D					X		EPA recommends performing both a pressure and vacuum leak check.

Recertification and Diagnostic Test Policy for Dry-Extractive CEMS[1]

Description of Event	Event Status[2]	RATA	7 Day Cal Error[3]	Cycle Time Test	Linearity Check	Calibration Error Test[4]	Submit an Event Record	Comments
Change probe length and/or location	R	X		(6)		X	X	The rule indicates that a probe location change is a recertification event. EPA will conditionally allow the alternative system response check to be performed (see footnote (6)).
Routine probe filter maintenance (<u>e.g.</u>, clean or replace coarse filter)	D					X		
Permanently replace umbilical line	D	X		(6)		X	X	EPA recommends performing both a pressure and vacuum leak check. EPA believes that permanently replacing an umbilical line can introduce bias into the system. Therefore, a RATA is necessary. Sources can use conditional data validation to minimize loss of data.
Replace probe heater or sample line heaters	D							
Change from extractive CEMS to in-situ CEMS	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify the Monitoring Plan, as necessary.
Change from extractive CEMS to dilution CEMS	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify the Monitoring Plan, as necessary.

(1) The relevant tests for CEMS are listed in § 75.20 (c)(1).
(2) "R" means a recertification event, and "D" means diagnostic test event.
(3) The 7-day calibration error test is not required for a "regular" non-redundant backup system (§ 75.20(d)(2)(i)).
(4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, Appendix B, Section 2.1.3 (a)). If conditional data validation is used, a probationary calibration error test is required (§ 75.20(b)(3)(ii)).
(5) A full, "hands-off" linearity check is recommended. However, an abbreviated linearity check is conditionally allowed (see Appendix, below). If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. <u>Note</u>: SO_2 and NO_x monitors with span values $\leq$ 30 ppm are exempted from linearity checks.
(6) A full cycle time test is recommended. However, the alternative system response check is conditionally allowed. If the system response check is not passed, perform a full cycle time test.
(X) "X" means that this test is required or that a <QACertificationEventData> record must be reported.
(A) Report a <QACertificationEventData> record only if the full linearity check or cycle time test is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.

Recertification and Diagnostic Test Policy for Dilution-Extractive CEMS[1]

Description of Event	Event Status[2]	RATA	7 Day Cal Error[3]	Cycle Time Test	Linearity Check	Calibration Error Test[4]	Submit an Event Record	Comments
Permanently replace NO_x, SO_2, O_2 or CO_2 analyzer with like-kind analyzer as defined in Question 7.13	R	X	X		X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. EPA does not require the cycle time test in this case, since the analyzer is like- kind and the rest of the system is the same. Modify the Monitoring Plan as necessary.
Permanently replace NO_x, SO_2, O_2 or CO_2 analyzer with new analyzer which does not qualify as a like-kind analyzer	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. Thus, all tests are required. Modify the Monitoring Plan as necessary.
Replace or repair any of the following components:								EPA will conditionally allow the abbreviated linearity check and the alternative system response check (see footnotes (5) and (6)). For repair or replacement of other major components that are not listed here (e.g., major components of new monitoring technologies or monitoring technology not addressed in this policy), contact EPA for a case-by case ruling.
Photomultiplier	D				(5)	X	A	
Lamp	D				(5)	X	A	
Internal analyzer particulate filter	D			(6)		X	A	
Analyzer vacuum pump	D			(6)	(5)	X	A	
Capillary tube	D			(6)	(5)	X	A	
Ozone generator	D				(5)	X	A	
Reaction chamber	D				(5)	X	A	
NO_2 converter	D				(5)	X	A	
Ozonator dryer	D				(5)	X	A	
Sample Cell	D				(5)	X	A	
Optical filters	D				(5)	X	A	
Replace or repair circuit board	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5)).

Recertification and Diagnostic Test Policy for Dilution-Extractive CEMS[1]

Description of Event	Event Status[2]	RATA	7 Day Cal Error[3]	Cycle Time Test	Linearity Check	Calibration Error Test[4]	Submit an Event Record	Comments
Replace, repair or perform routine maintenance (as specified in the QA/QC plan) on a minor analyzer component, including, but not limited to:								For repair or replacement of other minor components that are not listed here perform a diagnostic calibration error test.
PMT base	D					X		EPA recommends that each facility develop its own list of major and minor components and document this list within their QA/QC plan. If there is uncertainty whether a component is major or minor, contact EPA for a case-by-case ruling.
O-rings	D					X		
Optical windows	D					X		
High voltage power supply	D					X		
Zero air scrubber	D					X		
Thermistor	D					X		
Reaction chamber heater	D					X		
Photomultiplier cooler	D					X		
Photomultiplier cooler fins	D					X		
DC power supply	D					X		
Valve	D					X		
Display	D					X		
Replace or repair signal wiring in CEMS shelter	D					X		
Replace or repair sample tubing in CEMS shelter	D					X		EPA recommends performing both a pressure and vacuum leak check. The term "sample tubing" includes any sample or calibration tubing, the sample or calibration manifold, and the solenoid valve.
Replace or repair vacuum pump or pressure pump (not the analyzer pumps)	D					X		EPA recommends that a leak check be performed, also.
Replace critical orifice in dilution system with orifice of different size	R	X	X	(6)	X	X	X	Changing the size of the critical orifice (outside the manufacturer's tolerances for individual orifices) will significantly change the dilution ratio, may cause moisture problems and could introduce additional bias into the CEM system. Therefore, recertification testing must be performed.

Recertification and Diagnostic Test Policy for Dilution-Extractive CEMS[1]

Description of Event	Event Status[2]	RATA	7 Day Cal Error[3]	Cycle Time Test	Linearity Check	Calibration Error Test[4]	Submit an Event Record	Comments
Replace critical orifice in dilution system with orifice of the same size (within the manufacturer's specified tolerance)	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5)).
Disassemble and reassemble dilution probe for maintenance or service	D				(5)	X	A	EPA recommends performing both a pressure and vacuum leak check. EPA will conditionally allow the abbreviated linearity check (see footnote (5)).
Permanently replace umbilical line	D	X		(6)		X	X	EPA believes that permanently replacing an umbilical line can introduce bias into the system. Therefore, a RATA is necessary. Sources can use conditional data validation to minimize loss of data. EPA recommends performing both a pressure and vacuum leak check.
Replace CEMS probe (same probe length, location, and dilution ratio)	D			(6)	(5)	X	A	Potential non-linear response with the new probe requires a linearity check. EPA will conditionally allow the abbreviated linearity check and the alternative system response check to be performed (see footnotes (5) and (6)). EPA recommends performing both a pressure and vacuum leak check.
Change probe length and/or location	R	X		(6)		X	X	The rule indicates that a probe location change is a recertification event. EPA will conditionally allow the alternative system response check to be performed (see footnote (6)).
Routine probe filter maintenance (<u>e.g.</u>, clean or replace coarse filter)	D					X		
Replace probe heater or sample line heaters	D					X		
Change from dilution CEMS to in-situ CEMS	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify the Monitoring Plan, as necessary.

Recertification and Diagnostic Test Policy for Dilution-Extractive CEMS[1]

Description of Event	Event Status[2]	RATA	7 Day Cal Error[3]	Cycle Time Test	Linearity Check	Calibration Error Test[4]	Submit an Event Record	Comments
Change from dilution CEMS to extractive CEMS	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify the Monitoring Plan, as necessary.
Change from in-stack dilution to out-of-stack dilution methodology (or vice-versa)	R	X	X	X	X	X	X	EPA considers this to be equivalent to a monitoring system replacement. The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required.
Major modification to dilution air supply	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5)). EPA recommends performing both a pressure and vacuum leak check.

(1) The relevant tests for CEMS are listed in § 75.20 (c)(1).
(2) "R" means a recertification event, and "D" means diagnostic test event.
(3) The 7-day calibration error test is not required for a "regular" non-redundant backup system (§ 75.20(d)(2)(i)).
(4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, Appendix B, Section 2.1.3 (a)). If conditional data validation is used, a probationary calibration error test is required (§ 75.20 (b)(3)(ii)).
(5) A full, "hands-off" linearity check is recommended. However, an abbreviated linearity check is conditionally allowed (see Addendum, below). If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. Note: SO_2 and NO_x monitors with span values ≤ 30 ppm are exempted from linearity checks.
(6) A full cycle time test is recommended. However, the alternative system response check is conditionally allowed. If the system response check is not passed, perform a full cycle time test.
(X) "X" means that this test is required or that a <QACertificationEventData> record must be reported.
(A) Report a <QACertificationEventData> record only if the full linearity check or cycle time test is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.

Recertification and Diagnostic Test Policy for In-situ CEMS[1]

Description of Event	Event Status[2]	RATA	7 Day Cal Error[3]	Cycle Time Test	Linearity Check	Calibration Error Test[4]	Submit an Event Record	Comments
Permanently replace NO_x, SO_2, O_2 or CO_2 analyzer with like-kind analyzer as defined in Question 7.13	R	X	X		X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. EPA does not require the cycle time test in this case, since the analyzer is like- kind and the rest of the system is the same. Modify the Monitoring Plan as necessary.
Permanently replace NO_x, SO_2, O_2 or CO_2 analyzer with new analyzer which does not qualify as a like-kind analyzer	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. Thus, all tests are required. Modify the Monitoring Plan as necessary.
Replace or repair any of the following components:								EPA will conditionally allow the abbreviated linearity check (see footnote (5)). For repair or replacement of other major components that are not listed here, contact EPA for a case-by case ruling.
Light source	D				(5)	X	A	
Projection mirrors	D				(5)	X	A	
UV filter	D				(5)	X	A	
Fiberoptic cable	D				(5)	X	A	
Spectrometer grating	D				(5)	X	A	
Spectrometer mirrors	D				(5)	X	A	
Spectrometer mirror motor	D				(5)	X	A	
Replace or repair circuit board	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5)).
Replace or repair minor analyzer component or perform routine analyzer maintenance (as specified in the QA/QC plan)	D					X		Examples include display, filter replacement, power cord replacement, power supply, valves, and analyzer pumps.

Recertification and Diagnostic Test Policy for In-situ CEMS[1]

Description of Event	Event Status[2]	RATA	7 Day Cal Error[3]	Cycle Time Test	Linearity Check	Calibration Error Test[4]	Submit an Event Record	Comments
Change from in-situ to dry-extractive or dilution-extractive methodology	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify the Monitoring Plan, as necessary.
Change monitor location or measurement path	R	X	X			X	X	The 7-day calibration error test is required, since location changes may cause analyzer to drift, e.g., due to thermal effects or vibration. Modify the Monitoring Plan, as necessary.

(1) The relevant tests for CEMS are listed in § 75.20 (c)(1).
(2) "R" means a recertification event, and "D" means diagnostic test event.
(3) The 7-day calibration error test is not required for a "regular" non-redundant backup system (see § 75.20(d)(2)(i)).
(4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, Appendix B, Section 2.1.3 (a)). If conditional data validation is used, a probationary calibration error test is required (§ 75.20(b)(3)(ii)).
(5) A full, "hands-off" linearity check is recommended. However, an abbreviated linearity check is conditionally allowed (see Addendum, below). If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. Note: SO_2 and NO_x monitors with span values ≤ 30 ppm are exempted from linearity checks.
(X) "X" means that this test is required or that a <QACertificationEventData> record must be reported.
(A) Report a <QACertificationEventData> record only if the full linearity check is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.

Recertification and Diagnostic Test Policy for Flow Monitors(1)

Description of Event	Event Status(2)	RATA	Abbreviated Flow to Load	Leak Check(3)	7 Day Cal Error(4)	Calibration Error Test(5)	Report an Event Record	Comments
Permanently replace flow monitor (includes like-kind monitor)	R	X		X	X	X	X	Edit the Monitoring Plan as needed.
Replace or repair major component of flow monitor, such as:								Perform abbreviated flow to load ratio test. Perform a RATA if abbreviated flow to load test is failed. (Part 75, App. B, Section 2.2.5.3). Note that there are no appropriate QA/Certification records for reporting the abbreviated flow-to-load ratio diagnostic test. Therefore, only the <QACertificationEventData> record is required when this diagnostic test is performed. Keep the test data and calculated results on-site, in a format suitable for inspection.
Ultrasonic transducer Ultrasonic transducer interface (electronics)	D D		X X			X X	X X	
Differential Pressure Probe Differential Pressure Transducer/transmitter electronics	D D		X X	X X		X X	X X	
Thermal Probe Thermal Electronics to condition/convert probe signal to calculated flow	D D		X X			X X	X X	
Replace or repair minor component of flow monitor, such as:								Perform any diagnostic testing as recommended by the manufacturer.
Ultrasonic Purge system components, such as filters or fans	D					X		
Differential Pressure Back-purge probe cleaning system components	D			X		X		
Thermal Probe cleaning system components	D					X		
Change polynomial coefficients or K factors used to compute flow	D	X				X	X	3-load RATA required, except for monitors installed on peaking units and bypass stacks, which require only a normal-load RATA. (§ 75.20(c)(2)(ii)(A)).

(1) The relevant tests for FLOW CEMS are listed in § 75.20 (c)(2) and Part 75, Appendix B, Sections 2.2.2 and 2.2.5.3.
(2) "R" means a recertification event, and "D" means diagnostic test event.
(3) For differential pressure flow monitor only.
(4) The 7-day calibration error test is not required for a "regular" non-redundant backup system (see § 75.20 (d)(2)(i)).
(5) A calibration error is required after every maintenance event that may affect system accuracy (Appendix B, Section 2.1.3 (a)). If conditional data validation is used, a probationary calibration error test is required (§ 75.20 (b)(3)(ii)).
(X) "X" means that this test is required or that a <QACertificationEventData> record must be reported.

Recertification and Diagnostic Test Policy for FLUE Gas Moisture Sensors[(1)]

Description of Event	Event Status[(2)]	RATA[(3)]	Report an Event Record	Comments
Permanently replace a flue gas moisture sensor	R	X	X	Edit the Monitoring Plan as necessary.
Replace or repair moisture sensor electronics.	D			Perform any diagnostic testing as recommended by the manufacturer.
Change the K-factor or mathematical algorithm used to compute percent moisture	D	X	X	If a K-factor or mathematical algorithm is used to set up the sensor vs. Method 4, the rule requires a diagnostic RATA whenever this K-factor or algorithm is changed.

(1) The relevant tests for a moisture meter are listed in § 75.20 (c)(6), Appendix A, Section 6.5.7, and Appendix B, Section 2.3.
(2) "R" means a recertification event, and "D" means diagnostic test event.
(3) Moisture RATA consists of comparison with EPA Method 4.
(X) "X" means that this test is required or that a <QACertificationEventData> record must be reported.

Recertification and Diagnostic Test Policy for Fuel Flowmeters[1]

Description of Event	Event Status[2]	Flowmeter Calibration[3]	Transmitter Calibration[4]	Primary Element Inspection[4]	Redetermine Flow Coefficients[5]	Report an Event Record	Comments
Replace a fuel flowmeter with one certified by design (e.g., orifice, nozzle, or venturi-type)	R		X	X	X	X	Edit the Monitoring Plan as necessary.
Replace a fuel flowmeter with one certified by actual calibration	R	X				X	Edit the Monitoring Plan as necessary.
Replace primary element of a fuel flowmeter that was certified by actual calibration	D	X				X	Examples of primary elements include vortex shedding element of vortex fuel flowmeter, turbine of turbine meter, coriolis flow tubes or vibrating element of coriolis meter, and transmitters or transducers of ultrasonic meters.
Replace primary element of fuel flowmeter that was certified by design with an element of the same dimensions	D			X		X	
Replace primary element of fuel flowmeter that was certified by design with an element of different dimensions	D			X	X	X	
Replace or repair flowmeter electronics	D						Perform any diagnostic testing as recommended by the manufacturer.

(1) The relevant tests for fuel flowmeter are listed in Part 75, Appendix D, Sections 2.1.5 and 2.1.6.
(2) "R" means a recertification event, and "D" means diagnostic test event.
(3) Calibration by a reference flowmeter, by the manufacturer or by a laboratory (Part 75, Appendix D, Section 2.1.5).
(4) Transmitter calibrations and primary element inspection only apply to orifice, nozzle, and venturi-type fuel flowmeters (Part 75, Appendix D, Sections 2.1.6.1 and 2.1.6.4).
(5) Redetermine orifice, nozzle, or venturi flow coefficients using the procedures of AGA Report No. 3 or ASME MFC-3M whenever you change the size of the primary orifice, nozzle, or venturi (Part 75, Appendix D, Section 2.1.5.1).
(X) "X" means that this test is required or that a <QACertificationEventData> record must be reported.

Diagnostic Test Policy for DAHS[1]

Description of Event	Event Status[2]	Formula Verification	Missing Data Verification	RATA	Linearity Check	Calibration Error Test	Submit an Event Record	Comments
Replace entire DAHS (i.e., different vendor)	D	X	X			X	X	Modify the Monitoring Plan as necessary.
Upgrade DAHS to support a new EDR version using existing hardware, same equations, and algorithms to calculate emissions data	D	X	X				X	See Question 13.22.
Change or insert new temperature, pressure or molecular weight correction algorithms[3] in DAHS, for dilution systems	D			X	X	X	X	EPA recommends these types of changes be made immediately prior to the RATAs for affected systems.
Change or insert mathematical algorithm[3] in DAHS, for correcting measured NO concentration to total NO_x	D			X		X	X	EPA recommends this type of change be made immediately prior to the RATA for affected system.
Change missing data algorithm in DAHS	D		X				X	

(1) The relevant tests are listed in §§ 75.20 (c)(1) and (c)(9).
(2) "R" means a recertification event, and "D" means diagnostic test event.
(3) Contact EPA to discuss the appropriate diagnostic tests if other types of mathematical algorithms are changed or inserted in the DAHS.
(X) "X" means that this test is required or that a <QACertificationEventData> record must be reported.

[This page intentionally left blank.]

Addendum: Alternative Diagnostic Tests

Introduction

For certain component repairs, replacements or other changes made to a monitoring system, EPA will conditionally allow alternative diagnostic tests to be performed, in lieu of a full Part 75 quality-assurance test. The conditions are that if the alternative test is failed, the monitoring system will be considered out-of-control until corrective actions are taken and a full Part 75 QA test of the same type has been passed, "hands-off." The results of successful alternative diagnostic tests need only be kept on-site (e.g., recorded in maintenance logs) and do not have to be reported to EPA.

Abbreviated Linearity Check

For gas monitors, an abbreviated linearity check is allowed in place of a full linearity check, wherever "(5)" is indicated in the "Linearity Check" column in the Tables above. The monitor must be "in-control" with respect to its RATA requirement before beginning this check (see Appendix B, Section 2.2.3 (a)). The abbreviated linearity check procedure is as follows:

(1) Perform a "hands-off" calibration error test of the monitor. The calibration error for both the zero and upscale gases must be within the performance specifications in Section 3.1 of Appendix A. That is:

- For SO_2 and NO_x monitors, the calibration error (CE) must not exceed 2.5% of the span value. Alternatively, for SO_2 or NO_x span values < 200 ppm, the results are acceptable if the absolute difference between the tag value of the reference gas and the analyzer response, i.e., $|R - A|$, does not exceed five ppm; or

- For CO_2 and O_2 monitors, the CE, expressed as $|R - A|$, must not exceed 0.5% CO_2 or O_2.

You may perform routine or non-routine calibration adjustments prior to the hands-off calibration error test, as described in Sections 2.1.3 (b) and (c) of Appendix B.

(2) Following the hands-off daily calibration error test, check the linearity of the monitor (also "hands-off"), by performing three sequential calibration gas injections, i.e., one injection of a low-level gas (20 – 30% of span value), one mid-level gas injection (50 – 60% of span value) and one high-level injection (80 – 100% of span value). These three calibration gases are the same ones used for a full Part 75 linearity check. You may use the conditional data validation procedures in § 75.20 (b)(3) for the abbreviated linearity check. If you elect to use this option, the calibration error test in (1), above, may serve as the probationary calibration error test, and the abbreviated linearity check must be completed within 168 unit operating hours of the probationary calibration error test.

(3) The results of the abbreviated linearity check are acceptable if the Part 75 linearity specification is met for each gas injection. That is:

- For SO_2 and NO_x monitors, the linearity error (LE) must not exceed 5.0% of the tag value of the reference gas. Alternatively, the results are acceptable if $|R - A|$ does not exceed five ppm; or

- For CO_2 and O_2 monitors, the LE must not exceed 5.0% of the reference gas tag value. Alternatively, the results are acceptable if $|R - A|$ does not exceed 0.5% CO_2 or O_2.

(4) If the abbreviated linearity check is passed, keep the results on-site for inspection and audit purposes. Do not report the results to EPA. Report only the results of the hands-off calibration error test in EDR record type 230.

(5) If the abbreviated linearity check is failed, treat it as an aborted linearity check (see Section 2.2.3 (b)(2) of Appendix B) and follow it up with a full linearity check. Use the data validation rules in Section 2.2.3 (e) of Appendix B pertaining to aborted linearity checks. Since an aborted linearity check affects data validation, it must be reported to EPA in the electronic quarterly report as an aborted Linearity attempt (see Section 2.3.1 in the Quality Assurance and Certification Reporting Instructions for reporting the "Test Result Code").

Alternative System Response Test

For gas monitors, an alternative system response test is allowed in place of a full cycle time test, wherever "(6)" is indicated in the "Cycle Time Test" column in the Tables above. The alternative system response test procedure is as follows:

(1) Initiate a daily calibration error check of the monitor.

(2) Wait until a stable reading with the zero-level calibration gas has been attained. Start a timer (e.g., a stopwatch) when injection of the upscale calibration gas begins.

(3) Stop the timer when the analyzer reading reaches the 95% response level (i.e., when the measured gas concentration has risen to a level that is within five percent of the tag value of the upscale calibration gas).

(4) The results of the alternative system response test are acceptable if the measured response time is $\leq$ 15 minutes.

(5) If the alternative system response time is failed, declare the monitor out-of-control. Follow up with a full cycle time test after corrective actions are taken.

SECTION 13
DAHS, RECORDKEEPING, AND REPORTING

Page

13.1 Quarterly Reporting -- First Report 13-1

13.2 Recordkeeping 13-3

13.3 Recording Data Availability 13-3

13.4 Recording Hourly Data 13-4

13.5 Calculation Equations 13-4

13.6 Missing Data -- Electronic Format 13-4

13.7 DAHS Verification 13-5

13.8 QA Test Results 13-5

13.9 Quarterly Reporting -- Invalidation of Emissions Data 13-5

13.10 Test Notification of Annual/Semiannual QA/QC RATAs 13-6

13.11 Reporting Results of Annual/Semiannual QA/QC RATAs 13-6

13.12 Reporting of Partial Hours 13-7

13.13 Reporting for Non-operating Acid Rain Program Affected Units 13-8

13.14 Reporting -- Diluent Cap 13-8

13.15 Reporting -- Diluent Cap 13-9

13.16 Reporting Heat Input -- Multiplication by Operating Time and Fuel Usage Time 13-9

13.17 Electronic Reports -- Editing Data of Negative Values 13-10

Page

13.18 Minimum Data Acquisition and Handling System Requirements for Appendix D and/or E 13-10

13.19 Validation of Stored Data during DAHS Downtime 13-11

13.20 Quality Assurance RATA Notification 13-12

13.21 Monitoring Plan -- Hardcopy 13-12

13.22 DAHS Verification 13-12

13.23 Minimum CEMS Data Capture -- Maintenance Events 13-14

Question 13.1

Topic: Quarterly Reporting -- First Report

Question: When is the owner or operator of a source responsible for capturing and reporting emissions data for a unit that is coming on-line?

Answer: For the purposes of the Acid Rain or CAIR Programs there are two situations that dictate when an owner or operator of a source must begin capturing and reporting emissions data. First, for a new unit for which data were not previously reported under Part 75, the owner or operator must begin reporting emission data by means of an automated data acquisition and handling system (DAHS) beginning either on the date of provisional certification of the continuous emission monitoring systems (CEMS) or in the first hour following the applicable certification deadline, whichever date is earlier. For a new unit, the CEMS must be provisionally certified no later than 90 unit operating days or 180 calendar days (whichever occurs earlier) after the commencement of commercial operation. For a retired unit that loses its exemption from Acid Rain requirements, the owner or operator must capture and report data beginning with the hour that it recommences commercial operation as if it were a new unit.

Second, for an affected unit that has been shutdown since the beginning of the program but is now coming back on-line (deferred unit), emissions data must be reported beginning with the first hour of commercial operation in accordance with § 75.64(a). The owner or operator must complete certification testing for the deferred unit by the earlier of either 90 unit operating days or 180 calendar days (whichever comes first) after the recommences commercial operation in accordance with § 75.4(d).

Please refer to the table below for a summary of data collection and reporting requirements for new units.

Date Collection and Reporting Requirements for New and Previously Deferred Units

Unit Operation Category	Responsible for Capturing Data	Responsible for Certifying CEMS[1]	Responsible for Reporting Data	Approved Data Source
Deferred	Capture data beginning with the first hour of recommencing commercial operation. (§ 75.64(a))	Complete certification testing by the earlier of: 90 unit operating days; or 180 calendar days (whichever occurs first) after commencing commercial operation. (§ 75.4(d))	Submit report beginning with the calendar quarter corresponding to the date of recommencing commercial operation. (§ 75.64(a))	From the hour of recommencing commercial operation until all certification tests are completed, use maximum potential values, reference methods (under § 75.22(b)), or an EPA approved alternative. Maximum values are determined using Appendix A, Sections 2.1.1.1, 2.1.2.1, 2.1.3.1, 2.1.3.2, and 2.1.4.1, and Appendix D, Sections 2.4.1 and 2.4.2.2. Alternatively, for CEMS, you may use the conditional data validation procedures in § 75.20(b)(3).
Retired	Any retired unit that loses the retired unit exemption will be considered a new unit on the date that it recommences commercial operation. (§ 72.8(d)(6)(B)(ii), see new unit)	(See new unit.)	(See new unit.)	(See new unit.)
New	Capture data beginning with the earlier of: the hour of provisional certification; or, the hour corresponding to the relevant certification deadline. (§ 75.64(a))	Complete certification testing the earlier of 90 unit operating days or 180 calendar days after commencing commercial operation. (§ 75.4(b)(2))	Submit report beginning with the earlier of: the calendar quarter corresponding to the date of provisional certification; or, the calendar quarter corresponding to the date for the relevant initial certification deadlines. (§ 75.64(a))	If the certification tests are passed prior to the certification deadline, report provisional data as "quality-assured" from hour of provisional certification until the certification application is approved or disapproved. If the certification tests are not passed prior to the certification deadline, use maximum potential values until certification testing is completed, except when the conditional data validation procedures of § 75.20 (b)(3) are used. Maximum values are determined using Appendix A, Sections 2.1.1.1, 2.1.2.1, 2.1.3.1, 2.1.3.2, and 2.1.4.1, and Appendix D, Sections 2.4.1 and 2.4.2.2.

[1] For a deferred unit, § 75.4(d) presently contains language that the source is responsible for data for all unit operating hours once it is back online. It is EPA's intent to modify this language to more clearly support the use of commercial operating hours as a trigger for hourly emissions accountability as specified in § 75.64(a). At present, use the provisions of § 75.64(a).

References: § 75.64(a); § 75.4(a) and (d)

Question 13.2

Topic: Recordkeeping

Question: The recordkeeping requirements at § 72.9(f)(1) state that records (including all emission monitoring data) must be kept on site at the source for a period of five years from the date the document is created. The recordkeeping requirements at § 75.57(a) state that records required by Part 75 (CEM data) must be kept for three years. Should we keep CEM records on site for five years or for three years?

Answer: Since § 72.9(f)(1) begins with the qualifying statement "Unless otherwise provided. . .," the record retention requirements in § 75.57(a) supersede those in § 72.9(f)(1). Therefore, a retention period of three years is adequate for the types of records specified in § 75.57(a).

References: § 72.9(f)(1), § 75.57(a)

Question 13.3

Topic: Recording Data Availability

Question: The percent monitoring availability requirement for a CEM system (§ 75.32) calls for hourly calculations even when no data are missing. Would it be appropriate to calculate availability only when there are missing data and at the end of each quarter instead of redundant calculations every hour? Where will this data be recorded in the Electronic Report File Formats?

Answer: Once you begin using the standard missing data procedures of § 75.33, you must calculate hourly percent monitor data availability (PMA) for each hour in which quality-assured data are reported. See also the instructions for reporting "Percent Available" in the <MonitorHourlyValueData> and <DerivedHourlyValueData> records in the ECMPS Emissions Reporting Instructions.

References: § 75.57(c) – (f)

Question 13.4

Topic: Recording Hourly Data

Question: How does the utility report hourly data when they change time standards (e.g., from local standard time to daylight savings time or vice-versa)?

Answer: All data are to be reported in local standard time.

References: § 75.57

Question 13.5

Topic: Calculation Equations

Question: The monitoring plan submission will include the equations used to calculate emissions data (see citation at § 75.53(g)(1)(iv)). Assume that during EPA review of the monitoring data it is discovered that an equation is in error. Would data be invalidated if the data could simply be corrected by modifying the equation?

Answer: Issues of this type will have to be handled on a case-by-case basis.

References: § 75.53(g)(1)(iv)

Question 13.6

Topic: Missing Data -- Electronic Format

Question: If data are missing for a recorded parameter, and no explicit data substitution is necessary, what should be reported to EPA for that particular field?

Answer: An example would be the reporting of hourly gross unit load or steam load in § 75.57(b)(3). There is no specified missing data procedure in Part 75 for this parameter. If load data are missing, report the best available estimate of the load for the hour, based upon knowledge of process conditions and engineering judgment.

References: § 75.57

Question 13.7

Topic: DAHS Verification

Question: If a DAHS is integrated into a network (e.g., a LAN or a WAN), will it be necessary to perform DAHS verification testing on each terminal hooked to the network?

Answer: No. Only the installed DAHS software must be tested, and on a network, this may be accomplished by performing the testing on any one of the attached terminals.

References: § 75.20(c)(10)

Question 13.8

Topic: QA Test Results

Question: Must the calculated result for tests (e.g., confidence coefficient) be calculated by the DAHS? Or could it be added to the electronic file manually?

Answer: The information may be added to the electronic file manually.

References: N/A

Question 13.9

Topic: Quarterly Reporting -- Invalidation of Emissions Data

Question: What is EPA's policy on the invalidation of measured emissions data?

Answer: In some cases, you may determine, using sound engineering judgment, that a measured emissions value (or values) or other parameter is clearly in error and should be invalidated. When this situation occurs, determine whether correction of all the measured value(s) believed to be in error results in a significant change in the reported SO_2, NO_x, or CO_2 emissions or heat input. If the effect of replacing the erroneous values is not significant, you may make the replacements and do not have to notify EPA. However, if replacement of the erroneous data values has a significant effect, contact EPA's Clean Air Markets Division. If the Agency agrees that the data are clearly in error, document the error (in the <SubmissionComment> record for the quarterly report) and replace the erroneous data with quality-assured measured data from a certified backup monitoring system, a substitute value according to missing data procedures, or reference method backup data. If you replace measured data with substitute data, the replacement data should be automatically calculated by a certified component of the DAHS. If you replace measured data with data from a certified backup monitoring system, the replacement data should be automatically recorded by the DAHS.

References: § 75.64

Question 13.10

Topic: Test Notification of Annual/Semiannual QA/QC RATAs

Question: For annual/semiannual QA/QC RATAs, what type of test notification does EPA require? Should a utility submit a test notification form?

Answer: For annual/semiannual QA/QC RATAs, EPA requires that a written test notice be provided to the Administrator, to the EPA Regional Office and to the applicable state agency, in accordance with § 75.61(a)(5). No special form or format for the test notification is required; however, at a minimum, the notice should indicate the affected unit(s) to be tested, the type(s) of RATA(s) to be performed, and the scheduled test date(s). The written notification may be provided by regular mail or by facsimile. The use of electronic mail is acceptable if the respective state or EPA office agrees that this is an acceptable form of notification. Note that under § 75.61(a)(5)(iii), the Administrator, the EPA Regional Office or the state air pollution control agency may issue a waiver from the RATA notification requirements for a unit or group of units, for one or more tests.

References: § 75.21, § 75.61(a)(5)

Question 13.11

Topic: Reporting Results of Annual/Semiannual QA/QC RATAs

Question: For annual/semiannual QA/QC RATAs how should a source report results of the tests?

Answer: Report these test results to EPA CAMD electronically as required under § 75.64. Also provide hardcopy RATA results to the applicable EPA Regional Office and/or state air pollution control agency, upon request.

References: § 75.59, § 75.64(a), (d), and (f)

Question 13.12

Topic: Reporting of Partial Hours

Question: How do I account for SO_2 and CO_2 emissions and heat input rate during a partial operating hour?

Answer: Account for partial operating hours when the quarterly cumulative tons of SO_2 or CO_2 are calculated. Before summing SO_2 or CO_2 mass emissions for the quarter, multiply each reported hourly SO_2 or CO_2 mass emission rate (i.e., lb/hr or tons/hr) by the corresponding unit operating time to convert it to a mass value (lbs or tons).

For example, if a unit operated only for the first 12 minutes in a clock hour and took SO_2 readings once every minute, those 12 readings would be averaged and would be reported as the average hourly concentration. The hourly average volumetric flow rate would be calculated in the same way. These values would then be substituted into the appropriate equation (F-1 or F-2) to calculate the hourly SO_2 mass emission rate. Suppose, for the sake of this example, that the hourly SO_2 and flow averages for the 12 minutes of unit operation are, respectively, 500 ppm and 25,000,000 scfh. Assuming that SO_2 is measured on a wet basis, the hourly SO_2 mass emission rate reported would be 2,075 lbs/hr, according to Equation F-1. However, to indicate that the unit emitted SO_2 at this rate for only 12 minutes, you would report the unit operating time, rounded to the nearest hundredth of an hour, as 0.20.

The product of the hour's SO_2 mass emission rate and the unit operating time would then give the *actual* SO_2 mass emitted during the partial unit operating hour: (2,075 lbs/hr)(0. 20 hr) = 415 lbs. This would then be added to the products of the SO_2 mass emission rates and the unit operating times for all of the other unit operating hours in the quarter and divided by 2,000 lbs/ton to determine the quarterly SO_2 mass emissions (in tons).

The quarterly CO_2 mass emissions and heat input should be reported and calculated in an analogous fashion (i.e., quantify the effects of partial unit operating hours *only* when the cumulative quarterly CO_2 mass emissions and heat input values are determined).

Note: There is one exception to this. If the DAHS is programmed such that it performs the calculation of SO_2 mass or CO_2 mass on an hourly basis and enters the results into the new, optional data fields for SO_2 mass and CO_2 mass then the quarterly cumulative mass of SO_2 or CO_2 emitted is determined simply by summing all of the reported values for the quarter.

References: § 75.64(d)

Question 13.13

Topic: Reporting for Non-operating Acid Rain Program Affected Units

Question: For an existing Acid Rain Program affected unit that was shut down at the time of its monitor certification deadline and remains shut down indefinitely thereafter, are quarterly electronic reports, showing zero emissions and zero heat input, required to be submitted?

Answer: No. The owner or operator of an Acid Rain Program affected unit that was either in long-term cold storage (as defined in 40 CFR 72.2) or was shut down as the result of a planned or forced outage on the applicable CEMS certification deadline and has not operated since is *not* required to submit quarterly emissions reports for the unit *until* it re-commences commercial operation, notice of which must be provided in advance (see §§ 75.61(a)(3) and (a)(7), and § 75.64(a)). All required monitoring systems must be certified within 90 unit operating days or 180 calendar days (whichever comes first) after the unit re-commences operation (see § 75.4(d)).

References: §72.2, §75.4(d), §75.64(a), §§75.61(a)(3) and (a)(7)

Question 13.14

Topic: Reporting -- Diluent Cap

Question: Appendix F of Part 75 allows me to calculate NO_x emission rate in lb/mmBtu using a "diluent cap", value whenever the CO_2 or O_2 concentration is at or near ambient air levels (e.g., during unit startup and shutdown). When the diluent cap is used to calculate the NO_x emission rate, should I also use the cap value to calculate heat input and CO_2 mass emissions?

Answer: No. Revisions to Part 75 were published on January 24, 2008, restricting the use of the diluent cap to the calculation of NO_x emission rate, and only for hours in which a quality-assured diluent gas reading is obtained, showing that use of the cap value is justified (see 73 FR 4333-34, January 24, 2008). For every hour in which the diluent cap is used to calculate the NO_x emission rate, you must use the quality-assured CO_2 or O_2 value for that hour to calculate CO_2 mass emissions and heat input.

References: Appendix F, Section 3.3.4.1

Question 13.15

Topic: Reporting -- Diluent Cap

Question: Appendix F of Part 75 allow us to calculate NO_x emission rate by substituting a diluent cap CO_2 concentration of 5.0% for boilers or 1.0% for turbines or an O_2 diluent cap concentration of 14.0% for boilers or 19.0% for turbines for a measured CEM reading whenever the diluent concentration is below 5.0% CO_2 for boilers or 1.0% for turbines or above 14.0% O_2 for boilers or 19.0% for turbines. Are hours when the diluent cap value is substituted for a CEM value considered missing data, resulting in lower percent monitor data availability for NO_x emission rate?

Answer: No. You may only use the diluent cap during periods when the diluent monitor is measuring valid, quality-assured data. Therefore, as with any hours of valid, quality-assured data, these hours count as quality-assured data to go in the lookback period for substitute data and they count as quality-assured hours for purposes of calculating availability. If the diluent monitor is not measuring valid, quality-assured data, use the missing data procedures in subpart D of Part 75 (§ 75.31 or § 75.33 for NO_x, § 75.31 or § 75.35 for CO_2, and § 75.36 for heat input rate).

References: §§ 75.31, 75.33, 75.35, and 75.36; Appendix F, Sections 3.3.4, 4.1, 4.4.1, 5.2.1, 5.2.2, 5.2.3, 5.2.4

Question 13.16

Topic: Reporting Heat Input -- Multiplication by Operating Time and Fuel Usage Time

Question: For Appendix E recordkeeping, do we multiply the fuel usage time by the hourly heat input rate to determine total hourly heat input prior to reading off of the NO_x correlation curve?

Answer: For Appendix E, use the heat input rate to determine the NO_x emission rate along the NO_x/heat input correlation curve. If you burn multiple fuels in an hour, then use the total heat input for each fuel for the hour (heat input rate multiplied by fuel usage time) in calculating the average NO_x emission rate for the unit for the hour (see Equation E-2).

References: Appendix E, Sections 3.3.4, 2.4.1, and 2.4.3

Question 13.17

Topic: Electronic Reports -- Editing Data of Negative Values

Question: How should negative measurement values be handled? Can the negative emission values manually be changed to zero?

Answer: When negative emission concentration values (i.e., CO_2, NO_x, and SO_2), NO_x emission rate values or percent moisture values are recorded during startup and shutdown you may replace them manually with zeros. When you replace a negative value with zero, you must also report MODC "21" to indicate that zero was substituted for the actual recorded value from the monitoring system. MODC "21" may also be manually entered.

References: Reporting Instructions

Question 13.18

Topic: Minimum Data Acquisition and Handling System Requirements for Appendix D and/or E

Question: What are the minimum requirements for a Data Acquisition and Handling System, particularly for Appendix D and/or E units?

Answer: The Quality Assurance and Monitoring Plan data may be generated using the ECMPS client tool. The fuel sampling results and hourly emissions data may be entered into a spreadsheet and imported into ECMPS in XML format.

References: Appendix A, Section 4

Question 13.19

Topic: Validation of Stored Data during DAHS Downtime

Question: Data Acquisition and Handling Systems (DAHS) are often made up of multiple components such as a Programmable Logic Controller (PLC), which does limited data processing and short term data storage, and a PC, which does more complete data processing and long term data storage. Because of this, it may be possible to collect and store raw data during a DAHS downtime and complete the processing of that data when the complete DAHS is running again. For example, this might occur during the installation of upgraded software or when a PC crashes. May we collect and store raw data in a component such as a PLC during a DAHS downtime and then complete processing of the data when the complete DAHS system is operating again? If so, would our data be considered valid if the reason for the DAHS downtime is a change to the DAHS that requires recertification?

Answer: Yes. It is acceptable to store raw data during a period when the complete DAHS is not available (e.g., during installation and DAHS verification testing for a new software version or when the DAHS PC crashes) and later complete processing of that data in the DAHS and report that data as valid during the entire time that the DAHS was unavailable, as long as the raw data (including any necessary quality assurance data) are:

(1) Quality-assured based on all other applicable criteria (e.g., daily calibration has been passed);

(2) Stored electronically in a component (e.g., PLC, data logger) that is identified in the data pathway diagram (in the monitoring plan) of a certified system; and

(3) Captured, stored, and transferred electronically.

If the software is being upgraded, but the data storage component is not affected, data may be collected and stored in the storage component while the missing data and formula verification tests are run on the software. As long as those tests are passed, the data collected and stored in the storage component may be processed by the newly certified DAHS component and may be considered valid. Please note, however, that if the storage component (e.g., PLC, data logger) is also being modified or replaced, data may not be stored on the new or modified component until after the recertification tests are completed.

References: § 75.10(a)

Question 13.20

Topic: Quality Assurance RATA Notification

Question: Is EPA CAMD allowing a waiver from the requirement in § 75.61 to provide notice of the date of periodic quality assurance RATAs?

Answer: Yes. Effective February 28, 1997, EPA CAMD has issued a waiver from the requirement to notify the Administrator (or Administrator's delegatee) of the date of periodic relative accuracy testing under § 75.61(a)(5). This waiver shall continue until the Agency issues guidance otherwise. This policy does not waive the requirement to notify the Administrator for certification/recertification RATA testing.

Note that the requirements to notify EPA Regional Offices or state or local agencies remain in effect, unless those respective agencies also issue a waiver.

References: § 75.21(e), § 75.61(a)(5)

Question 13.21

Topic: Monitoring Plan -- Hardcopy

Question: Can the hardcopy portion of the monitoring plan be kept in an electronic format (e.g., in PDF, Word, etc.)?

Answer: Electronic storage of all monitoring plan information, including the hardcopy portions, is permissible provided that a paper copy of the information can be furnished upon request for audit purposes.

References: § 75.53(g)

Question 13.22

Topic: DAHS Verification

Question: What are the DAHS verification requirements?

Answer: Both formula verification and missing data routine verification are required. The minimum requirements are as follows:

(1) Emission and heat input rate formulas must be verified at each unit or stack location. The results of these checks must be kept on-site in a format suitable for inspection.

(2) Missing data routines may be verified either:

(i) By performing tests at each location where the software is installed. If the developer of the software is able to perform this testing for customers via network, rather than by visiting each individual site, this is acceptable; or

(ii) By installing a standard software package which has been thoroughly tested by the developer for conformance with the Part 75 missing data algorithms.

If Option (ii) above is chosen, the following additional requirements apply:

(A) The missing data software must be installed at each location using the same type of operating system on which the software was tested by the developer;

(B) The developer must provide an official statement to each user (e.g., a certificate or a letter from the appropriate corporate official) certifying that the missing data software meets the requirements of Part 75; and

(C) Each user of the software must add a provision to the QA plan for the monitoring systems (if such a provision is not already in place) to examine the values substituted by the DAHS during missing data periods for "reasonableness" (e.g., do the substituted values appear to be correct in view of the percent monitor data availability (PMA) and the length of the missing data period; do the substitute NO_x and flow rate values change when the load range changes during a missing data period; are maximum potential values substituted when the PMA drops below 80.0%; etc.) The QA plan must include a corrective action provision to resolve any problems encountered with the missing data routines expeditiously. If correction of erroneous substitute data is found to have a "significant" impact on the reported quarterly emissions or heat input resubmittal of the affected quarterly report(s) is required.

For both Options (i) and (ii), you must keep documentation of the tests performed to verify the missing data routines and the test results on-site in a format suitable for inspection.

References:

Question 13.23

Topic: Minimum CEMS Data Capture -- Maintenance Events

Question: Does a CEMS purge constitute a "maintenance activity" that would reduce to two the minimum number of data points required to calculate a valid hourly average under § 75.10(d)?

Answer: Yes, provided that the reason for performing the CEMS purge and the minimum acceptable frequency of the purge are clearly explained in the QA/QC plan for the unit. Note, however, that excessive, unnecessary CEMS purging may not be used as a means of circumventing the requirement to provide complete, accurate emissions accounting during all periods of unit operation. If, for a particular monitor, the required purging frequency is unusually high (e.g., once or twice per hour), EPA recommends that the utility consider replacing the monitor with one that is less maintenance-intensive.

References: § 75.10(d), § 75.5(d)

SECTION 14
MISSING DATA PROCEDURES

Page

14.1 Number of data Points for a Valid Hour ... 14-1

14.2 Certification Test, QA Test, or Audit Failures and CEMS Disapprovals ... 14-1

14.3 DAHS Failure ... 14-2

14.4 Missing Data -- Unit down Time ... 14-3

14.5 Appendix D and E Missing Data Procedures -- DAHS Verification ... 14-3

14.6 Initial Substitute Data Procedures for Infrequently Operated Units ... 14-7

14.7 Appendix D Missing Data Procedures ... 14-8

14.8 Valid Hour -- Calibration Error tests ... 14-8

14.9 Missed QA/QC Tests -- Linearity Checks and RATAs ... 14-9

14.10 Valid Hours ... 14-9

[This page intentionally left blank.]

Question 14.1

Topic: Number of Data Points for a Valid Hour

Question: If a CEMS collected ten one-minute averages during a full hour of operation and only eight or nine of the averages were valid, would the hour's data still be valid (see § 75.10(d)(1))?

Answer: In order for the hourly average monitoring value to be considered valid during periods other than calibration, maintenance, or quality assurance, the hourly average must be calculated from a minimum of one data point collected in each of four successive 15-minute periods (minimum of four data points per hour). Therefore, if each of the four successive 15-minute periods are accounted for with the eight or nine valid readings in the example above, the hourly average calculated from the readings would be considered valid.

References: § 75.10(d)

Question 14.2

Topic: Certification Test, QA Test, or Audit Failures and CEMS Disapprovals

Question: Please explain the data validation and reporting rules that apply to the following circumstances:

(1) If a CEMS does not pass its required certification tests by the applicable deadline in § 75.4;

(2) If the Administrator issues a notice of disapproval of a CEMS within the 120-day review period;

(3) If a CEMS fails a required daily, quarterly, semiannual or annual quality-assurance (QA) test; or

(4) If a certified CEMS fails an EPA audit.

Answer: (1) and (2) In order for data from a monitor to be considered valid, a monitoring system must be certified in accordance with the provisions in § 75.20. If a CEM system does not pass the certification tests by the applicable deadline in § 75.4, or if the Administrator issues a notice of disapproval of the CEMS within the 120-day review period, data from the CEMS are considered invalid, and the owner or operator must report (as applicable) the maximum potential concentration for SO_2, NO_x and CO_2, and/or the maximum potential NO_x emission rate, and/or the maximum potential flow rate, until the CEMS is certified (i.e., unless quality-assured data from a certified backup monitor or reference method are available to be reported in the interim). In the former case, begin reporting maximum potential values when the allotted window of time in § 75.4 to complete the certification tests expires. In the latter case, follow the procedures for loss of certification in § 75.20 (a)(5). These procedures require maximum potential values to be reported retrospectively, back to the date and hour of provisional certification.

(3) Whenever a required daily, quarterly, semiannual, or annual quality-assurance test is failed, the CEMS is considered to be out of control, as of the date and hour of the failed test. In such cases, apply the applicable data validation rules in Appendix B of Part 75. Specifically, follow the procedures in Sections 2.1.4 and 2.1.5 for daily QA assessments, Section 2.2.3 for quarterly assessments and Section 2.3.2 for semiannual and annual assessments.

(4) In addition to the circumstances described above, EPA can issue a certification disapproval notice after the 120-day certification application review period if an audit of a system or the certification application reveals that a monitor does not meet the Part 75 performance requirements, and should not have been certified. In these circumstances, the owner or operator must follow the loss of certification procedures in § 75.20(a)(5).

References: § 75.24, § 75.20 (a)(5), Appendix B, Sections 2.1.4, 2.1.5, 2.2.3 and 2.3.2

Question 14.3

Topic: DAHS Failure

Question: In case the DAHS fails, is the data captured on a data logger (or other electronic storage device such as the plant distributive control system (DCS) or a PLC)) considered valid if the CEM system is otherwise functional?

Answer: Yes. Since the DAHS must "provide a continuous permanent record" of all measurements and required information, if a source has a device capable of collecting and storing data when the data acquisition system is not functioning properly, then the source has met the intent of the Part 75 rule. If the analyzer is meeting performance specifications, the data can be stored in this device and the calculations performed later. Missing data procedures are not required in this circumstance. However, a strip chart recorder may not be used for this purpose because the graph produced by the strip chart would require interpretation of data and would not provide the equivalent accuracy that is required.

References: § 75.10(a)

Question 14.4

Topic: Missing Data -- Unit Down Time

Question: How should the missing data algorithm handle the situation of a unit going off-line during a missing data period?

Answer: Do not include the hours when the unit is not operating as part of CEMS downtime or availability.

Given the following example: During a 24 hour period, the CEMS is down from hour 4 until hour 19. Meanwhile, the unit is down from hour 7 until hour 14. The HB value = 450 and the HA value = 500.

```
                         |<---------------  CEMS down    ---------------->|
HB=450ppm                |                                                |          HA=500ppm
                         |           |<---- Unit down --->|               |
             |---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
             0       2       4       6       8      10      12      14      16      18      20      22
                                                  Hour

Length of CEMS outage = [19-4] - [14-7] = 8 hours = [CEMS down time] - [Unit down time]
```

Assuming the CEMS is an SO_2 monitor with availability $\geq$ 90%, use (HB + HA)/2 = (450 + 500)/2 = 475 ppm to fill in gaps from hours 4 to 7 and hours 14 to 19. For data availability, use an outage duration of eight hours.

References: § 72.2, § 75.33

Question 14.5

Topic: Appendix D and E Missing Data Procedures -- DAHS Verification

Question: What should I do to certify that the Appendix D and E missing data routines are properly programmed within my DAHS?

Answer: EPA expects the owner or operator to demonstrate that the DAHS correctly substitutes missing data according to the requirements of Part 75. For Appendices D and E, the documentation for demonstrating correct missing data substitution should include:

(1) A list of all of the tests performed. Include dates, times and results. EPA recommends that you use the format in the "Appendix D and E

Missing Data Verification Checklist" (see below), but regardless of whether the format in the checklist is used, all of the applicable tests listed in the checklist are required.

(2) A signed certification statement (electronic or hardcopy) that reads as follows:

> I certify that the automated Data Acquisition and Handling System (DAHS) component of each CEM system identified here was tested and that proper computation of the missing data substitution procedures was verified according to 40 CFR Part 75. The results of the verification tests for the missing data routine are available on-site in a format suitable for inspection, as required by 40 CFR §§ 75.20(c)(9) and 75.63(a)(2)(iii).

The certification statement in (2), above, should be submitted with the certification or recertification application. Copies of the DAHS testing must be kept available on site for inspection.

References: § 75.20; § 75.63; Appendix D; Appendix E

Appendix D and E Missing Data Verification Checklist Please enter a "P" for any test that was performed and passed, an "F" for any test that was performed and failed, and an "NA" for any test that is not applicable to the DAHS being tested.	
Appendix D Fuel Flow Rate Missing Data -- Single-Fuel Hours, Load-Based Units (§§ 2.4.2.2.1 and 2.4.3)	
For each single-fuel hour in the missing data period (i.e., each hour in which only one type of fuel was combusted), verify that:	
	(1) The DAHS performs a lookback through the quality-assured fuel flow rate data for the previous 720 operating hours when only that same type of fuel was combusted, and substitutes the arithmetic average fuel flow rate at the corresponding load range.
	(2) The DAHS substitutes the average fuel flowrate from the next available higher load range if no quality-assured data is available, at the corresponding load range.
	(3) The DAHS substitutes the maximum potential fuel flow rate (as defined in Section 2.4.2.1 of Appendix D) if no quality-assured data is available at either the corresponding load range or a higher load range.
	(4) When it is necessary to look back more than three years prior to the missing data period to find the required 720 hours of data, the DAHS excludes data from more than three years prior to the missing data period in performing the appropriate missing data substitution in (1), (2) or (3), above.
	(5) For a new or newly-affected unit, when fewer than 720 hours of fuel flow rate data are available for the required lookback, the DAHS performs the appropriate missing data substitution in (1), (2) or (3), above, using whatever data are available.
Appendix D Fuel Flow Rate Missing Data -- Single-Fuel Hours, Non Load-Based Units (§§ 2.4.2.2.2, and 2.4.3)	
The following assumes that the owner or operator has not received permission from the Administrator under § 75.66 to segregate the fuel flow rate data into operational bins. For each single-fuel hour in the missing data period, verify that:	
	(1) The DAHS performs a lookback through the quality-assured fuel flow rate data for the previous 720 operating hours when only that same type of fuel was combusted, and substitutes the arithmetic average of the hourly fuel flow rates.
	(2) When it is necessary to look back more than three years prior to the missing data period to find the required 720 hours of data, the DAHS excludes data from more than three years prior to the missing data period in performing the appropriate missing data substitution in (1), above.
	(3) For a new or newly-affected unit, when fewer than 720 hours of fuel flow rate data are available for the required lookback, the DAHS performs the appropriate missing data substitution in (1), above, using whatever data are available.
	(4) If there is no quality-assured flow rate data available for the fuel, the DAHS substitutes the maximum potential fuel flow rate, as defined in Section 2.4.2.1 of Appendix D.

Appendix D Fuel Flow Rate Missing Data -- Co-Fired Hours, Load-Based Units (§§ 2.4.2.3.1, 2.4.2.3.3, 2.4.2.3.4 and 2.4.3)	
For each co-fired hour in the missing data period, (i.e., any hour in which two different types of fuel are combusted -- e.g., oil and gas), verify that:	
	(1) In an hour when the fuel flow rate is missing for *one fuel only*, the DAHS looks back through the quality-assured fuel flow rate data for the previous 720 hours in which that fuel was co-fired, and substitutes the maximum flow rate for the fuel, at the corresponding load range.
	(2) If quality-assured data are not available at the corresponding load range but are available at a higher load range, the DAHS substitutes the maximum flow rate for the fuel at the next higher available load range.
	(3) If quality-assured data are not available at the corresponding load range or a higher load range, the DAHS substitutes the maximum potential flow rate for the fuel, as defined in Section 2.4.2.1 of Appendix D.
	(4) In an hour when the fuel flow rate data is missing for *both* fuels, the DAHS performs the appropriate substitution, in (1), (2) or (3) above, for each fuel separately. Note: If this causes the reported hourly heat input rate to exceed the maximum rated hourly heat input of the unit, Section 2.4.2.3.4 of Appendix D requires the substitute fuel flow rate values to be adjusted so that the reported hourly heat input rate equals the unit's maximum rated hourly heat input. However, manual adjustment of the flow rates is permitted in this case, i.e., the adjustments do not have to be performed automatically by the DAHS.
	(5) When it is necessary to look back more than three years prior to the missing data period to find the required 720 hours of data, the DAHS excludes data from more than three years prior to the missing data period in performing the appropriate missing data substitution in (1) through (4), above.
	(6) For a new or newly-affected unit, when fewer than 720 hours of fuel flow rate data are available for the required lookback, the DAHS performs the appropriate missing data substitution in (1) through (4), above, using whatever data are available.
Appendix D Fuel Flow Rate Missing Data -- Co-Fired Hours, Non-Load-Based Units (§§ 2.4.2.3.2, 2.4.2.3.3, 2.4.2.3.4 and 2.4.3)	
The following assumes that the owner/operator has not received permission from the Administrator under § 75.66 to segregate the fuel flow rate data into operational bins. For each co-fired hour in the missing data period, verify that:	
	(1) In an hour when the fuel flow rate is missing for one fuel only, the DAHS looks back through the quality-assured fuel flow rate data for the previous 720 hours in which that fuel was co-fired, and substitutes the maximum flow rate for the fuel.
	(2) If no quality-assured fuel flow rate data for co-fired hours are available, the DAHS substitutes the maximum potential fuel flow rate, as defined in 2.4.2.1 of Appendix D, for each missing data hour.
	(3) In an hour when the fuel flow rate data is missing for both fuels, the DAHS performs the appropriate substitution, in (1) or (2) above, for each fuel separately. Note: If this causes the reported hourly heat input rate to exceed the maximum rated hourly heat input of the unit, Section 2.4.2.3.4 of Appendix D requires the substitute fuel flow rate values to be adjusted so that the reported hourly heat input rate equals the unit's maximum rated hourly heat input. However, manual adjustment of the flow rates is permitted in this case, i.e., the adjustments do not have to be performed automatically by the DAHS.

	(4) When it is necessary to look back more than three years prior to the missing data period to find the required 720 hours of data, the DAHS excludes data from more than three years prior to the missing data period in performing the appropriate missing data substitution in (1), (2), or (3), above.
	(5) For a new or newly-affected unit, when fewer than 720 hours of fuel flow rate data are available for the required lookback, the DAHS performs the appropriate missing data substitution in (1), (2) or (3), above, using whatever data are available.
Simplified Fuel Flow Rate Missing Data Procedure for Peaking Units (§ 2.4.2.1)	
	If the owner or operator elects to use the simplified missing data option in Section 2.4.2.1 of Appendix D for a peaking unit, verify that the DAHS substitutes the maximum potential fuel flow rate (as defined in Section 2.4.2.1 of Appendix D) for every hour of missing fuel flow rate data.
Appendix D Missing Data -- Sulfur Content, GCV and Density (§ 2.4.1)	
	When sulfur content, density or GCV data are missing or invalid for any periodic fuel sampling and analysis required under Section 2.2 or 2.3 of Appendix D, verify that the DAHS substitutes the appropriate maximum potential sulfur content, SO_2 emission rate, GCV, or density for the fuel, from Table D-6 of Appendix D.
Appendix E Missing Data (§§ 2.5.1, 2.5.2, 2.5.2.1, 2.5.2.2)	
	(1) For any operating hour in which the quality assurance operating parameters are not within the limits specified in the monitoring plan, verify that the DAHS substitutes the maximum NO_x emission rate recorded during the last series of baseline tests, for each hour of the missing data period, except as noted in (2) or (3), below.
	(2) When the measured hourly heat input rate exceeds the highest heat input rate measured during the most recent Appendix E test, verify that the DAHS either: (a) Substitutes the higher of the NO_x emission rate obtained by linear extrapolation of the correlation curve or the fuel-specific maximum potential NO_x emission rate (MER), for each hour of the missing data period; or (b) Substitutes 1.25 times the highest NO_x emission rate from the baseline correlation tests, not to exceed the fuel-specific MER, for each hour of the missing data period.
	(3) For a unit with add-on NO_x emission controls (e.g., steam/water injection or selective catalytic reduction), verify that the DAHS substitutes the fuel-specific NO_x MER for each operating hour in which proper operation of the add-on controls is not verified.

Question 14.6

Topic: Initial Substitute Data Procedures for Infrequently Operated Units

Question: A unit operates for fewer than 720 hours in the three year period following initial certification. Does the utility continue to implement the initial missing data procedures or should the utility instead begin to implement the standard missing data procedures for SO_2?

Answer: Begin to use the standard missing data procedures when either: (1) 720 quality-assured monitor operating hours of SO_2 have been recorded since initial certification; or (2) when three years have passed since initial certification (whichever occurs first). Once you have begun to use the standard missing data procedures it makes no difference how many unit operating hours there are in any subsequent year.

References: § 75.31; § 75.32; § 75.33(a)

Question 14.7

Topic: Appendix D Missing Data Procedures

Question: Are there any initial missing data procedures in Appendix D for fuel flowmeter data?

Answer: No. Beginning with the hour of provisional certification, use the standard missing data procedures in Section 2.4 of Appendix D. If there are fewer than 720 hours of historical quality-assured fuel flow data available for a look back during a missing data period, use whatever quality-assured hours are available, consistent with Section 2.4.2.2 of Appendix D. See also the answer to Question 14.5.

References: Appendix D, Section 2.4

Question 14.8

Topic: Valid Hour -- Calibration Error Tests

Question: If a successful daily calibration error test of a CEMS began at 08:00 and ended at 08:16 and the unit completes shutdown at 08:29 with at least one minute of valid data, are there sufficient data for a valid hour?

Answer: No. During periods when calibration, quality assurance, or maintenance activities pursuant to § 75.21 and Appendix B are being performed, a valid hour shall consist of at least two data points separated by a minimum of 15 minutes. However, if the calibration had begun at 08:01, and that first minute of the hour was in-control, then there would be sufficient data to compute a valid hourly average.

References: § 75.10(d)(1), § 75.21; Appendix B

Question 14.9

Topic: Missed QA/QC Tests -- Linearity Checks and RATAs

Question: If a linearity check or RATA for routine quality-assurance is not completed by the end of the quarter in which it is due, is the use of substitute data required in the first unit operating hour following the test deadline?

Answer: No. EPA recognizes that there are times when a scheduled linearity check or RATA deadline may be missed due to circumstances beyond the control of the owner or operator. Therefore, Part 75 provides a grace period in which a missed QA test may be completed without loss of data. Section 2.2.4 of Appendix B provides a 168 unit (or stack) operating hour grace period for a missed quarterly linearity check and Section 2.3.3 of Appendix B provides a 720 unit (or stack) operating hour grace period for a missed semiannual or annual RATA. If the required QA test has not been successfully completed within the grace period, data from the monitoring system become invalid beginning with the first operating hour after the grace period expires.

References: Appendix B, Sections 2.2.4 and 2.3.3

Question 14.10

Topic: Valid Hours

Question: Suppose that in the first two 15-minute quadrants of an hour (Hour # 1), sufficient valid CEMS data is captured to meet the requirement of § 75.10(d)(1) and then I perform preventative maintenance on the CEMS for the remainder of that hour, extending into the next clock hour (Hour # 2). If the monitor passes a post-maintenance calibration error test in Hour # 2 and collects sufficient valid data in the last two 15 minute quadrants of Hour # 2 to satisfy § 75.10(d)(1), are both Hours # 1 and 2 valid, or is only Hour # 2 valid?

Answer: The emission data for both Hours # 1 and # 2 may be reported as quality-assured. The principal data capture requirement for Part 75 sources in § 75.10(d)(1) states that in order to validate data for an hour, you must obtain at least one valid data point in each quadrant of the hour in which fuel is combusted. However, § 75.10(d)(1) provides an exception to this requirement for hours in which quality assurance testing and preventive maintenance activities are performed. For such hours, a minimum of two data points, separated by at least 15 minutes, are required to validate the hour.

In the present case, the emission data collected in Hour # 1 are considered valid, because the data were recorded prior to the maintenance event (i.e., prior to commencement of the out-of-control period). The data in Hour # 2 are valid because they were collected after a successful post-maintenance calibration error test (i.e., after the end of the out-of-control period).

References: § 75.10(d)(1)

SECTION 15
ADD-ON EMISSION CONTROLS AND PARAMETRIC MONITORING

Page

15.1 Missing Data -- Units with Add-on Emission controls 15-1

15.2 Control Device Operation during a Missing Data Period 15-3

15.3 Scrubber Modules -- Slurry Flow Measurement 15-3

15.4 Recertification and Diagnostic Test Requirements for Add-on SO_2 and NO_x Emisson Control Installation 15-4

15.5 Recertification and Diagnostic Test Requirements for Add-on SO_2 and NO_x Emisson Control Installation 15-5

15.6 Certification Timeline for Existing Units Constructing a New Stack with Add-on SO_2 and NO_x Emission Control Installation on an Acid Rain and or CAIR-Affected Unit 15-10

15.7 Data Validation and Reporting Requirements Following the Installation of Add-on SO_2 and/or NO_x Emission Controls 15-10

[This page intentionally left blank.]

Question 15.1

Topic: Missing Data -- Units with Add-on Emission Controls

Question: How are the appropriate substitute data values determined during missing data periods, for units with add-on emission controls?

Answer: The owner or operator of a unit with add-on SO_2 or NO_x emission controls has the following options with respect to missing data substitution:

(1) Standard Missing Data Routines with Parametric Supporting Data

The owner or operator may use the standard missing data routines in § 75.33 provided that the parametric data specified in § 75.58(b)(3) are recorded and maintained on-site, and that the data document proper operation of the control device during the missing data period. The owner or operator is not required to report the parametric information to EPA unless the Agency requests it. The owner or operator also does not have to use a DAHS to record the parameters, because the parametric data are not used to calculate the substitute data values, but are only used to document that the emission controls are operating properly.

The owner or operator must determine the acceptable range of values for each parameter that is used to demonstrate proper operation of the emission controls, and must document the parameters and ranges in the unit's QA plan. The owner or operator must also keep hourly records of the parameters during missing data periods, to show whether the add-on control device is operating inside or outside of the acceptable ranges.

In each quarterly report, the designated representative must certify that the add-on emission controls were operating properly during all missing data periods in which the standard missing data routines were used, and that the substitute values do not systematically underestimate SO_2 or NO_x emissions. For any missing data hour(s) in which the add-on controls are not documented to be in proper operation, the maximum potential SO_2 concentration or the maximum potential NO_x emission rate (as applicable) must be reported, unless quality-assured CEMS data from certified inlet monitoring systems are available -- in which case, the CEMS data may be reported in lieu of the maximum potential values.

(2) Alternatives to the Standard Missing Data Algorithms

On January 24, 2008, EPA published revisions to the missing data provisions in § 75.34 for units with add-on SO_2 and NO_x emission controls (see 73 FR 4318, January 24, 2008). Paragraph (a)(3) was revised and a new paragraph (a)(5) was added. These revisions allow certain alternative substitute data values to be reported, for missing data periods where parametric data are available to document proper operation of the emission controls. Specifically:

- When the percent monitor data availability (PMA) of an SO_2 or NO_x monitoring system is between 80 and 90 percent, instead of reporting the maximum value of SO_2 concentration, NO_x concentration, or NO_x emission rate in a lookback period, revised § 75.34(a)(3) allows you to report the maximum *controlled* value in the lookback period.

- When the PMA of an SO_2 or NO_x monitoring system is below 80 percent, instead of reporting the maximum potential value of SO_2 concentration, NO_x concentration, or NO_x emission rate, § 75.34(a)(5) allows you to report , as applicable:

  -- The greater of the maximum expected SO_2 or NO_x concentration (MEC) or 1.25 times the maximum controlled concentration in the lookback period; or

  -- The greater of the maximum controlled NO_x emission rate (MCR) or 1.25 times the maximum controlled NO_x emission rate in the lookback period.

These modifications to the standard missing data routines take into account the operating status of the add-on emission controls during the missing data period, while preserving the conservative nature of missing data substitution.

(3) Parametric Missing Data Substitution Method

The owner or operator may petition EPA to make limited use of site-specific parametric monitoring to calculate substitute values during missing data periods, in lieu of using the standard missing data routines and allowable alternatives described in paragraphs (1) and (2), above. This option is referenced in §§ 75.34(a)(4), 75.34(c), and 75.66(e), and is described in detail in Section 1 of Appendix C.

The petition must be approved by EPA prior to implementing a parametric substitution approach. Once the petition is approved by EPA, the owner or operator must use an automated data acquisition and handling system to continuously record and report the parameters specified in Appendix C (and any other parameters approved during the petition process) for use in determining the substitute values used to fill in for missing CEM data.

Note that § 75.34(c) and Section 1.1 of Appendix C state that use of an approved parametric scheme for providing substitute data is restricted to missing data hours where the PMA remains at 90 percent or above. If the PMA falls below 90 percent, then the owner or operator must use the missing data substitution procedures described in paragraphs (1) and (2), above.

References: § 75.33, § 75.34, § 75.58(b), § 75.64(c), § 75.66(e), Appendix C

Question 15.2

Topic: Control Device Operation during a Missing Data Period

Question: Section 75.34(d) states that "the owner or operator shall keep records of information as described in § 75.58(b)(3) to verify the proper operation of all add-on SO_2 or NO_x emission controls, during all periods of SO_2 or NO_x emission missing data." If data substitution is being completed in accordance with § 75.34(a)(1), what specific scrubber operating information must be recorded? Also, please indicate the specific sections of subpart F which provide this information.

Answer: The specific recordkeeping procedures for the proper operation of the SO_2 and NO_x emissions controls can be found in §§ 75.58(b)(1) to (3) of subpart F. The information must be recorded but need not be reported to the Agency with the quarterly report. This recorded information must be kept at the site for three years. This information must be available on demand in the event of a field audit or a request by the Agency. As specified in §75.58(b), the information to verify the proper operation of an emission control device shall be recorded by an automated data acquisition and handling system.

References: § 75.34(d), § 75.58(b)(1) to (3), § 75.64(a)(2)(iv)

Question 15.3

Topic: Scrubber Modules -- Slurry Flow Measurement

Question: For an FGD with several modules, can verification and reporting of the number of pumps operating on each module and the tested flow rate of the pump be used to calculate the slurry flow rate to meet the slurry flow measurement requirement?

Answer: Yes, the verification of flow of slurry through the pipes can be performed by reporting the number of pumps operating on each module and the tested flow rate of each pump in operation, provided that the pumps are all fixed-rate. If the pumps operate at variable rates, then there must be flowmeters for each scrubber module.

References: § 75.34; Appendix C, Section 1.2

Question 15.4

Topic: Recertification and Diagnostic Test Requirements for Add-on SO_2 and NO_x Emission Control Installation

Question: During the installation of an add-on emissions control device, may we test auxiliary equipment, such as damper motors, of the new system without triggering the start of the timeline requited to complete recertification and diagnostic testing, (e.g., as described in § 75.4(e) for Acid Rain Program Units)?

Although the emissions will be directed through the add-on controls, the controls will not be operating at this time (i.e., no scrubbing agent (lime, ammonia, etc.) has yet been injected). At what point are the recertification timelines triggered?

Answer: All necessary recertification and diagnostic testing is to be completed within 90 operating days or 180 calendar days (whichever occurs first) after emissions first exit to the atmosphere through a new add-on SO_2 or NO_x emission control system. EPA believes that the timeline should begin when the emissions first exit to the atmosphere through a newly installed add-on emission control that is operating (i.e., once a scrubbing agent (lime, ammonia, etc.) has been injected). This includes test operations used for optimization of the control device. In this case, operations such as testing the damper motors, which may cause emissions to be temporarily routed through an idle control device are not what EPA intends to be the trigger for the testing timeline.

For common stack configurations, if emission controls are added to the individual units in stages (e.g., an SCR is added to Unit 1 this spring and a second SCR is added to Unit 2 next fall), each control device installation will have its own separate timeline.

References: § 75.4(e), § 75.20(b), §§ 96.170(b)(3), 96.270(b)(3), and 96.370(b)(4)

Question 15.5

Topic: Recertification and Diagnostic Test Requirements for Add-on SO_2 and NO_x Emission Control Installation

Question: When add-on SO_2 or NO_x emission controls (e.g., flue gas desulfurization (FGD) systems, selective catalytic reduction (SCR, SNCR), etc.) are installed on affected units, what are the recertification and diagnostic test requirements? Do all monitoring systems need to be recertified in all cases?

Answer: Section 75.20(b) describes various changes (e.g., changes to a continuous emission monitoring system (CEMS), to the manner of unit operation, to the flue gas handling system, etc.) that may require recertification or diagnostic testing. For example, relocation of a CEMS sampling probe, replacement of an analyzer, or replacement of an entire CEMS requires recertification. Modifications to a CEMS may require recertification if the changes "significantly affect" the ability of the CEMS to accurately measure and record emissions. And changes to the manner of unit operation or to the flue gas handling system may require recertification if the changes "significantly" alter the flow or concentration profile.

Changes such as these often accompany the installation of add-on SO_2 and NO_x emission controls. Therefore, installing an add-on control device may require recertification or diagnostic testing of certain monitoring systems. Below are guidelines that explain, in accordance with § 75.20(b), under what circumstances recertification is required and when diagnostic testing is sufficient.

Recertification Requirements

The following describes those circumstances under which a monitoring system must be recertified (or initially certified) upon installation of an FGD or add-on NO_x control.

(1) If installation of the add-on controls involves either the relocation of a particular continuous emission monitoring system (CEMS), the replacement of an analyzer, or installation of a new CEMS, the full battery of recertification tests described in § 75.20(c) is required for that monitoring system.

(2) For dilution-extractive CEMS, if the nominal size of the critical orifice is changed (i.e., if the dilution ratio changes) when add-on emission controls are installed, a full battery of recertification tests is required for all of the gas monitoring systems (i.e., SO_2, NO_x, and CO_2, as applicable).

(3) In cases where installation of the add-on controls triggers a dual-span requirement under Section 2.1.1.4 or 2.1.2.4 of Appendix A to Part 75, if the low-scale SO_2 or NO_x measurement range is on a different analyzer from the existing high-scale range, a full battery of tests of the low scale is required [i.e., you must perform a linearity test (unless exempted under Section 6.2 of Appendix A), a 7-day calibration error test (unless exempted under Section 6.3.1 of Appendix A), a normal load RATA, and a cycle time test].

All required recertification tests must be completed no later than 90 unit operating days or 180 calendar days (whichever occurs first) after emissions first pass through the add-on control device (see Question 15.4 for further guidance on determining when the start of the testing period is triggered). Submit the recertification application in accordance with § 75.63(a)(2), no later than 45 days after completing all required tests.

Also submit the results of the recertification tests in the appropriate electronic quarterly report. Be sure to include the ECMPS record, describing the control device installation, the tests performed, and (if applicable), the use of conditionally valid data.

Diagnostic Testing -- FGD Installations on Boilers

In cases where the installation of an add-on SO_2 control (FGD) does not involve the relocation of existing CEMS, replacement of an analyzer, installation of new CEMS, or a change in dilution ratio, but only involves the addition of a low-scale measurement range for SO_2 (using the same analyzer as the high-scale measurement range), diagnostic testing is sufficient.[1]

(1) No additional tests are required for the high-scale SO_2 measurement range.

(2) To quality-assure the new low-scale SO_2 measurement range, perform the following on that range:

- A diagnostic linearity check;
- A diagnostic 7-day calibration error test; and
- A diagnostic normal load RATA.[2]

---

[1] If the monitoring system is not up-to-date with all QA/QC requirements of Part 75, Appendix B, then sufficient QA testing must be performed in addition to the tests required by this policy, to make up the deficiency.

[2] A normal-load RATA of the low measurement scale is required since, according to Section 6.5(c) in Appendix A of Part 75, for an add-on control device which operates continuously rather than seasonally (such as an FGD, or certain SCR units), the low range is the range normally used to measure emissions.

(3) To quality assure the existing NO_x and CO_2 monitoring systems, perform a 12-point stratification check for NO_x, and CO_2 at the CEMS or reference method sampling location, in accordance with Section 6.5.6.1 of Appendix A to Part 75, with the FGD operating.

If the results of the stratification test show the absence of significant stratification for NO_x and CO_2, consistent with the criteria in Section 6.5.6.3(a) of Appendix A, no additional tests are required for the existing NO_x monitoring system, or the existing CO_2 monitoring system.

If a lack of significant stratification cannot be demonstrated for NO_x or CO_2, perform:

- A diagnostic normal load RATA for the parameter(s) that failed the stratification test.[1]

(4) To quality-assure the existing flow monitor, perform:

- A diagnostic 3-load flow RATA.

All required diagnostic testing must be completed no later than 90 unit operating days or 180 calendar days (whichever occurs first) after the first unit operating hour in which emissions first pass through the FGD (see Question 15.4 for further guidance on determining when the start of the testing period is triggered). Submit the results of the required diagnostic tests electronically. Be sure to include the <QACerificationEventData> record describing the control device installation, the tests performed, and (if applicable), the use of conditionally valid data.

<u>Diagnostic Testing -- Add-on NO_x Control Installations</u>

In cases where the installation of an add-on NO_x control (<u>e.g.</u>, SCR or SNCR) does not involve the relocation of existing CEMS, replacement of an analyzer, installation of new CEMS, or a change in dilution ratio, but may only involve the addition of a low-scale measurement range for NO_x (using the same analyzer as the high-scale measurement range), diagnostic testing is sufficient.[2]

---

1 At the source's option, a diagnostic normal load RATA can be performed initially in lieu of the stratification test.

2 If the monitoring system is not up-to-date with all QA/QC requirements of Part 75, Appendix B, then sufficient QA testing must be performed in addition to the tests required by this policy, to make up the deficiency.

(1) Except as provided in (6) below, no additional tests are required for the high-scale NO_x measurement range.

(2) If Part 75 requires a low NO_x measurement scale to be added[1], quality-assure that measurement range as follows. Perform:

- A diagnostic linearity check[2];
- A diagnostic 7-day calibration error test[3]; and
- A diagnostic normal load NO_x RATA with the add-on controls operating, if either:
  - -- The add-on NO_x controls will be operated year-round rather than seasonally; or
  - -- The high and low ranges are not connected to a common sample probe and interface.

If the add-on controls will be operated seasonally, EPA strongly recommends that a diagnostic RATA be performed with the add-on controls in normal operation prior to use of the low scale for any seasonal compliance program, even if the high and low ranges are connected to a common sample probe and interface.[4]

(3) No tests are required to quality assure existing SO_2 and CO_2 monitoring systems that are dilution-extractive.[5]

---

[1] See Sections 2.1.1.4 and 2.1.2.4 of Part 75, Appendix A. Generally speaking, a second (low) measurement range is required if the maximum expected concentration (MEC) during normal, stable operation of the add-on controls is less than 20% of full-scale on the high range. In certain cases, a dual range may not be required (e.g., for a common stack where an SCR is installed on only one of the units or for an SNCR installation that reduces NO_x emissions by less than 50%).

[2] Unless exempted from this test under Section 6.2 or Section 6.3.1 of Appendix A.

[3] Unless exempted from this test under Section 6.2 or Section 6.3.1 of Appendix A.

[4] Many add-on NO_x controls are being installed for the purpose of reducing NO_x mass emissions during the NO_x Budget Trading Program control period (i.e., the ozone season, from May 1st through September 30th). Although Section 6.5(c) of Appendix A allows the required RATAs for certain dual-span units to be done on either the low or high range when the emission controls are operated seasonally, EPA believes that it is prudent to perform the RATAs while the unit is operating with the add-on controls functioning. The Agency believes that this will provide the most representative measure of the NO_x monitoring system's accuracy and bias during the control period, and will ensure that emissions are neither under-reported nor over-reported.

[5] For dilution extractive systems, since the sample will be diluted, this minimizes any possible analytical interferences from the presence of unreacted ammonia (ammonia "slip") in the effluent gas stream.

(4) To quality assure existing SO_2 and CO_2 monitoring systems that are not dilution extractive, perform:

- Diagnostic normal-load RATAs.[1]

(5) To quality assure the existing stack flow monitoring system, perform:

- An abbreviated diagnostic flow-to-load test, as described in Section 2.2.5.3 of Appendix B.

If the test is passed, no further testing of the flow monitor is required. If the test is failed, perform:

- A diagnostic flow RATA. This RATA may be a single-load test at normal load, provided that the flow monitor polynomial coefficients and/or K-factors are not reset or adjusted. If the polynomial coefficients and/or K-factors are adjusted, a diagnostic 3-load RATA is required.

(6) For common stack configurations, if emission controls are added to the individual units in stages (e.g., an SCR is added to Unit 1 this spring and a second SCR is added to Unit 2 next fall)[2], perform:

- An engineering analysis or a stratification test after each control device addition, to evaluate whether NO_x stratification is likely to be introduced by the differences in the concentrations of the gas streams entering the stack.

If the results of the evaluation or test suggest that addition of the SCR has introduced stratification that was not present during the last RATA, then, consistent with § 75.20(b), perform a diagnostic RATA of the NO_x monitoring system.

All required diagnostic testing must be completed no later than 90 unit operating days or 180 calendar days (whichever occurs first) after the first unit operating hour following installation of the add-on NO_x controls (see Question 15.4 for further guidance on determining when the start of the testing period is triggered). Submit the results of the required diagnostic tests electronically. Be sure to include the <QACertificationEventData> record describing the control device

[1] For non-dilution extractive systems, EPA is concerned about possible interferences and bias that may be caused by the presence of unreacted ammonia in the effluent gas stream. Therefore, EPA believes that a diagnostic RATA should be conducted to assure that there is no significant bias from these interference effects.

[2] This situation has the potential to introduce stratification in the NO_x concentration profile which could adversely affect the accuracy of NO_x measurements made in the stack.

installation, the tests performed, and (if applicable), the use of conditionally valid data.

References: § 75.4(e), §§ 75.20(b) and (c), § 75.63(a), Appendix A, Sections 2.1.1.4, 2.1.2.4 and 6.5(c), Appendix B, Section 2.2.5.3, §§ 96.170(b)(3), 96.270(b)(3), and 96.370(b)(4).

Question 15.6

Topic: Certification Timeline for Existing Units Constructing a New Stack with Add-on SO_2 and NO_x Emission Control Installation on an Acid Rain and or CAIR-Affected Unit

Question: When a New Stack and add-on SO_2 or NO_x emission controls (e.g., flue gas desulfurization (FGD) systems, selective catalytic reduction (SCR, SNCR), etc.) are constructed and installed simultaneously on an existing Acid Rain and or CAIR affected unit, what is the certification timeline?

Answer: Section 75.4(e) requires all necessary certification testing to be completed within 90 operating days or 180 calendar days (whichever occurs first) after emissions first exit to the atmosphere through the new stack. Certification testing must be conducted with the control device in operation.

References: § 75.4(e)

Question 15.7

Topic: Data Validation and Reporting Requirements Following the Installation of Add-on SO_2 and/or NO_x Emission Controls

Question: When add-on SO_2 or NO_x emission controls (e.g., flue gas desulfurization (FGD) systems, selective catalytic reduction (SCR), etc.) are installed on affected units, how should emissions data be reported in the interval of time prior to successful completion of the required recertification or diagnostic tests?

Answer: For monitoring systems requiring full certification or recertification, starting with the first unit operating hour after the event that triggered certification, and for monitoring systems requiring diagnostic testing only, starting with the first unit operating hour after emissions first pass through the add-on SO_2 or NO_x emission controls[1], until all required recertification or diagnostic tests are successfully completed for the relevant parameter

[1] See Question 15.4 for further guidance in determining when the start of the missing data period begins.

and measurement scale[1], the owner or operator should, for that parameter and scale determine and report emissions data using either:

(a) The appropriate value for substitution of missing data as described in the applicable "Substitute Data" section below; or

(b) Data obtained from the continuous use of EPA Reference Methods. If hourly flow rate data is collected using Reference Method 2, follow the procedures outlined in Question 19.31; or

(c) Conditionally valid data from the installed continuous emissions monitoring systems (CEMS), as described in § 75.20(b)(3). However, for the purposes of this policy, note the following special considerations regarding the use of conditionally valid data:

   (i) Conditional data validation may, if necessary, be used for the entire window of time allotted to complete the necessary testing[2]; and

   (ii) In cases where testing of a low measurement scale or range is required and a certified high range monitor is available to record the emissions data, the start of conditional data validation may be delayed for a period not to exceed 60 unit operating days after emissions first pass through the control device, triggering the start of the timeline (see Question 15.4 for further guidance on determining when the 60 unit operating day period starts).

      (1) Until the start of conditional data validation, data recorded on the certified high measurement scale may be reported as quality assured for all operating hours whether controlled or uncontrolled (i.e., whether or not reagent is injected).[3]

---

1 See Question 15.5 for further guidance in determining whether full certification or recertification is required for a particular monitoring system or whether diagnostic testing is sufficient.

2 This policy provision is modeled after § 75.20(b)(3) and Appendix A, Sections 6.2(a), 6.3.1(a), 6.3.2(a), 6.4(a), and 6.5(f), which, for initial certification, allow the owner or operator to replace the conditional data validation timelines of § 75.20(b)(3)(iv) with the window of time allotted to complete the certification testing, (e.g., under § 75.4 for Acid Rain units). EPA believes this is appropriate, since in many instances, add-on control device installation involves certification of new monitoring systems.

3 When add-on SO_2 or NO_x controls are installed, there is an initial "shakedown" period during which the unit operators experiment with the control device in order to achieve the desired or guaranteed level of emission reduction. The shakedown period may last for several weeks, during which the emission levels are gradually reduced. Thus, for an extended period of time, the emissions during normal, stable unit operation will be variable and may not be consistently recorded on the low measurement scale. EPA believes that delaying the start of conditional data validation will allow sufficient time to optimize the controls and will allow testing of the low range to be completed, with minimal use of substitute data.

(2) After the start of conditional data validation, only those operating hours during which data do not fall on the new low measurement scale (e.g., uncontrolled hours, partially-controlled hours, or hours when reagent is not injected) may be reported as fully quality-assured from the certified high measurement scale.

For RATAs of new or relocated monitoring systems, if conditional data validation is used, apply a BAF of 1.000 until the hour that the RATA is completed. For recertification or diagnostic RATAs, if conditional data validation is used, apply the BAF from the previous RATA until the hour of completion of the recertification or diagnostic RATA.

Substitute Data for FGD Installations:

(a) If installation of the FGD does not change the unit/stack relationship[1]:

(i) For CO_2 and NO_x, continue to use the standard Part 75 missing data procedures.

(ii) For flow rate, you may either continue to use the standard missing data procedures of § 75.33 or you may re-start the initial missing data procedures of § 75.31, beginning with the first hour of unit operation after installation of the FGD system.[2]

(iii) For SO_2, you may either:

(1) Report the maximum potential concentration (MPC) for each hour of each missing data period; or

(2) Use the missing data procedures in § 75.34(a)(1), beginning with the first missing data hour after the first hour of operation of the FGD (see Question 15.4).

To implement the provisions of § 75.34(a)(1), you may either apply the standard missing data algorithms of § 75.33 or you may re-start the initial missing data procedures of § 75.31.[2]

---

[1] If the discharge configuration is the same before and after installation of the add-on controls, the unit/stack relationship has not changed (for example, if the unit emits through a single, dedicated stack before and after control device installation). However, if two uncontrolled units which had previously emitted through separate stacks are connected to a common control device and now emit through a common stack, the unit/stack configuration has changed.

[2] Re-starting the initial missing data procedures may be preferable to using the standard missing data routines because the properties of the controlled and uncontrolled flue gas streams (e.g., pollutant concentration, stack temperature, stack gas molecular weight, etc.) may be substantially different.

In either case, following initial operation of the FGD as described in Question 15.4, appropriate parametric data must be recorded for each hour of missing data to verify proper operation of the FGD, as described in §§ 75.34(d) and 75.58(b)(3). For any missing data hour(s) in which proper operation of the FGD is not documented, you must report the MPC in lieu of applying the missing data algorithms of § 75.33 or § 75.31.

(b) If the FGD installation changes the unit/stack relationship, re-start the initial missing data procedures of § 75.31 for all parameters, beginning with the first hour of unit operation after installation of the FGD. For SO_2, the parametric data recording requirements and data validation rules under § 75.34(a)(1) also apply.

Substitute Data for Add-on NO_x Control Installations:

(a) If installation of the add-on NO_x emission controls does not change the unit/stack relationship[1]:

(i) For SO_2 and CO_2 and flow rate, continue to use the standard Part 75 missing data procedures.

(ii) For NO_x, you may either:

(1) Report the maximum potential NO_x emission rate (MER) for each hour of each missing data period of a NO_x emission rate system, or report the maximum potential NO_x concentration (MPC) for each hour of each missing data period of a NO_x concentration system; or

(2) Use the missing data procedures in § 75.34(a)(1), beginning with the first missing data hour after initial operation of the add-on emission controls (see Question 15.4).

To implement the provisions of § 75.34(a)(1), you may either apply the standard missing data algorithms of § 75.33 or you may re-start the initial missing data procedures of § 75.31.[2]

---

1 If the discharge configuration is the same before and after installation of the add-on controls, the unit/stack relationship has not changed (for example, if the unit emits through a single, dedicated stack before and after control device installation). However, if two uncontrolled units which had previously emitted through separate stacks are connected to a common control device and now emit through a common stack, the unit/stack configuration has changed.

2 Re-starting the initial missing data procedures may be preferable to using the standard missing data routines because the properties of the controlled and uncontrolled flue gas streams (e.g., pollutant concentration, stack temperature, stack gas molecular weight, etc.) may be substantially different.

In either case, following initial operation of the add-on control device as described in Question 15.4, appropriate parametric data must be recorded for each hour of missing data to verify proper operation of the add-on controls, as described in §§ 75.34(d) and 75.58(b)(3). For any missing data hour(s) in which proper operation of the add-on controls is not documented, you must report the MER in lieu of applying the missing data algorithms of § 75.33 or § 75.31.

Units using add-on controls seasonally and utilizing the procedures in § 75.34(a)(2) are not required to document proper operating of the add-on controls during the non-ozone season in order to apply the missing data algorithms in § 75.33 or § 75.31.

(b) If installation of the add-on controls changes the unit/stack relationship, re-start the initial missing data procedures of § 75.31 for *all* parameters, beginning with the first hour of unit operation after installation of the emission controls. For NO_x, the parametric data recording requirements and data validation rules under § 75.34(a)(1) also apply.

References: § 75.4(e), § 75.20(b)(3), § 75.31, § 75.33, § 75.34, § 75.57, and § 75.58(b)(3), Appendix A, Section 2.1

SECTION 16
COMMON, MULTIPLE, AND COMPLEX STACKS

Page

16.1 Load Stack RATAs 16-1

16.2 Load Ranges 16-1

16.3 Common Stack -- Heat Input Rate Apportionment 16-2

16.4 NO_x Monitoring -- Multiple Stack Configurations 16-2

16.5 NO_x Monitoring -- Multiple Stack Configurations 16-5

16.6 SO_2 Monitoring in Multiple Stacks or Ducts 16-7

16.7 CO_2 Monitoring and Reporting for Multiple Stacks or Ducts 16-8

16.8 Heat Input Calculations and Reporting for Monitoring in Multiple Stacks or Ducts 16-8

16.9 Operationd Data for Monitoring in Multiple Stacks or Ducts 16-9

16.10 Reporting Partial Operationd Hours for Multiple Stack Units 16-9

[This page intentionally left blank.]

Question 16.1

Topic: Common Stack RATAs

Question: For a multi-unit situation where more than one unit feeds a common stack, how does EPA define low, medium, and high load for RATA purposes for affected units that produce electrical output or steam since there are numerous permutations or combinations in flows to the stack?

Answer: The method for determining the range of operation and the low, mid and high load levels for a unit or common stack is found in Section 6.5.2.1 of Appendix A to Part 75. For a common stack, the lower boundary of the range of operation is either: (1) the lowest minimum, safe stable load for any of the units discharging through the common stack; or (2) for a group of frequently-operated units, the sum of the minimum safe, stable loads of the individual units. The upper boundary of the range of operation is defined as the sum of the maximum sustainable loads for the individual units, unless that combined load is unattainable in practice, in which case, use the maximum sustainable combined load from a four quarter (minimum) historical lookback. The low, mid, and high load levels are expressed as percentages of the range of operation (0 – 30% of range = low, 30 – 60% = mid, and 60 – 100% = high).

References: Appendix A, Section 6.5.2.1

Question 16.2

Topic: Load Ranges

Question: In the common stack provisions concerning the load ranges for missing data substitution, there is mention of using twenty ranges with five percent increments (for flow rate data) instead of ten ranges with ten percent increments. Is this alternative an option or a requirement for two or more units monitored by a single monitoring system?

Answer: The use of twenty load ranges, rather than ten, is optional. Section 2.2.1 of Appendix C, which addresses missing data procedures for units sharing a common stack, indicates that the load ranges for flow (but not for NO_x) *may* be broken down into twenty equally-sized operating load ranges, but this is not required.

References: Appendix C, Section 2.2.1

Question 16.3

Topic: Common Stack -- Heat Input Rate Apportionment

Question: Can a utility use the ratio of the load from a unit to the load from all of the units to apportion heat input rate to the units in a common stack?

Answer: Yes, provided that all units using the common stack are using fuel with the same F-factor. Use the gross electrical load or the gross steam load (flow) reported in the apportionment. Use Equation F-21a or Equation F-21b, as appropriate.

These equations should be included in the monitoring plan. In, fill out separate heat input rate equations for each unit, with individual units filled in for each equation. The heat input rate apportionment formula must also be verified and included with the DAHS Verification Statement.

Other apportionment methods for heat input rate may be approved as petitions are received.

References: § 75.16(e)(3); Appendix F, Section 5.5

Question 16.4

Topic: NO_x Monitoring -- Multiple Stack Configurations

Question: For a single unit with a multiple stack or duct configuration, can the NO_x emission rate be measured in only one stack and still ensure that NO_x emissions are accounted for "during all times when the unit combusts fuel," as required by § 75.17(c)(2)?

Answer: Yes, (unless the monitored stack or duct can be bypassed, then use § 75.17(d)), depending on the type of unit, the specifics of the stack or duct configuration, and the way in which the unit is operated. Use the following guidelines:

<u>Guidelines for Boilers</u>

(1) For a simple multiple stack configuration in which the flue gases from the unit are sent to two or more exhaust stacks, you may monitor NO_x emission rate using a single monitoring system installed on one stack, provided that:

(a) The products of combustion are sufficiently well-mixed to ensure that a NO_x emission rate representative of the unit can be obtained in any one of the stacks. As a guideline, the combustion products are considered to be well-mixed if test data or CEM data are available to show that the NO_x emission rates in the individual stacks differ by no more than ten percent or 0.01 lb/mmBtu (whichever is less restrictive);

(b) The flue gases are never routed in such a manner that they will bypass the monitored stack; and

(c) For units with NO_x emission controls, the flue gases flowing through all of the individual stacks are controlled to the same level.

(2) For a single-stack unit with split or multiple breechings, if the owner or operator elects to monitor NO_x emission rate in the ductwork (breechings) rather than in the stack, you may monitor NO_x emission rate using a single monitoring system installed on one duct, provided that:

(a) The products of combustion are sufficiently well-mixed to ensure that a NO_x emission rate representative of the unit can be obtained in any one of the ducts (see guideline in (1)(a), above);

(b) The flue gases are never routed in such a manner that they will bypass the monitored duct; and

(c) For units with NO_x emission controls, the flue gases flowing through all of the individual ducts are controlled to the same level, and there are no additional NO_x emission controls downstream of the point at which the NO_x emission rate is monitored.

(3) For a configuration consisting of a main stack and a bypass stack, you may monitor NO_x emission rate with a single monitoring system installed on the main stack, provided that:

(a) You report the maximum potential NO_x emission rate (MER) for any hour in which flue gases flow through the bypass stack; and

(b) A method of determination code of "23" is reported for every hour in which flue gases flow through the bypass stack. Treat hours in which code "23" is reported as non-quality-assured hours (do not include these hours in the load ranges (bins) for missing data lookbacks).

If the applicable conditions in paragraph (1), (2), or (3) above are fully met and you elect to monitor NO_x emission rate at only one stack or duct, then:

- Report all of the NO_x emission data and the related NO_x quality-assurance data at the unit level. Do not use multiple stack ("MS") prefixes for NO_x reporting. If you use MS prefixes for SO_2 and CO_2 reporting from the same unit, continue to use these prefixes.

- If a flow monitor is installed on each stack or duct, determine the hourly heat input rate at each stack using the applicable Appendix F equation. For each hour, use the CO_2 or O_2 reading from the NO_x-diluent CEMS in the heat input equation. Calculate the heat input rate at the unit level using Equation F-21C.

- For cases (1) and (2), above, if you should install an additional NO_x-diluent CEMS on any of the other stacks or ducts, designate it as a redundant backup system in your monitoring plan.

- If the unit uses Appendix D and G methodology for SO_2 and CO_2, determine hourly SO_2 and CO_2 emissions in the normal manner during bypass hours. Also, determine the actual hourly heat input rates at the unit level, using the measured fuel flow rates and the fuel GCV value(s).

- Report the quarterly and cumulative arithmetic average NO_x emission rates for the unit.

- Perform missing data substitution for NO_x emission rate at the unit level.

- For further reporting guidance see the ECMPS Reporting Instructions.

<u>Guidelines for Combustion Turbines</u>

(1) For combustion turbines that have both a main stack and a bypass stack, you may monitor NO_x emission rate using a single monitoring system installed on the main stack, as described in paragraph (3) under "GUIDELINES FOR BOILERS," above. If you choose this option, follow the applicable reporting guidelines in the bulleted items, above.

(2) For combustion turbines that have a main stack and a bypass stack, you may not monitor NO_x emission rate using a single, certified monitoring system installed on the bypass stack, except for an interim period while the heat recovery steam generator (HRSG) and the main stack are under construction. If you elect to monitor NO_x emissions from the bypass stack during this interim period, designate the NO_x

monitoring system as a primary system in your monitoring plan. Report all NO_x emission data and heat input data at the unit level.

When construction of the HRSG and main stack is complete, if you wish to continue monitoring NO_x emission rate from only one stack (i.e., the HRSG stack), you must certify a primary monitoring system at the main stack. Keep the "primary" designation for the NO_x-diluent system in your monitoring plan and you may keep the same system and component ID numbers. While testing the monitoring system for recertification, you may either use conditional data validation procedures of § 75.20(b)(3) or you may use the Part 75 missing data routines until the system is recertified.

After recertifying the NO_x monitoring system at the main stack location, monitor the NO_x emission rate as described in paragraph (3) under "GUIDELINES FOR BOILERS," above. Follow the applicable reporting guidelines in the bulleted items, above.

If the guidelines and conditions for single-stack monitoring described above are not fully met, it is the responsibility of the utility to insure that NO_x emissions are accurately measured whenever an affected unit is combusting fuel. In these cases, owners and operators must install separate NO_x monitoring systems in each of the multiple stacks or ducts (see Question 16.5).

References: § 75.17(c), and § 75.17(d)

Question 16.5

Topic: NO_x Monitoring -- Multiple Stack Configurations

Question: If I must measure the NO_x emission rate from all of the multiple stacks or ducts associated with a single unit, or if I choose to do so, how do I determine the NO_x emission rate for the unit?

Answer: If you have a unit with a multiple stack (or duct) configuration, and the unit does not qualify for single-stack (or duct) monitoring under Question 16.4, you must monitor the NO_x emission rate in each of the multiple stacks or ducts separately. If you are required to monitor all of the stacks or ducts, or if you voluntarily choose to do so, use the following guidelines.

<u>Guidelines for Boilers</u>

For boilers you may either:

(1) Identify separate NO_x emission rate monitoring systems with unique system IDs for each stack or duct and test and certify each system

separately. Apply missing data procedures for each stack or duct separately. Calculate and report the NO_x emission rates separately for each duct or stack (which has been identified in the monitoring plan with a multiple stack ("MS") prefix). Assign formula IDs to support the calculation of hourly NO_x emission rate and include these formulas in the monitoring plan.

Calculate and report the quarterly and cumulative arithmetic average NO_x emission rate for each stack or duct. Also calculate and report the quarterly and cumulative heat input-weighted NO_x emission rates for the unit. See Section 2.1 of the ECMPS Emissions Reporting Instructions ("Summary Value Data") for a discussion of these calculations; or

(2) If the unit uses Appendices D and G for SO_2 and CO_2 emissions accounting, monitor the NO_x emission rate separately at each stack or duct and, in lieu of installing a flow monitor on each stack or duct, you may report all hourly, quarterly and cumulative NO_x emission data at the unit level; provided that:

(a) For any hour in which flue gases exhaust through only one of the stacks, the NO_x emission rate measured at that stack is reported (or, if the monitoring system is out-of-control, the appropriate missing data value is reported); and

(b) For any hour in which flue gases exhaust through all of the stacks, report the highest NO_x emission rate measured by any of the installed monitoring systems. If any of the monitoring systems is out-of-control during a particular operating hour, report the higher of the appropriate missing data value for that hour or the measured value from the system that is not out-of-control.

If you use this option, designate each NO_x-diluent CEMS as a primary monitoring system in the monitoring plan. Perform missing data substitution for NO_x at the unit level. The reported quarterly and cumulative NO_x emission rates for the unit will be arithmetic averages of the reported hourly NO_x emission rates values.

Guidelines for Combustion Turbines

Monitor the NO_x emission rate at both the main HRSG stack and at the bypass stack. Report all hourly, quarterly, and cumulative NO_x emission data and heat input data at the unit level. Also, perform missing data substitution at the unit level.

In the monitoring plan, designate the NO_x monitoring system on the HRSG stack as the primary system and the bypass stack system as the

"Primary Bypass" system using the appropriate <SystemDesignationCode> in the <MonitoringSystemData> record for each system. Additionally, for purposes of reporting:

(1) For any hour in which flue gases exhaust through only one of the stacks, report the NO_x emission rate measured at that stack (or, if the monitoring system is out-of-control, report the appropriate missing data value); and

(2) For any hour in which flue gases exhaust through both of the stacks, report the higher of the two NO_x emission rates measured by the installed monitoring systems. If either or both of the monitoring systems is out-of-control during a particular operating hour, draw the substitute data value for that hour from the bypass stack data pool.

References: §§ 75.17(c) and (d), ECMPS Emissions Reporting Instructions, Sections 2.1 and 2.5.2

Question 16.6

Topic: SO_2 Monitoring in Multiple Stacks or Ducts

Question: What are the requirements for SO_2 monitoring and reporting for a unit with multiple stacks or multiple ducts, when the monitoring systems are located in the ducts?

Answer: You must install and identify separate SO_2 and flow monitoring systems for each stack or duct in the monitoring plan. Use a unique system ID for each system in one stack or duct and a different system ID for the monitoring system of the same pollutant in the other stack or duct. Each system should be tested and certified separately. Missing data substitution procedures apply separately to each stack or duct as well.

Do not report hourly SO_2 mass emissions on a unit basis. Instead, for each hour of unit operation, report, for each stack or duct, one record for SO_2 concentration, one record for flow rate, and one record for SO_2 mass emissions. Provide quarterly and cumulative SO_2 mass emissions (in tons) for each stack or duct as follows: (1) multiply each hourly mass emission rate reported for the stack or duct by the corresponding stack operating time; (2) take the sum of these products; and (3) convert to tons.

Report cumulative SO_2 mass emissions only for the individual stacks or ducts in the multiple stack/duct configuration. Do *not* report the combined SO_2 mass emissions for the affected unit.

References: § 75.16, Appendix F, Section 2.3

Question 16.7

Topic: CO_2 Monitoring and Reporting for Multiple Stacks or Ducts

Question: What are the requirements for CO_2 monitoring and reporting for a unit with multiple stacks or ducts?

Answer: If you choose to use O_2 or CO_2 analyzers to calculate CO_2 mass emissions, install analyzers in all stacks or ducts. Calculate and report the CO_2 mass emission rate in tons/hr for each stack or duct separately.

Provide quarterly and cumulative CO_2 mass emissions for each stack or duct as follows: (1) multiply each hourly mass emission rate reported for the stack or duct by the corresponding stack operating time; and (2) take the sum of these products.

Report cumulative CO_2 mass emissions only for the individual stacks or ducts in the multiple stack/duct configuration. Do *not* report the combined CO_2 mass emissions for the affected unit.

References: § 75.13(c); Appendices F and G

Question 16.8

Topic: Heat Input Calculations and Reporting for Monitoring in Multiple Stacks or Ducts

Question: What are the requirements for heat input reporting for a unit using CEMS in multiple stacks or ducts?

Answer: You must calculate hourly heat input rate for each stack or duct individually and report this value for that stack or duct. Calculate the hourly heat input rate for the unit by summing the heat input values for the corresponding stacks or ducts for that hour and dividing by the unit operating time (using Equation F-21c) and report that value reported for the unit.

Provide quarterly and cumulative heat input data for each stack or duct in the multiple stack or duct configuration. Also provide quarterly and cumulative *composite* heat input data for the affected unit (i.e., the sum of the duct or stack heat inputs).

For each stack or duct, determine the quarterly or cumulative heat input as follows: (1) multiply each hourly heat input rate for the stack or duct by the corresponding stack operating time; and (2) take the sum of these products.

References: § 75.16

Question 16.9

Topic: Operating Data for Monitoring in Multiple Stacks or Ducts

Question: What are the requirements for reporting operating data for a unit using CEMS in multiple stacks or ducts?

Answer: For any quarter in which the unit operates at all, operating data must be submitted for all hours in the quarter for both the unit and the stacks or ducts. If, during any unit operating hour, the damper to a particular stack or duct is completely closed and the monitors in the stack or duct are recording zero emissions, report an operating time of zero (0.00) for that stack or duct, indicating a non-operating status for the hour.

References: § 75.64

Question 16.10

Topic: Reporting Partial Operating Hours for Multiple Stack Units

Question: A unit has two stacks and a damper that can direct emissions from one stack to the other. Suppose that emissions go through one stack for the first 20 minutes of the hour, and through the other stack for the remainder of the hour. How many operating hours should be reported for each stack and for the unit?

Answer: You may report the actual portion of the hour in which each stack was used, to the nearest hundredth of an hour (0.3 operating hours for the first stack, 0.67 operating hours for the second stack, and 1.00 operating hours for the unit). Alternatively, you may report the next highest quarter hour in which each stack was used (0.50 operating hours for the first stack, 0.75 for the second stack, and 1.00 operating hours for the unit).

References: § 75.57(b)

[This page intentionally left blank.]

SECTION 17
CONVERSION PROCEDURES

Page

17.1 F-factors During Co-firing 17-1

17.2 Load and Heat Input Rate Determination for Combustion Turbines and Cogenerators 17-1

17.3 Missing F-factor Data 17-4

17.4 Missing Data Load Ranges for Combustion Turbines 17-4

[This page intentionally left blank.]

Question 17.1

Topic: F-factors During Co-firing

Question: When burning more than one fuel in a boiler during startup or shutdown, what F-factor should be used?

Answer: If accurate measurement of quantities of both fuels can be determined, use the BTU weighted average procedure specified in Part 75, Appendix F (Sections 3.3.5 and 3.3.6.4). However, if measurement of the startup/shutdown fuels cannot be accurately determined, then during the transition periods of co-firing use the F-factor that will produce the higher NO_x emission rate in order to prevent under-reporting of emissions (Section 3.3.6.5).

References: Appendix F, Sections 3.3.5, 3.3.6.4, and 3.3.6.5

Question 17.2

Topic: Load and Heat Input Rate Determination for Combustion Turbines and Cogenerators

Question: For combustion turbines, how do I report unit load and heat input rate? Are there any special considerations for cogeneration facilities?

Answer: Report all of the hourly heat input to the unit and report a consistent measure of unit load.

Heat Input Rate Reporting

Report unit heat input rate, as follows:

(1) For a simple-cycle combustion turbine (CT) without a heat recovery steam generator (HRSG), or a for a combined-cycle turbine that has an HRSG but does not have auxiliary firing, report the hourly heat input rate to the CT; or

(2) For a combined-cycle turbine that has both an HRSG and auxiliary firing (e.g., a duct burner), report the combined hourly heat input to the CT and the auxiliary combustion source.

Unit Load Reporting

Report the unit load as follows:

(1) For a simple-cycle turbine, report the electrical output (in megawatts) from the generator that serves the CT; or

(2) For a combined-cycle unit (with or without auxiliary firing), if a single generator serves both the CT and the HRSG, report the electrical output (megawatts) from this generator; or

For a combined-cycle unit (with or without auxiliary firing), if separate generators serve the CT and HRSG, add the electrical outputs (megawatts) from these generators[1]; or

(3) If the HRSGs of two or more combined cycle units (CCUs) share a common steam turbine, then, for each CCU, add the electrical output (megawatts) from the generator that serves the CT to an apportioned fraction of the electrical output from the shared steam turbine. Apportion the combined electrical load from the common steam turbine to the individual CCUs according to the fraction of the total steam load contributed by each unit. Alternatively, if the turbines are *identical*, you may apportion the combined electrical load from the common steam turbine to the individual CCUs according to the fraction of the total heat input contributed by each unit.

Example 1: Suppose that combined-cycle units CT1 and CT2 share a common steam turbine. For a particular hour, the electrical loads at the generators serving CT1 and CT2 are 100 and 150 MW, respectively, and the electrical load at the common steam turbine is 120 MW. If the measured steam loads from the heat recovery steam generators of CT1 and CT2 are 200,000 and 300,000 klb/hr, what unit loads should be reported in RT 300 for CT1 and CT2?

To determine the load for CT1, add the load from the generator serving CT1 to a fraction of the load at the common turbine, apportioned by steam load, i.e., 100 MW + (200,000/500,000)(120 MW), or *148 MW*. Similarly, for CT2, the reported unit load should be 150 MW + (300,000/500,000)(120MW), or *222 MW*.

Example 2: Suppose that the turbines in Example 1 are *identical*. If, for a particular hour, the heat inputs to CT1 and CT2 are 1000 and 1500 mmBtu, respectively, the heat inputs to the duct burners are 200 and 300 mmBtu, respectively, and the electrical loads are the same as in Example 1. What unit loads should be reported in RT 300 for CT1 and CT2?

First, determine the fraction of the total heat input associated with each unit. The total heat input is 1000 + 1500 + 200 + 300 = 3000 mmBtu. The fraction of the total heat input contributed by CT1 is (1000 +

[1] An earlier version of Question 17.2 advised you to report only the electrical output from the CT, for a combined-cycle unit without auxiliary firing. Under this revised policy, you may continue to report that way. However, if that method of reporting unit load is inconsistent with the requirements of other applicable regulations, EPA recommends that you consider revising your monitoring plan and re-programming your DAHS, so that the total unit load is represented, including any steam or electrical output from the HRSG.

200)/3000, or 0.40, and for CT2 it is (1500 + 300)/3000, or 0.60. To determine the load for CT1, add the load from the generator serving CT1 to 0.40 times the load at the common steam turbine, i.e., 100 MW + (0.40)(120 MW), or *148 MW*. Similarly, for CT2, the reported unit load should be 150 MW + (0.60)(120 MW), or *222 MW*.

For cogeneration facilities, where part of the output is electrical load and part of it is steam load, consistency in reporting unit load is essential. The owner or operator may either convert the steam load portion to an equivalent electrical load and report the unit load in megawatts, or may convert the electrical output to an equivalent steam load and report the unit load in klb/hr of steam[1].

For combined cycle combustion turbines that use the combustion turbine to generate electricity and use the HRSG to produce steam which is not used for electrical generation, one acceptable way to convert the steam portion of the load to an equivalent electrical load is to use the following equation:

$$L_{eq} = K\, \eta_{hrsg}\, [(1 - \eta_t)(HI_t) + HI_a]$$

Where:

L_{eq} = Equivalent electrical load for the steam generated by the HRSG (MW)

η_{hrsg} = Efficiency of the HRSG in converting heat input to electricity (Use either the actual, measured efficiency or a default value of 0.30)

η_t = Efficiency of the combustion turbine in converting heat input to electricity (Use either the actual, measured efficiency or a default value of 0.33)

HI_t = Heat input rate to the turbine (mmBtu/hr)

HI_a = Heat input rate to the HRSG (if any) from an auxiliary combustion source, e.g., a duct burner (mmBtu/hr)

K = Conversion factor (0.293 MW-hr/mmBtu)

References: § 75.57(b)

1 An earlier version of Question 17.2 advised you to report only the electrical output from the CT, for a combined-cycle unit without auxiliary firing. Under this revised policy, you may continue to report that way. However, if that method of reporting unit load is inconsistent with the requirements of other applicable regulations, EPA recommends that you consider revising your monitoring plan and re-programming your DAHS, so that the total unit load is represented, including any steam or electrical output from the HRSG.

Question 17.3

Topic: Missing F-factor Data

Question: If an Appendix D unit is burning multiple fuels and the owner/operator has chosen to determine their NO_x emissions based on a prorated F-factor calculated from the heat input from each fuel, how should they determine the NO_x emissions for an hour in which they are missing heat input data for one of the fuels?

Answer: Use the F-factor from the fuel with the highest F-factor that is burned in a given hour.

References: Appendix D, Section 2.4; Appendix F, Section 3

Question 17.4

Topic: Missing Data Load Ranges for Combustion Turbines

Question: For combustion turbines, how do you establish the missing data load ranges (load "bins") required under Section 2.2.1 of Appendix C?

Answer: Establish the load ranges in terms of percent of the maximum hourly gross load (MHGL) of the unit, as follows:

(1) For a simple-cycle turbine, the MHGL is the maximum electrical output (in megawatts) of the generator that serves the CT; or

(2) For a combined-cycle unit (with or without auxiliary firing), if a single generator serves both the CT and the HRSG, the MHGL is the maximum electrical output (megawatts) of this generator; or

(3) For a combined-cycle unit (with or without auxiliary firing), if separate generators serve the CT and HRSG, the MHGL is the sum of the maximum electrical outputs (megawatts) of these generators[1]; or

(4) If the HRSGs of two or more combined cycle units (CCUs) share a common steam turbine, then, for *each* CCU, the MHGL is the sum of the maximum electrical output (in megawatts) of the generator that serves the CT and the maximum electrical output obtainable from its HRSG; or

[1] An earlier version of Question 17.2 advised you to report only the electrical output from the CT, for a combined-cycle unit without auxiliary firing. Under this revised policy, you may continue to report that way. However, if that method of reporting is inconsistent with the requirements of other applicable regulations, EPA recommends that you consider revising your monitoring plan and re-programming your DAHS, so that the total unit load is represented, including any steam or electrical output from the HRSG.

(5) For cogeneration facilities, where the HRSG is not used for electrical generation, the MHGL is the sum of the maximum output of the generator that serves the CT and the maximum output from the HRSG. You may express these outputs either in megawatts or in klb/hr of steam, provided that the MHGL for the CCU is calculated on a consistent basis.

One acceptable way of converting the maximum heat input to the HRSG to an equivalent electrical load is to use the following equation:

$$L_{max} = K\ \eta_{hrsg}\ [(1 - \eta_t)(HI_{tm}) + HI_{am}]$$

Where:

L_{max} = Maximum equivalent electrical load for the HRSG (MW)

η_{hrsg} = Efficiency of the HRSG in converting heat input to electricity (Use either the actual, measured efficiency or a default value of 0.30)

η_t = Efficiency of the combustion turbine in converting heat input to electricity (Use either the actual, measured efficiency or a default value of 0.33)

HI_{tm} = Maximum heat input rate to the turbine (mmBtu/hr)

HI_{am} = Maximum heat input rate to the HRSG (if any) from an auxiliary combustion source, e.g., a duct burner (mmBtu/hr)

K = Conversion factor (0.293 MW-hr/mmBtu)

References: Appendix C, Section 2.2.1

[This page intentionally left blank.]

SECTION 18
APPLICABILITY

Page

18.1 New Unit Exemptions (from Monitoring Requirements) 18-1

18.2 Diesel-fired Units 18-1

[This page intentionally left blank.]

Question 18.1

Topic: New Unit Exemptions (from Monitoring Requirements)

Question: Which units are eligible for a new unit monitoring exemption under Title IV?

Answer: In accordance with the provisions of § 72.7 and § 75.2(b)(1), if a new unit serves a generator (or generators) with a total capacity of 25 MWe or less and burns only fuels with a sulfur content of 0.05 weight percent or less, then that unit would be exempt from Acid Rain monitoring requirements.

References: § 72.7, § 75.2(b)(1)

Question 18.2

Topic: Diesel-fired Units

Question: Is a combustion turbine firing #2 fuel oil considered a diesel-fired unit, and therefore, exempt from opacity monitoring requirements?

Answer: 40 CFR 72.2 defines diesel fuel as "a low sulfur fuel oil of grades 1-D or 2-D, as defined by the American Society for Testing and Materials standard ASTM D 975-91, 'Standard Specification for Diesel Fuel Oils,' grades 1-GT or 2-GT, as defined by ASTM D2880-90a, 'Standard Specification for Gas Turbine Fuel Oils,' or grades 1 or 2, as defined by ASTM D396 90a, 'Standard Specification for Fuel Oils'."

A combustion turbine would be considered a diesel-fired unit for purposes of the monitoring requirements in Part 75 if it uses primarily diesel fuel, and uses only gaseous fuels as a secondary fuel source. This type of diesel-fired combustion turbine would be exempt from opacity monitoring.

References: § 72.2

[This page intentionally left blank.]

SECTION 19
REFERENCE METHODS AS BACKUP MONITORS

Page

19.1 Dilution Systems and Reference Method Applications 19-1

19.2 Span Settings for RM Backup Monitoring Systems 19-2

19.3 Calibration Gas Concentrations for RM Backup Monitoring 19-2

19.4 Use of Calibration Gas Dilution Devices with Reference Methods 19-3

19.5 RM Backup System Calibration Error and System Bias Checks 19-3

19.6 Acceptable Calibration Error for RM Backup Monitoring 19-4

19.7 Validation of RM Backup data 19-4

19.8 RM Backup Monitor Zero and Calibration Drift Checks 19-5

19.9 RM Backup System Calibration Error and System Bias Data 19-5

19.10 Frequency of 3-Point Analyzer and System Calibration Error Checks 19-6

19.11 Dilution-type RM Backup Monitoring Systems 19-6

19.12 Selection of RM Backup Monitor Sampling Location and Points 19-7

19.13 System Response Time and RM Backup Monitoring 19-8

19.14 Run Length for RM Backup Gas Analyzers 19-8

19.15 Minimum Data Requirements and Data Reduction for RM Backup Test Runs 19-9

19.16 Stack Gas Moisture and RM Backup Monitoring 19-9

19.17 Correction of RM Backup Monitoring Data for Moisture 19-10

Page

19.18 Moisture Basis of Primary and RM Backup Monitors 19-11

19.19 Restrictions on Use of RM Backup Monitoring 19-11

19.20 Interference Chack Requirements for Instrumental Reference Methods 19-12

19.21 RM Backup Monitoring and NO_x Conversion Efficiency Tests 19-12

19.22 Data Adjustments for Gas RM Backup Systems 19-12

19.23 Bias Adjustment Factors and RM Backup Monitoring........................ 19-13

19.24 Monitoring Plan Requirements for RM Backup Systems.................... 19-13

19.25 Formulas and RM Backup Monitoring 19-14

19.26 Submission of Revised Monitoring Plans Containing RM Backup Systems... 19-14

19.27 DAHS Verification for RM Backup Formulas 19-15

19.28 Reporting of Data from RM Backup Gas Monitors............................ 19-15

19.29 Reporting of Data from RM Backup Gas Monitors............................ 19-15

19.30 Recordkeeping Requirements for RM Backup Monitoring................. 19-17

19.31 Use of EPA Reference Methods for Monitoring Flow Rate................ 19-18

19.32 Monitoring Plan Requirements for RM 2 Backup Monitoring............ 19-19

19.33 Reporting of Flow Rate from RM Backup Monitors........................... 19-19

BACKGROUND

Section 75.24(c)(2) of Part 75 allows the use of EPA reference methods for data collection and reporting whenever a primary monitoring system is out-of-control. Section 75.20(d) of Part 75 further states that a monitoring system that is operated as a reference method (RM) may be used to provide quality-assured data for Part 75 reporting purposes. In particular, the following reference methods in 40 CFR Part 60, Appendix A may be used as RM backup monitors: Methods 6C, 7E, and 3A for SO_2, NO_x, and CO_2/O_2, respectively, and Method 2 for stack gas flow rate. These methods do not require certification prior to use.

POLICY

The following policy guidance, in question-and-answer format, outlines the general procedures to be followed when EPA Reference Methods are adapted for use as backup monitoring systems to collect data for Part 75 reporting. Note that the procedures and guidelines set forth in this policy are specific to Part 75 monitoring applications, and are not necessarily appropriate for use in other programs.

Question 19.1

Topic: Dilution Systems and Reference Method Applications

Question: Is it acceptable to use an in-stack dilution probe or an out-of-stack (ex-situ) dilution device as part of a Reference Method 6C, 7E, or 3A measurement system that is used for Part 75 backup monitoring? If so, may this type of system also be used for Part 75 RATA applications?

Answer: Yes, to both questions. Except for the measurement of O_2 with Method 3A, an in-stack dilution probe or an ex-situ dilution device may be used as part of a Reference Method 6C, 7E, or 3A system, for Part 75 backup monitoring and RATA applications.

References: § 75.20(d)(3), § 75.22, § 75.24(c)(2), Methods 3A, 6C, and 7E in Appendices A-2 and A-4 to 40 CFR Part 60

Question 19.2

Topic: Span Settings for RM Backup Monitoring Systems

Question: When instrumental Reference Methods 6C, 7E, and 3A are used as backup Part 75 gas monitors, what are the proper span values for the measurement systems?

Answer: The span values for RM backup gas monitoring systems are not determined in the same manner as the span values of Part 75 gas monitors. Rather, the span of RM backup monitors must be set in a manner consistent with Methods 6C, 7E and 3A. The May 15, 2006 revisions to these instrumental methods define the "calibration span" of the analyzer as equal to the concentration of the high-level calibration gas. The high-level gas concentration is selected so that the measured emissions will fall between 20 and 100 percent of the calibration span.

References: § 75.20(d)(3); Part 75, Appendix A, Section 2.1; Method 7E, Sections 3.3.3 and 3.4

Question 19.3

Topic: Calibration Gas Concentrations for RM Backup Monitoring

Question: What calibration gas concentrations are needed to operate a Part 75 backup RM gas monitor?

Answer: At least two EPA Protocol gases (mid-level and high-level) are needed. A low-level gas is also required. The low-level gas must be an EPA Protocol gas unless it meets the definition of "zero air material" in 40 CFR 72.2.

The proper concentrations of the gases are defined in terms of the calibration span value for the instrumental method, and are as follows:

(1) Low-level: Less than 20% of the calibration span;

(2) Mid-level: 40 to 60% of the calibration span; and

(3) High-level: Equal to the calibration span.

References: § 75.20(d)(3); Method 7E, Sections 3.3 and 3.3.1 through 3.3.3

Question 19.4

Topic: Use of Calibration Gas Dilution Devices with Reference Methods

Question: Is it permissible to use calibration gas dilution devices with instrumental Reference Methods 6C, 7E, and 3A?

Answer: At the present time, gas dilution devices (such as those described in EPA Method 205), which enable the tester to generate calibration gases of various compositions from a single, high-concentration cylinder of Protocol gas, may *not* be used for Part 75 RM backup monitoring or RATA applications. However, EPA will consider allowing the use of gas dilution devices if demonstration data are provided to show that for linearity checks and RATAs performed using the dilution device, the test results are equivalent to those obtained using undiluted Protocol gases.

References: § 75.20(d)(3); 40 CFR 51, Appendix M, Method 205

Question 19.5

Topic: RM Backup System Calibration Error and System Bias Checks

Question: Are separate system calibration error checks and system bias checks necessary for Part 75 Reference Method backup gas monitoring systems?

Answer: For dry-extractive RM systems, separate 3-point analyzer calibration error checks prior to the commencement of any test runs and 2-point system bias checks before and after each run are required by Reference Methods 6C, 7E, and 3A. Analyzer calibration error and system bias are calculated using Equations 7E-1 and 7E-2 in Method 7E, respectively.

For dilution-type RM systems, it is technically infeasible to perform the 3-point analyzer calibration error check, because the low range of the analyzers precludes direct injection of undiluted calibration gases at the analyzer. In addition, the concept of system bias cannot be applied to dilution systems because the results of system calibrations cannot be referenced to calibrations of the isolated analyzers.
Therefore, for dilution-type RM systems, system calibration error tests, which check the entire system from probe to analyzer, are performed. An initial 3-point system calibration error test is required, prior to commencing any runs, using the zero, mid, and high-level gases. Thereafter, a 2-point system calibration error check is performed after each run, using the zero-level gas and whichever upscale gas (mid or high) is closest to the actual source emissions. The system calibration error is calculated using Equation 7E-3 in Method 7E.

References: § 75.20(d)(3); Method 7E, Sections 8.2.3, 8.2.5, 8.5, and 12.2 through 12.4

Question 19.6

Topic: Acceptable Calibration Error for RM Backup Monitoring

Question: For Part 75 RM backup gas monitoring systems, how much calibration error is acceptable in the pre-and post-test calibrations?

Answer: For the initial 3-point analyzer calibration error check of a dry extractive monitoring system, Methods 6C, 7E, and 3A allow calibration errors of up to ± 2.0% of the calibration span. For pre- and post-run bias checks, the system bias must be within ± 5.0% of the calibration span. Alternatively, the results of an analyzer calibration error check or a bias check are acceptable at any calibration gas level if the absolute difference between the reference and measured values does not exceed: 0.5 ppmv SO_2; 0.5 ppmv NO_x; 0.5 percent O_2; or 0.5 percent CO_2 (as applicable).

For the initial 3-point system calibration error check of a dilution system, the calibration error at each point must be within ± 2.0 % of the calibration span. For the subsequent 2-point system calibration error checks, the system calibration error must be within ± 5.0% of the calibration span at each point. Alternatively, the results of a system calibration error check are acceptable at any calibration gas level if the absolute difference between the reference and measured values does not exceed: 0.5 ppmv SO_2; 0.5 ppmv NO_x; 0.5 percent O_2; or 0.5 percent CO_2 (as applicable).

References: § 75.20(d)(3); Method 7E, Sections 13.1 and 13.2, Method 6C, Section 13.1, and Method 3A, Section 13.0

Question 19.7

Topic: Validation of RM Backup Data

Question: What criteria are used to validate a test run when a Part 75 RM backup gas monitoring system is used?

Answer: For dry-extractive monitoring systems, the run is validated if the RM backup system passes the post-run system bias check. For dilution-type RM backup systems, a run is validated if the CEMS passes the post-run system calibration error check. Whenever a RM backup monitor test run is invalidated, the Part 75 missing data procedures must be applied to fill in data for each hour of the test run.

References: § 75.20(d)(3); Method 7E, Section 8.5, §§ 75.31–75.37

Question 19.8

Topic: RM Backup Monitor Zero and Calibration Drift Checks

Question: Are zero and calibration drift checks necessary for Part 75 RM backup gas monitors?

Answer: Yes. For dry-extractive systems, the zero ("low-level") and calibration ("upscale") drift (i.e., the absolute difference between pre-run and post-run system bias responses) allowed by RM 6C, 7E, and 3A is 3.0% of the calibration span. For dilution systems, the allowable drift (i.e., the absolute difference between pre-run and post-run system calibration error responses) is also 3.0% of the calibration span. Low-level and upscale drift are calculated using Equation 7E-4 in Method 7E.

Exceeding the drift limit does not invalidate the run. However, for a dry-extractive system, a 3-point analyzer calibration error check and a system bias test must be successfully completed before additional test runs are conducted. For dilution-type systems, a 3-point system calibration error test must be successfully completed before additional test runs are conducted.

References: § 75.20(d)(3); Method 7E, Sections 8.5, 12.5, and 13.3

Question 19.9

Topic: RM Backup System Calibration Error and System Bias Data

Question: For Part 75 RM backup gas monitoring systems, is it permissible to use the data obtained during the post-run system calibration error or system bias checks as the pre-run data for the next run? For dilution-type systems, is it acceptable to use the results of the initial 3-point system calibration error check as pre-run calibration error data for the first RM test run?

Answer: Post-run system bias check or system calibration error data may be used as pre-run data for the next run, but only if the post-run results indicate that all of the applicable calibration error, bias, and calibration drift specifications have been met.

For dilution-type RM backup systems, you may use two of the three data points obtained during the initial 3-point system calibration error check as the two pre-run calibration values for the initial RM run.

References: § 75.20(d)(3); Method 7E, Sections 8.2.5 and 8.5

Question 19.10

Topic: Frequency of 3-Point Analyzer and System Calibration Error Checks

Question: How often must the 3-point analyzer calibration error check (for dry-extractive RM systems) or the 3-point system calibration error check (for dilution-type RM systems) be performed?

Answer: A 3-point analyzer or system calibration error check is required before any RM test runs are initiated. Thereafter, the test does not have to be repeated so long as an unbroken sequence of RM test runs is conducted (with less than two hours between runs) and the RM analyzer continues to pass the post-run bias (or calibration error) and drift checks. However, if two or more hours elapse between the ending and beginning times of successive test runs or if any required post-run check (i.e., system bias, system calibration error, zero drift, or calibration drift) is failed, the 3-point calibration must be repeated before any more RM runs are done.

References: § 75.20(d)(3); Method 7E, Sections 8.2.3 and 8.5

Question 19.11

Topic: Dilution-type RM Backup Monitoring Systems

Question: Are there additional procedural variations or special considerations to take into account when using a dilution-type RM backup gas monitoring system?

Answer: Yes. In order to obtain consistent and accurate results with a dilution-type system, it is essential to take into account the following:

(1) The critical orifice size and dilution ratio must be selected properly, to ensure that the water and acid dewpoints of the diluted sample will be below the sample line and instrument temperatures.

(2) A high quality, accurate probe controller must be used, to carefully maintain the proper dilution air pressure and ratio during sampling.

(3) Differences in molecular weight between calibration gas mixtures and stack gas must be taken into account, as these can affect the dilution ratio and introduce measurement bias.

References: § 75.20(d)(3); Method 7E, Section 8.3

Question 19.12

Topic: Selection of RM Backup Monitor Sampling Location and Points

Question: How are the sampling site and measurement points selected for Part 75 RM backup gas and flow rate monitoring systems?

Answer: **Gas Monitors:** Use the following siting and point location guidelines for Part 75 RM backup monitoring systems:

Sampling Location

The RM sampling site must be selected to ensure representative measurement of the actual emissions discharged to the atmosphere from the unit or stack. Follow the guidelines of Section 6.5.5 of Appendix A to Part 75 (i.e., the sampling location must be: (a) accessible; (b) in the same proximity as the CEMS location; and (c) meet the requirements of Performance Specification 2 (PS 2) in Appendix B to Part 60).

Sampling Point(s)

Follow the guidelines of Section 6.5.6 of Appendix A to Part 75 (i.e., the RM sampling point(s) must: (a) ensure that representative concentration measurements are obtained; and (b) meet the requirements of PS 2). To achieve this, the tester has the following options:

(1) Use three traverse points per test run, located in accordance with Section 8.1.3.2 of PS 2, and sample for an equal amount of time at each point; or

(2) Use a single, representative sampling point that meets the location criteria in (a) or (b), below:

(a) The selected point is acceptable if located within 30 cm of the measurement point of an installed, certified Part 75 gas monitoring system. (The RM probe may be located up to 2 feet above or below the plane of measurement of the installed CEMS; however, when the RM probe is projected onto the CEMS measurement plane, the CEM and RM sample points must be separated by 30 centimeters or less.)

(b) The selected point is acceptable if it is no less than 1.0 meters from the stack wall and is demonstrated to be representative of the source emissions by means of a 12-point stratification test for the pollutant(s) to be monitored. Conduct the stratification test in accordance with Section 6.5.6.1 of Appendix A to Part 75. In order for the selected point to be suitable for RM backup monitoring, the point must meet the acceptance criteria in Section 6.5.6.3(b) of Appendix A.

Flow Monitors: The sampling site and measurement point locations must conform to the requirements of EPA Reference Methods 1 and 2.

References: § 75.20(d)(3); Part 75, Appendix A, Sections 6.5.5 and 6.5.6; 40 CFR 60, Appendix B, Performance Specification 2

Question 19.13

Topic: System Response Time and RM Backup Monitoring

Question: What is meant by the "system response time" of a Part 75 RM backup gas monitoring system?

Answer: The system response time is the time required for the RM analyzer to give a stabilized reading, in response to step changes in calibration gas concentrations during the pre-test system calibration error tests (for dilution systems) or during the pre-test system bias checks (for dry-extractive systems). Specifically, the system response time is the time needed for the measurement system to display 95 percent of a step change in gas concentration on the data recorder. Round off the system response time to the nearest minute.

References: § 75.20(d)(3); Method 7E, Sections 8.2.5 and 8.2.6

Question 19.14

Topic: Run Length for RM Backup Gas Analyzers

Question: What is the proper run length for Part 75 RM backup gas monitors?

Answer: Run times as close as practicable to one hour are recommended, since Part 75 requires all data from gas monitoring systems to be reduced to hourly averages. But run lengths of up to eight (8) hours are permissible for Part 75 RM backup monitoring systems. Note that as the length of a test run increases, the likelihood of an analyzer failing a post-test bias or system calibration error test and invalidating the run, also increases.

References: § 75.20(d)(3); § 75.10(d)(1), Method 7E, Section 8.5

Question 19.15

Topic: Minimum Data Requirements and Data Reduction for RM Backup Test Runs

Question: What is the minimum required number of data points per run for Part 75 RM backup gas monitors, and how are the raw data reduced to hourly averages?

Answer: Each RM backup monitoring run must meet the minimum data capture requirement for continuous monitoring systems in § 75.10(d)(1) (i.e., a minimum of one valid data point (e.g., one-minute average) must be obtained in *each* 15-minute quadrant of each unit operating hour, except when required quality assurance activities are conducted during the hour, in which case, only two valid data points, separated by at least 15-minutes, are required. The calibration error, bias, and drift checks of RM 6C, 7E, and 3A fall within the definition of required quality assurance activities.

The raw data from each run are reduced to hourly averages as follows: For each individual clock hour of the run, calculate the (unadjusted) arithmetic average of all valid data points obtained during that hour. Then, adjust the hourly average for each clock hour of the run for calibration bias, using Equation 7E-5b (or Equation 7E-5a, if applicable) in Method 7E.

References: § 75.20(d)(3); § 75.10(d)(1), Method 7E, Section 12.6

Question 19.16

Topic: Stack Gas Moisture and RM Backup Monitoring

Question: Does stack gas moisture content have to be determined during Part 75 RM backup gas monitor test runs?

Answer: Only in certain cases. Moisture corrections will not be required if a dilution-type (wet basis) RM backup monitor is used (except possibly for a NO_x-diluent system), because flow measurement is also on a wet basis, and therefore mass emission rates and heat input rates can be calculated directly. However, if a dry-basis backup RM pollutant concentration monitor is used, moisture correction will be required (except possibly for a NO_x-diluent system), in order to calculate the mass emission rates, and heat input rates.

For a NO_x-diluent RM backup monitoring system, moisture correction will be necessary only if the moisture basis of the NO_x pollutant concentration monitor is different from the moisture basis of the diluent monitor. Proper calculation of the NO_x emission rate in lb/mmBtu requires that the pollutant and diluent measurements be on a common moisture basis.

When moisture correction is necessary, data from a certified continuous moisture monitoring system or an appropriate fuel-specific default moisture value may be used (see §§ 75.11(b) and 75.12(b)). Reference Method 4 in Appendix A of 40 CFR 60 (or its allowable equivalents or alternatives) may also be used to determine the stack gas moisture content during each backup RM monitor test run, if necessary.

If Method 4 is used, for sampling runs of one hour or less, moisture data must be collected in at least one of the 15-minute periods during which gas concentration measurements are made with RM 6C, 7E, or 3A. For runs greater than one hour in duration, a Method 4 moisture measurement must be made during at least one 15-minute period of each clock hour of the run.

Note: EPA has authorized the use of Approximation Method 4, which is a less rigorous moisture measurement technique than regular Method 4, for such applications (see EMTIC Guideline Document, GD-23, May 19, 1993).

References: §75.20(d)(3); §§75.11(b) and 75.12(b); Method 4 in Appendix A-3 to 40 CFR Part 60

Question 19.17

Topic: Correction of RM Backup Monitoring Data for Moisture

Question: If a primary, wet-basis SO_2 monitor is replaced by a dry-basis RM backup monitor, should the required moisture correction be applied to the reported hourly SO_2 concentrations?

Answer: No. For consistency in Part 75 reporting, the hourly SO_2 concentration obtained with the RM backup monitoring system should be reported on the moisture basis of the reference method monitor (in this case, on a *dry* basis) and the moisture correction should be applied when calculating values in the records.

The stack gas moisture content is reported in either the Monitor Hourly Value (MHV) emissions data records or, if a default moisture value is used, in a Monitoring Default Data record in the electronic monitoring plan. An appropriate formula must be included in a Monitor Formula Data record in the electronic monitoring plan, indicating how the moisture content, dry SO_2 concentration, and volumetric flow rate are used to calculate the SO_2 mass emission rate. The formula ID number must be referenced in the Derived Hourly Value (DHV) data records for SO_2 mass emission rate.

References: § 75.20(d)(3); ECMPS Emissions Reporting Instructions, Sections 2.5.1 and 2.5.2; ECMPS Monitoring Plan Reporting Instructions, Sections 9.0 and 10.0

Question 19.18

Topic: Moisture Basis of Primary and RM Backup Monitors

Question: For the wet and dry-basis primary and RM backup SO_2 monitors described in the previous Question, does reporting SO_2 concentration data on two different moisture bases affect the precision of the SO_2 missing data substitution values?

Answer: Yes, but the effect is considered to be minimal. The maximum amount of additional imprecision introduced into the 90th and 95th percentile substitution values by the occasional use of backup RM monitors is conservatively estimated to be about one percent, assuming that ten percent of the "look-back" values are RM readings, and that the moisture bias of each RM data point is ten percent. Recognizing that missing data values, by nature, are somewhat imprecise, this slight additional loss in accuracy is outweighed by the benefits of achieving consistency in Part 75 data reporting.

References: § 75.20(d)(3); §§ 75.31-75.37

Question 19.19

Topic: Restrictions on Use of RM Backup Monitoring

Question: Is there any limit on the number of hours that RM backup monitoring system may be operated under Part 75?

Answer: The only restriction is that when the primary monitoring system is operating and not out-of-control, the primary system must be used for data reporting under Part 75.

References: § 75.20(d)(3); § 75.10(e), § 75.24

Question 19.20

Topic: Interference Check Requirements for Instrumental Reference Methods

Question: What are the interference check requirements for instrumental reference methods in Part 75 applications?

Answer: The interference check requirements for the instrumental reference methods used in Part 75 applications are found in Section 8.3 of Method 6C, Section 8.2.7 of Method 7E, and Section 8.3 of Method 3A.

References: § 75.20(d)(3); Method 7E, Section 8.2.7, Method 6C, Section 8.3, and Method 3A, Section 8.3

Question 19.21

Topic: RM Backup Monitoring and NO_x Conversion Efficiency Tests

Question: Is a Part 75 NO_x RM backup analyzer required to pass a NO_2 to NO conversion efficiency test prior to use?

Answer: A conversion efficiency test, using the procedures described in Section 8.2.4 of Method 7E or the alternative procedures in Section 16.2 of Method 7E, is required prior to the initial use of the analyzer as a RM backup monitor. This test must be repeated each time that the RM backup analyzer is brought into service.

It is recommended that the conversion efficiency test be repeated daily if the RM backup system is used for an extended period of time. Alternatively, performing the test after several days of use is permissible, but if the test is failed, all data from the analyzer must be invalidated, back to the date and hour of the last successful conversion efficiency test.

References: § 75.20(d)(3); Method 7E, Sections 8.2.4 and 16.2

Question 19.22

Topic: Data Adjustments for Gas RM Backup Systems

Question: Should the raw hourly average pollutant and diluent concentrations obtained with Part 75 backup RM gas monitors be reported as-recorded, or do the averages first have to be adjusted for calibration bias?

Answer: Each raw hourly average from a backup RM gas monitor must be adjusted for calibration bias, using Equation 7E-5b of Method 7E, before being reported in the Monitor Hourly Value (MHV) data record. The adjustments are made by using the pre-and post-run zero ("low-level") and upscale system responses obtained during the bias checks (for dry-extractive systems) or the pre- and post-run zero and upscale system responses during the system calibration error checks (for dilution systems). For test runs longer than one hour, the *same* pre-and post-run quality assurance data are used to adjust each of the individual hourly average concentrations obtained during the test run.

(Note: If a non-zero low-level calibration gas is used, make the calibration bias adjustments using Equation 7E-5a, rather than Equation 7E-5b.)

References: § 75.20(d)(3); Method 7E, Section 12.6

Question 19.23

Topic: Bias Adjustment Factors and RM Backup Monitoring

Question: Must a bias adjustment factor (BAF) be applied to data from Part 75 RM backup monitors, as described in Section 7.6.5 of Appendix A to Part 75?

Answer: No. Part 75 bias adjustment factors are derived from relative accuracy test data. Backup reference method monitoring systems are not required to undergo relative accuracy testing and therefore the data from these systems are not subject to the bias adjustment requirements of Section 7.6.5.

References: § 75.20(d)(3); § 75.22; Part 75, Appendix A, Section 7.6.5

Question 19.24

Topic: Monitoring Plan Requirements for RM Backup Systems

Question: Is it necessary to list Part 75 backup reference method monitoring systems in the electronic monitoring plan?

Answer: Yes. All RM backup monitoring system information must be listed in the electronic monitoring plan, for each unit or common-stack served by the RM backup system. Each RM backup system must be assigned a unique system ID number. Each component of the monitoring system must also be assigned a unique ID number.

In the Monitoring System Data record, report a System Designation Code of "RM" to indicate that a particular monitoring system is a reference method backup system.

Each backup RM system must include the certified Part 75 DAHS as a system component. If the reference method system has its own software component, this should also be listed.

If correction for moisture is required, represent a moisture monitoring system in the monitoring plan (unless a default % H_2O is used, in which case report the default moisture value in a Monitor Default Data record).

References: § 75.20(d)(3); § 75.11(b), § 75.12, § 75.53(g)(1); ECMPS Monitoring Plan Reporting Instructions, Sections 8.0 and 10.0

Question 19.25

Topic: Formulas and RM Backup Monitoring

Question: Should backup reference method gas monitoring systems be represented in the formulas in the electronic monitoring plan?

Answer: Yes. For RM backup monitoring systems, sufficient formulas must be included in the monitoring plan to represent the calculation of all required quantities (e.g., SO_2 and CO_2 mass emission rates, NO_x emissions in lb/mmBtu, heat input rate in mmBtu/hr, etc.) when the backup RM systems are used for Part 75 data reporting. Each formula must be assigned a unique identification number.

However, note that redundant formulas for a RM backup system are unnecessary if the RM backup system uses the same basic equations as the primary monitoring system.

References: § 75.20(d)(3), § 75.53(g)(1); ECMPS Monitoring Plan Reporting Instructions, Section 9.0

Question 19.26

Topic: Submission of Revised Monitoring Plans Containing RM Backup Systems

Question: When must a utility identify RM backup systems in a monitoring plan?

Answer: RM backup systems must be represented in the electronic monitoring plan prior to submitting the electronic data report for a calendar quarter in which the systems are used to report emissions data. Use the ECMPS Client Tool to add the backup RM systems to the monitoring plan. The monitoring plan changes and the quarterly emissions report may be submitted on the same date, provided that the monitoring plan revisions are made prior to submitting the emissions report.

References: § 75.20(d)(3), § 75.53(g), § 75.62(a)(1); ECMPS Monitoring Plan Reporting Instructions, Sections 1.0 and 8.0

Question 19.27

Topic: DAHS Verification for RM Backup Formulas

Question: For formulas that include signals from RM backup monitoring systems, is formula verification required?

Answer: Formula verification is recommended, but not required. ECMPS will independently recalculate the hourly emission rates and heat input values for hours in which RM backup monitoring systems are used, to ensure that the DAHS is programmed correctly.

References: § 75.20(d)(3); § 75.20(c)(10)

Question 19.28

Topic: Reporting of Data from RM Backup Gas Monitors

Question: When Part 75 backup reference method gas monitoring systems are used during a calendar quarter, how are the RM data to be represented electronically in the quarterly report?

Answer: Data generated by backup RM gas monitors must be reported as hourly averages in Monitor Hourly Value (MHV) data records. Mass emission rates and heat input rates calculated from the RM data are reported in Derived Hourly Value (DHV) data records.

References: § 75.20(d)(3), § 75.64, ECMPS Emissions Reporting Instructions, Sections 2.5.1 and 2.5.2

Question 19.29

Topic: Reporting of Data from RM Backup Gas Monitors

Question: Are there any special instructions for proper reporting of data from RM backup gas monitoring systems?

Answer: Yes. Use the following guidelines to ensure that the RM data are properly reported:

(1) The reported hourly average concentrations are the values obtained by correcting the raw RM hourly averages for calibration bias, using Equation 7E-5b of RM 7E (or Equation 7E-5a, if applicable).

(2) Report only the final gas concentrations obtained from Equation 7E-5b or 7E-5a.

- Report these values in *both* the unadjusted and adjusted concentration fields of the Monitor Hourly Value (MHV) data records for SO_2 and for NO_x, if the NO_x monitor is part of a NO_x concentration monitoring system (assume a BAF of 1.000 for all RM data).

- Report concentration data for CO_2, O_2, and NO_x (if the NO_x monitor is part of a NO_x-diluent system) *only* in the unadjusted data field of the MHV records, and leave the adjusted field blank.
- Report the concentration values on the *same* moisture basis as the reference method raw data; do *not* correct the reported values for moisture.

(3) For NO_x emission rate, report the calculated lb/mmBtu value in both the unadjusted and adjusted fields of the Derived Hourly Value (DHV) record (assume a BAF of 1.000 for all RM data).

(4) Report a Method of Determination Code of "04" in the MHV or DHV record (as applicable) for each hour in which pollutant or diluent concentration data or NO_x emission rate are obtained with a RM backup system.

(5) In the MHV data records, the component IDs and monitoring system IDs must refer to RM backup monitoring systems and components in the electronic monitoring plan.

(6) For each hourly mass emission rate and heat input rate calculated from the RM data, the formula ID reported in the DHV record must refer to the appropriate formula from the electronic monitoring plan.

References: § 75.20(d)(3), § 75.57 (Table 4a), § 75.64; Method 7E, Section 12.6; ECMPS Emissions Reporting Instructions, Sections 2.5.1 and 2.5.2; ECMPS Monitoring Plan Reporting Instructions, Sections 7.0, 8.0, and 9.0

Question 19.30

Topic: Recordkeeping Requirements for RM Backup Monitoring

Question: When Part 75 reference method backup monitoring systems are used during a calendar quarter, what records must be kept in addition to the information reported electronically to EPA in the quarterly report?

Answer: In addition to the electronic reporting requirements, the following records must be kept on-file (active for three years, except for Items (6), (7), and (8), below, which must be kept on file permanently), to be made available to EPA upon request:

(1) The hourly average data for each RM monitor test run, including date and time stamps. Keep records of both the unadjusted averages and the averages after adjustment for calibration bias.

(2) The field data for all of the required RM analyzer QA/QC activities during each run (including, as applicable, calibration error checks, bias checks, zero and calibration drift checks).

(3) The field data and calculated results for any stack gas moisture content determinations made during the RM test runs.

(4) Documentation of the calibration gas concentrations used for the analyzer QA/QC activities.

(5) Documented results of the NO_2 to NO conversion efficiency tests of each NO_x analyzer.

(6) Documentation of the required interference check of each analyzer or analyzer model (as applicable).

(7) Field data and calculated results for any measurements that were made to verify the representativeness of the RM sampling point location.

(8) The method used (if applicable) to account for stack gas molecular weight effects.

References: § 75.20(d)(3), § 75.57, § 75.59

Question 19.31

Topic: Use of EPA Reference Methods for Monitoring Flow Rate

Question: May EPA Reference Method 2 be used to provide backup data for Part 75 reporting when the primary flow monitor malfunctions?

Answer: Yes. This option is allowable under § 75.24(c)(2). However, if this method is used, sufficient RM data must be collected to represent each unit operating hour. Therefore, use the following guidelines to collect RM backup flowrate data for Part 75:

(1) The number and location of the RM traverse points must be in accordance with EPA Reference Method 1.

(2) For each full operating hour and for each partial operating hour covering more than two 15-minute quadrants, perform a minimum of two complete velocity traverses. The traverses must generate sufficient data to represent at least two of the four 15-minute quadrants in the clock hour. Successive traverses may not begin within the same 15-minute quadrant.

(3) For partial operating hours covering one or two 15-minute quadrants, perform at least one velocity traverse to validate the hour.

(4) The individual velocity head measurements should be made at evenly-spaced time intervals over the duration of each traverse.

(5) The dry-basis CO_2 and O_2 concentrations must be accounted for to determine the dry stack gas molecular weight. These concentrations may be obtained by RM 3 or 3A, or from available CEMS data. The tester may opt to use a single CO_2 and O_2 determination for a series of flow test runs at steady process operating conditions.

(6) The moisture content of the stack gas must be accounted for, in order to calculate the wet-basis stack gas molecular weight. Because the calculated flow rate is relatively unaffected by minor variations in the stack gas molecular weight, the tester may opt to make a single moisture determination to represent a series of flow test runs.

(7) For each operating hour, calculate the arithmetic average of the flow rate from all traverses performed during the hour.

References: § 75.20(d)(3); Methods 1, 2, 3, 3A, and 4 in Appendices A-1, A-2 and A-3 to 40 CFR Part 60

Question 19.32

Topic: Monitoring Plan Requirements for RM 2 Backup Monitoring

Question: What are the requirements for representing Reference Method 2 backup monitoring systems in the electronic monitoring plan?

Answer: Create a system in consisting of two components -- the velocity probe (i.e., the Type-S pitot tube) and the DAHS. Use the following guidelines to represent this system.

(1) In the Monitoring System Data record:

- Report a System Type Code of "FLOW"; and
- Report a System Designation Code of "RM."

(2) In the Component Data record for the pitot tube:

- Report a Component Type Code of "FLOW";
- Report a Sample Acquisition Method Code of "DP";
- Leave the Manufacturer and/or Model Version fields blank if the pitot tube manufacturer and/or model are not known; and
- In the Serial Number field, report the ID number engraved on the pitot tube.

References: § 75.20(d)(3), § 75.53(g)(1); ECMPS Monitoring Plan Reporting Instructions, Sections 7.0 and 8.0

Question 19.33

Topic: Reporting of Flow Rate from RM Backup Monitors

Question: When Reference Method 2 is used to generate backup flow rate data for Part 75, how are the RM data to be reported electronically in the quarterly report?

Answer: The following electronic reporting guidelines should be followed:

(1) The flow rate data must be reported in units of wet, standard cubic feet per hour (scfh) in the Monitor Hourly Value data record for volumetric flow. Report a Method of Determination Code of "04"; and

(2) Report flow rate in both the unadjusted and adjusted volumetric flow rate fields (assume a BAF of 1.000 for all RM data).

References: § 75.20(d)(3), § 75.64; ECMPS Reporting Instructions -- Emissions, Section 2.5.1

SECTION 20
SUBTRACTIVE CONFIGURATIONS

Page

20.1 Purpose of rSubtractive Stack Policy..20-2

20.2 Monitoring Requirements for SO_2 and Heat Input Rate........................20-2

20.3 Monitoring Requirements for NO_x Mass...20-6

20.4 Reporting of Hourly Heat Input Rate..20-10

20.5 Monitoring Plan Requirements...20-15

20.6 QA Requirements...20-16

20.7 Unit/Stack EDRs...20-16

20.8 Reporting Hourly Emissions Data 20-16

20.9 Cumulative Emissions Data Reporting..20-17

20.10 Missing Data Requirements..20-17

20.11 Representation for Subtractive Stack Configuration 20-18

[This page intentionally left blank.]

BACKGROUND

For the Acid Rain Program (40 CFR Parts 72 through 78), SO_2 and heat input (HI) monitoring requirements for exhaust configurations in which units discharge to the atmosphere through a common stack are defined in § 75.16. For a state or Federal NO_x mass emissions reduction program subject to Subpart H of 40 CFR 75, provisions for monitoring various common stack configurations are found in § 75.72. In the specific case where affected and nonaffected units share a common stack, the allowable monitoring options under all of these programs are similar. To determine emissions for the affected units, you may:

(1) Monitor in the duct(s) leading from the affected unit(s) to the common stack; or

(2) Monitor at the common stack and opt-in the nonaffected units; or

(3) Monitor at the common stack and attribute all of the emissions to the affected units; or

(4) Petition EPA to use an alternative approach; or

(5) Monitor the combined emissions from the affected and nonaffected units at the common stack and monitor the emissions of each nonaffected unit in the duct from the nonaffected unit to the common stack, and then determine the affected unit emissions by subtraction. Questions 20.1 through 20.11 provide monitoring and reporting guidelines for this subtractive stack configuration.

(Note: Common stack NO_x *emission rate* monitoring and reporting is not addressed in this section. For information about NO_x emission rate monitoring for affected units and nonaffected units sharing a common stack, consult Section 22 of this Policy Manual.)

DEFINITIONS

Affected Unit: A unit subject to an SO_2 or NO_x mass emissions limitation under the Acid Rain Program or under a State or Federal NO_x mass trading program.

Main Common Stack: The stack through which the emissions from *all* units (affected and nonaffected) in a subtractive stack configuration discharge to the atmosphere.

Nonaffected Unit: A unit not subject to an SO_2 or NO_x mass emissions limitation under the Acid Rain Program or under a State or Federal NO_x mass trading program.

Secondary Common Stack: A location in the ductwork of a subtractive stack configuration, upstream of the main common stack, where the combined emissions from two or more nonaffected units are monitored.

Subtractive Stack Configuration: An exhaust configuration in which combined emissions from affected and nonaffected units discharge to the atmosphere through a common stack, and for which the mass emissions and heat input from the affected unit(s) are determined by subtracting the mass emissions and heat input measured at the nonaffected unit(s) from the combined mass emissions and heat input measured at the common stack.

Question 20.1

Topic: Purpose of Subtractive Stack Policy

Question: What is the purpose of this policy?

Answer: If you have an exhaust configuration consisting of affected and nonaffected units that discharge to the atmosphere through a common stack and you elect to use the subtractive stack methodology (i.e., Option (5) under Background section, above), this policy provides guidance on emissions monitoring and reporting.

You may use this guidance under § 75.16(b)(2)(ii)(A) without approval of a petition for SO_2 mass emissions determinations under the Acid Rain Program. However, for NO_x mass emissions applications under Subpart H of 40 CFR Part 75, you must petition the Administrator and the permitting authority for permission to use a subtractive stack methodology (see § 75.72(b)(2)(ii)). If your petition is consistent with the provisions of this policy, you have reasonable assurance that the petition will be approved and your monitoring will be consistent with other facilities using a subtractive stack methodology.

References: § 75.16, § 75.72(b)(2)(ii)

Question 20.2

Topic: Monitoring Requirements for SO_2 and Heat Input Rate

Question: What are the SO_2 mass emission rate and heat input rate monitoring requirements for Acid Rain Program affected units that are in a subtractive stack configuration?

Answer: Sections 75.16(b)(2)(ii)(B) and 75.16(e) of Part 75 specify the SO_2 mass emission rate and heat input rate monitoring requirements for the common stack and for the nonaffected units in a subtractive stack configuration. These rule provisions are summarized in Sections A, B, and C, below. The hourly SO_2 mass emission rates and heat input rates described in Sections A, B and C are calculated using the applicable equations from Appendix F or Appendix D to Part 75:

A. Main Common Stack Hourly SO_2 and Heat Input Rate Monitoring Requirements

The owner or operator of an Acid Rain-affected facility with a subtractive stack configuration must monitor hourly SO_2 mass emission rate and heat input rate at the common stack using the following methodologies:

(1) For SO_2 mass emission rate: an SO_2 CEM and a flow monitor; and

(2) For heat input rate: a stack flow monitor and a diluent gas (CO_2 or O_2) monitor.

B. Nonaffected Unit(s) Hourly SO_2 Monitoring Requirements

The owner or operator must determine the hourly SO_2 mass emission rate (in lb/hr) at the nonaffected unit(s) using one of the methodologies below:

(1) Install an SO_2 CEM and a flow monitor in the duct from each nonaffected unit to the common stack; or

(2) If the emissions from two or more nonaffected units in the subtractive stack configuration are combined prior to discharging through the main common stack, you may monitor the combined nonaffected unit SO_2 emissions at a single location, defined as a second common stack, in lieu of installing separate CEMS on each unit; or

(3) For nonaffected gas or oil-fired units, you may use Appendix D SO_2 mass emission rate estimation procedures based on fuel flow rate measurements and fuel sampling.

C. Nonaffected Unit(s) Hourly Heat Input Rate Monitoring Requirements

The owner or operator must determine the hourly heat input rate at each nonaffected unit using one of the following methodologies:

(1) You may install a flow monitor and a diluent gas monitor in the duct from each nonaffected unit to the common stack; or

(2) If the flue gases from two or more nonaffected units in the subtractive stack configuration are combined prior to discharging through the main common stack, you may monitor the combined heat input rate at a single location (designated as a secondary common stack) in lieu of separately monitoring each unit. If this alternative is chosen, you must apportion the heat input rate measured at the secondary common stack to the individual nonaffected units; or

(3) In lieu of directly monitoring the heat input rate(s) of the nonaffected unit(s), you may opt to monitor heat input rate at the main common stack, only. This option is only allowed if all of the units exhausting to the common stack:

(i) Combust the same type of fuel; and

(ii) Use the same F factor.

Note that when this option is selected, the heat input rate measured at the main common stack is a *combined* rate, representing both the affected and nonaffected units. Therefore, you must apportion the main common stack heat input rate to *all* of the units (affected and nonaffected) in the subtractive stack configuration; or

(4) For nonaffected gas and oil-fired units, you may use Appendix D heat input rate estimation procedures based on fuel flow rate measurements and fuel sampling.

(Note: For a common pipe configuration, you must apportion the heat input rate measured at the common pipe to the individual nonaffected units.)

See Question 20.4 for a more detailed discussion of heat input rate apportionment in subtractive stack configurations.

D. Affected Unit(s) Hourly SO_2 Monitoring Requirements

Use Equation SS-1a (see Table 20-1) to determine the total hourly SO_2 mass emissions (in lb) for the affected unit(s) by subtraction. In Equation SS-1a, use the measured SO_2 mass emission rates from Sections A and B, above, along with the unit and stack operating times. When the combined emissions from two or more nonaffected units are monitored at a single location, then, for those units, replace the term $SO2_{nonaff}\ t_{nonaff}$ in Equation SS-1a with the term $SO2_{CS*}\ t_{CS*}$, where $SO2_{CS*}$ is the combined SO_2 emission rate for the nonaffected units and t_{CS*} is the stack operating time at the monitored location (which is designated as a secondary common stack).

If any of the nonaffected units are oil or gas-fired and receive fuel from a common pipe, then, for those units, replace the expression $SO2_{nonaff}\ t_{nonaff}$ in Equation SS-1a with the expression $SO2_{CP}\ t_f$, where $SO2_{CP}$ is the measured hourly SO_2 mass emission rate at the common pipe and t_f is the fuel usage time at the common pipe.

After determining the total hourly SO_2 mass emissions for the affected units, use Equation SS-1b (see Table 20-1) to apportion the total hourly SO_2 mass emissions to the individual affected units.

Ensure that Equations SS-1a and SS-1b (as applicable) are implemented on an hourly basis in the data acquisition and handling system (DAHS), so that the cumulative SO_2 mass emissions reported are correct. Keep records of all hourly SO_2 mass emissions values for the affected units and use these values to calculate the quarterly and cumulative SO_2 mass emissions (in tons) from the affected units. However, do *not* report any SO_2 mass emission rates (in lb/hr) for the affected units.

Table 20-1: Hourly SO_2 Mass Emissions Formulas for the Affected Unit(s)

Equation Code	Formula	Where
SS-1a	$SO2M_{aff-tot} = SO2_{CS}\, t_{CS} - \sum_{All-nonaff} SO2_{nonaff}\, t_{nonaff}$	$SO2M_{aff\text{-}tot}$ = Total hourly SO_2 mass emissions from the affected unit(s) (lb) $SO2_{CS}$ = Hourly SO_2 mass emission rate measured at the common stack (lb/hr) $SO2_{nonaff}$ = Hourly SO_2 mass emission rate measured at a particular nonaffected unit (lb/hr) t_{CS} = Operating time for the common stack (hr) t_{nonaff} = Operating time for a particular nonaffected unit (hr)
SS-1b	$SO2M_{aff-i} = SO2M_{aff-tot} \dfrac{L_{aff-i}\, t_{aff-i}}{\sum_{all-aff} L_{aff-i}\, t_{aff-i}}$	$SO2M_{aff\text{-}i}$ = Hourly SO_2 mass emissions from a particular affected unit (lb) $SO2M_{aff\text{-}tot}$ = Total hourly SO_2 mass emissions from the affected unit(s) (lb) $(L)_{aff\text{-}i}$ = Hourly unit load for a particular affected unit (MW <u>or</u> klb per hour of steam) $t_{aff\text{-}i}$ = Operating time for a particular affected unit (hr)

When using Equation SS-1a, if in a given hour the measured total SO_2 mass emissions (in lb) at the nonaffected units are greater than the mass emissions measured at the main common stack (i.e., if the summation term to the right of the minus sign in Equation SS-1a is greater than the term to the left of the minus sign), this will result in negative mass emissions for that hour. For any hour in which this happens, substitute a value of zero for the total SO_2 mass emissions from the affected units when determining quarterly, or year-to-date SO_2 mass for the affected units.

E. Affected Unit(s) Hourly Heat Input Rate Determination

Determine the hourly heat input rate for each affected unit; using the applicable method described in Question 20.4.

F. Affected Unit(s) Hourly Load and Operating Time

As indicated in paragraphs A through D, above, emissions from the affected units in a subtractive stack configuration are not measured directly. However, the owner or operator must maintain hourly records of unit load and unit operating time for each affected unit, for the purposes of apportioning emissions and/or heat input to the individual affected units. Report these hourly values in the <HourlyOperatingData> record.

References: § 75.16(b)(2)(ii)(B), § 75.16(e)

Question 20.3

Topic: Monitoring Requirements for NO_x Mass

Question: What are the NO_x mass emissions monitoring requirements for subtractive stack configurations under Subpart H of 40 CFR Part 75?

Answer: The monitoring requirements for the common stack and for the nonaffected units are found in § 75.72(b)(2). These provisions are summarized in Sections A and B, below. Note, that the subtractive option in § 75.72(b)(2)(ii) requires a petition under § 75.66. The hourly NO_x emission rates, NO_x mass emissions, and heat input rates described in Sections A and B are calculated using the applicable equations from Appendix F or Appendix D to Part 75:

A. Main Common Stack NO_X Monitoring Requirements

The owner or operator must determine NO_x mass emissions at the common stack using either a "NO_x emission rate and heat input rate" methodology or a "NO_x concentration and stack flow rate" methodology, as follows:

(1) You may install a NO_x-diluent CEMS for NO_x emission rate determination and a stack flow monitor and a diluent monitor for heat input rate determination; or

(2) You may install a NO_x concentration CEM and a stack flow monitor; or

(3) If the subtractive stack configuration consists exclusively of oil and gas-fired units exhausting to a common stack, you may install a NO_x-diluent CEM at the main common stack to determine the NO_x

emission rate, use Appendix D fuel flowmeters to determine unit-level heat input rates, and then derive the heat input rate at the common stack from the unit-level heat input rates and operating times, using Equation F-25 in Appendix F of Part 75 (see heat input apportionment and summation formula Table under Question 20.4, below).

B. <u>Nonaffected Unit(s) Hourly NO_x Monitoring Requirements</u>

The owner or operator must determine hourly NO_x mass emissions at the nonaffected unit(s) using one of the following methodologies:

(1) Install a NO_x-diluent CEMS, a stack flow monitor, and a diluent monitor in the duct leading from each nonaffected unit to the common stack; or

(2) If the emissions from two or more nonaffected units in the subtractive stack configuration are combined prior to discharging through the main common stack, you may monitor the combined nonaffected unit NO_x emission rate and heat input rate at a single location in lieu of installing separate CEMS on each unit. Define the monitoring location as a secondary common stack serving the nonaffected units; or

(3) If the following conditions are met you may opt to install NO_x-diluent monitoring systems on the nonaffected units (or group(s) of units) and monitor heat input rate only at the main common stack:

(i) All units (affected and nonaffected) exhausting to the main common stack combust the same type of fuel and use the same F factor; and

(ii) All units (affected and nonaffected) exhausting to the main common stack are of the same basic design with a similar combustion efficiency ($\pm$ 10%); and

(iii) There is no suitable location in the existing ductwork at which to install a flow monitor.

Paragraph A in Question 20.4 explains how to determine the nonaffected unit heat input rates when heat input rate is monitored only at the main common stack; or

(4) You may install a NO_x concentration CEM and flow monitor in the duct from each nonaffected unit to the common stack; or

(5) If the emissions from two or more nonaffected units in the subtractive stack configuration are combined prior to discharging through the main common stack, you may monitor the combined nonaffected unit NO_x concentration and flow rate at a single location in lieu of

installing separate CEMS on each unit. Define the monitoring location as a secondary common stack serving the nonaffected units; or

(6) For nonaffected oil or gas-fired units, you may install a NO_x-diluent CEMS in the duct from each nonaffected unit to the common stack, and use Appendix D fuel flowmeter(s) to determine the unit heat input rate(s).

(Note: If any of the nonaffected units receive fuel through a common pipe, you must apportion the heat input rate measured at the common pipe to the individual units (see Question 20.4)); or

(7) If the emissions from two or more nonaffected oil and gas-fired units in the subtractive stack configuration are combined prior to discharging through the main common stack, you may monitor the combined nonaffected unit NO_x emissions at a single location in lieu of installing separate NO_x-diluent CEMS on each unit. Define the monitoring location as a secondary common stack serving the nonaffected units. Determine the heat input rate at the secondary common stack by summing the unit-level heat inputs, using Equation F-25 in Appendix F of Part 75 (see heat input rate apportionment and summation formula Table in Question 20.4, below).

C. Affected Unit(s) Hourly NO_x Mass Emissions Determination

Determine the *total* hourly NO_x mass emissions (in lb) for the affected unit(s), by substituting the measured NO mass emissions from Sections A and B, above into Equation SS-2a (see Table 20-2). Then, use Equation SS-2b or SS-2c (as applicable) (see Table 20-2) to apportion the total hourly NO_x mass emissions to the individual affected units. Equation SS-2b applies when unit load is reported in megawatts. Equation SS-2c applies when unit load is reported in klb of steam per hour. Note that the summation terms in the denominators of these equations include only the heat input rates and load values for the *affected* units.

Ensure that Equations SS-2a, SS-2b, and SS-2c (as applicable) are implemented on an hourly basis in the data acquisition and handling system (DAHS), so that the NO_x mass emissions reported are correct. Keep records of all hourly NO_x mass emissions values for the affected units, as determined from these equations, and use the hourly values to calculate the quarterly and cumulative NO_x mass emissions (in tons) for these units. However, do *not* report any hourly NO_x mass emissions values for the affected units.

When using Equation SS-2a, if in a given hour the measured total NO_x mass emissions (lb) at the nonaffected units are greater than the mass emissions measured at the common stack (i.e., if the summation term to the right of the minus sign in Equation SS-2a is greater than the term to the left of the minus sign), this will result in negative mass emissions for that hour. For any hour in which this happens, substitute a value of zero for the total NO_x mass emissions from the affected units.

Table 20-2: Hourly NO_x Mass Emissions for the Affected Unit(s)

Equation Code	Formula	Where
SS-2a	$NOXM_{aff-tot} = NOXM_{CS} - \sum_{all-nonaff} NOXM_{nonaff}$	$NOXM_{aff\text{-}tot}$ = Total hourly NO_x mass emissions from the affected unit(s) (lb) $NOXM_{CS}$ = Hourly NO_x mass measured at the common stack (lb) $NOXM_{nonaff}$ = Hourly NO_x mass measured at a particular nonaffected unit (lb)
SS-2b	$NOXM_{aff-i} = NOXM_{aff-tot} \dfrac{MW_{aff-i} t_{aff-i}}{\sum_{all-aff} MW_{aff-i} t_{aff-i}}$	$NOXM_{aff\text{-}i}$ = Hourly NO_x mass emissions from a particular affected unit (lb) $NOXM_{aff\text{-}tot}$ = Total hourly NO_x mass emissions from the affected unit(s) (lb) $(MW)_{aff\text{-}i}$ = Hourly load for a particular affected unit (MW) $t_{aff\text{-}i}$ = Operating time for a particular affected unit (hr)
SS-2c	$NOXM_{aff-i} = NOXM_{aff-tot} \dfrac{ST_{aff-i} t_{aff-i}}{\sum_{all-aff} ST_{aff-i} t_{aff-i}}$	$NOXM_{aff\text{-}i}$ = Hourly NO_x mass emissions from a particular affected unit (lb) $NOXM_{aff\text{-}tot}$ = Total hourly NO_x mass emissions from the affected unit(s) (lb) $(ST)_{aff\text{-}i}$ = Hourly load for a particular affected unit (klb/hr of steam) $t_{aff\text{-}i}$ = Operating time for a particular affected unit (hr)

D. Affected Unit(s) Hourly Heat Input Rate Determination

Determine the hourly heat input rate for each affected unit using the applicable method described under Question 20.4.

E. Affected Unit Hourly Load and Operating Time

As indicated in Sections A through C, above, emissions from the affected units in a subtractive stack configuration are not measured directly. However, the owner or operator must report hourly records of unit load and unit operating time for each affected unit, for purposes of apportioning emissions and/or heat input to the individual affected units.

References: § 75.72(b)(2)

Question 20.4

Topic: Reporting of Hourly Heat Input Rate

Question: How do I determine and report hourly heat input rates for a subtractive stack configuration?

Answer: Determine hourly heat input rates: (1) at the main common stack; (2) at any secondary common stack(s); (3) any common pipe(s) and (4) for *each* individual unit in the subtractive stack configuration (both affected and nonaffected units). Determine the hourly heat input rates as follows:

A. Heat Input Rate Measured at the Main Common Stack Only

When heat input rate is measured only at the main common stack (for qualifying configurations, as described in Section C.(3) of Question 20.2 or in Section B.(3) of Question 20.3), apportion the hourly heat input rate at the common stack to each of the units in the subtractive stack configuration (both affected and nonaffected units) using Equation F-21a or F-21b in Appendix F to Part 75 (see Table 20-3), for each stack operating hour (each hour in which effluent gases discharge through the main common stack). The summation term in the denominator of these equations must include *all* unit loads (for both the affected and non-affected units).

Table 20-3: Hourly Heat Input Rate Apportionment and Summation Formulas

Equation Code	Formula	Where
F-21a	$$HI_i = HI_{CS}\left(\frac{t_{CS}}{t_i}\right)\left[\frac{MW_i\, t_i}{\sum_{i=1}^{n} MW_i\, t_i}\right]$$	HI_i = Heat input rate for a unit (mmBtu/hr) HI_{CS} = Heat input rate at the common stack or pipe (mmBtu/hr) MW_i = Gross electrical output for a unit (MWe) t_i = Operating time at a particular unit (hour or fraction of an hour) t_{CS} = Operating time at common stack (hour or fraction of an hour) n = Total number of units using the common stack or pipe i = Designation of a particular unit
F-21b	$$HI_i = HI_{CS}\left(\frac{t_{CS}}{t_i}\right)\left[\frac{SF_i\, t_i}{\sum_{i=1}^{n} SF_i\, t_i}\right]$$	HI_i = Heat input rate for a unit (mmBtu/hr) HI_{CS} = Heat input rate at the common stack or pipe (mmBtu/hr) SF_i = Gross steam load for a unit (klb/hr) t_i = Operating time at a particular unit (hour or fraction of an hour) t_{CS} = Operating time at common stack (hour or fraction of an hour) n = Total number of units using the common stack or pipe i = Designation of a particular unit
F-25	$$HI_{CS} = \frac{\sum_{all-units} HI_u t_u}{t_{CS}}$$	HI_{CS} = Heat input rate at the common stack (mmBtu/hr) I_u = Heat input rate for a unit (mmBtu/hr) t_u = Operating time at a particular unit (hour or fraction of an hour) t_{CS} = Operating time at common stack (hour or fraction of an hour)

B. <u>Heat Input Rate Measured at the Main Common Stack and the Nonaffected Unit(s)</u>

When heat input rate is monitored or measured at both the main common stack and at the nonaffected unit(s), determine the heat input rate for each unit in the subtractive stack configuration as follows:

Scenario #1: For hours in which *both* affected and nonaffected units are operating and the total heat input in mmBtu measured at the main common stack is greater than the total heat input of the nonaffected unit(s):

(i) For the affected units:

(A) Use Equation SS-3a (see Table 20-4) to obtain the total hourly heat input for the affected units. The term on the left side of the minus sign in Equation SS-3a is the hourly total heat input at the main common stack (mmBtu), and is the product of the measured heat input rate and the stack operating time. The term on the right hand side of the minus sign is the total hourly heat input for the nonaffected units, and is the sum of the products of the measured heat input rates and the unit operating times for all of the nonaffected units.

(B) If any nonaffected units are monitored as a group at a single location, then, for those units, replace the term $HI_{nonaff}\ t_{nonaff}$ in Equation SS-3a with the term $HI_{CS*}\ t_{CS*}$, where HI_{CS*} is the hourly heat input rate measured at the nonaffected units' monitoring location (designated as a secondary common stack) and t_{CS*} is the stack operating time at the secondary common stack.

(C) For each hour in which Scenario # 1 applies, calculate the individual affected unit heat rates using Equation SS-3b (see Table 20-4). Note that the summation term in the denominator of Equation SS-3b includes *only* the affected unit hourly loads.

(ii) For the nonaffected units:

(A) If the nonaffected units are individually monitored for heat input rate, report the measured hourly heat input rate value(s). This includes gas and oil-fired units using Appendix D procedures to determine heat input rate.

(B) If, for a group of nonaffected units, heat input rate is monitored at a single location (designated as a secondary common stack) using a flow monitor and a diluent CEM, apportion the heat input rate measured at the secondary common stack to the individual nonaffected units in the group, using Equation F-21a or F-21b in Appendix F to Part 75. When this methodology is used, replace the term t_{CS} in Equation F-21a or F-21b with the term t_{CS*}, where t_{CS*} is the stack operating time at the secondary common stack. Also, include only the hourly unit loads for the nonaffected units in the summation term in the denominator of Equation F-21a or F-21b.

(C) For a group of oil or gas-fired nonaffected units that receive fuel from a common pipe, apportion the heat input rate measured at the common pipe to the individual nonaffected units, using Equation F-21a or F-21b in Appendix F to Part 75. In using these equations, replace the term "t_{CS}" with the term "t_f", which is the fuel usage time for the common pipe.

Table 20-4: Hourly Heat Input Formulas for Affected Units

Equation Code	Formula	Where
SS-3a	$HItot_{aff-hr} = HI_{CS} t_{CS} - \sum_{all-nonaff} HI_{nonaff} t_{nonaff}$	$HItot_{aff\text{-}hr}$ = Total hourly heat input for the affected units (mmBtu) HI_{CS} = Hourly heat input rate at the common stack (mmBtu/hr) HI_{nonaff} = Hourly heat input rate for a particular nonaffected unit (mmBtu/hr) t_{CS} = Operating time for the common stack (hr) t_{nonaff} = Operating time for a particular nonaffected unit (hr)
SS-3b	$HI_{aff} = \frac{1}{t_i} \times HItot_{aff-hr} \times \left(\frac{L_i t_i}{\sum_{all-aff} L_i t_i} \right)$	HI_{aff} = Hourly heat input rate for a particular affected unit (mmBtu/hr) $HItot_{aff\text{-}hr}$ = Total hourly heat input for all affected units (mmBtu) t_i = Operating time for a particular affected unit (hr) L_i = Hourly unit load for an affected unit in the subtractive stack configuration (MW <u>or</u> klb of steam per hour)

Scenario #2: For any hour in which both nonaffected unit(s) and affected unit(s) are operating and the total heat input at the main common stack is less than or equal to the total heat input for the nonaffected unit(s), causing Equation SS-3a to give a negative or zero total heat input value for the affected units, follow these procedures:

(i) Invalidate the result obtained from Equation SS-3a;

(ii) Consider the heat input rate measured at the main common stack to be correct;

(iii) Disregard all heat input rate(s) measured at the nonaffected unit(s); and

(iv) Apportion the heat input rate measured at the main common stack to all units (affected and nonaffected) in the subtractive stack configuration, using Equation F-21a or F-21b.

Scenario # 3: For any hour in which *only* affected units are operating,

(i) <u>For the affected units</u>:

(A) Set the summation term in Equation SS-3a equal to zero, so that the total heat input for the affected units equals the heat input measured at the main common stack.

(B) Then, use Equation SS-3b to determine the hourly heat input rate for each affected unit.

(ii) <u>For the nonaffected units</u>:

Assign a heat input rate value of zero to each nonaffected unit.

Scenario #4: For any hour in which *only* nonaffected units are exhausting to the common stack,

(i) <u>For the affected units</u>:

Assign a heat input rate value of zero to each affected unit.

(ii) <u>For the nonaffected units</u>:

(A) Invalidate all measured heat input rates for the nonaffected units;

(B) Consider the heat input rate measured at the main common stack to be correct; and

(C) Apportion the heat input rate measured at the main common stack to the nonaffected units, using Equation F-21a or F-21b.

References: Appendix F

Question 20.5

Topic: Monitoring Plan Requirements

Question: What are the electronic monitoring plan reporting requirements for subtractive stack configurations?

Answer: For all units in the subtractive stack configuration, including the nonaffected unit(s), report all standard unit-level monitoring plan record types including unit data, program data, monitoring methodologies, controls and fuels.

For the main common stack serving both affected and nonaffected units, define the relationship between the stack and units and submit all the standard monitoring plan information to support the continuous emission monitoring systems (CEMS) at the common stack

If the combined emissions from a group of nonaffected units are monitored at a single location (i.e., a secondary common stack, serving only the nonaffected units), define the relationship between the unit and the secondary common stack.

If a group of nonaffected units receives fuel from a common pipe, define the relationship between the unit and the common pipe.

For each nonaffected unit monitoring location, report all the standard monitoring plan information to support the CEMS or other monitoring systems for that location.

For each affected unit, report the applicable subtractive mass emissions and heat input formulas and any apportionment formulas (i.e., Equations SS-1a, SS-1b, SS-2a, SS-2b, SS-2c, SS-3a, SS-3b, F-21a, F-21b, or F-25, as applicable).

If you petition and receive approval to use a minimum NO_x rate for missing data purposes, include the approved minimum rate in the <MonitoringDefaultData> record. Use the code "MNNX" as the parameter and "APP" (approval) as the source of data code. See Question 20.10.

Also include a narrative description of the subtractive stack configuration and method used to determine NO_x mass emissions in <MonitoringPlanCommentData> record, as described in Question 20.11.

References: EDR v2.1/2.2, 500-level RTs

Question 20.6

Topic: QA Requirements

Question: What are the quality assurance requirements for the monitoring systems installed on the nonaffected unit(s) in a subtractive stack configuration?

Answer: The monitoring systems for the nonaffected unit(s) in a subtractive stack configuration must be fully certified in accordance with § 75.20 and must undergo the periodic quality assurance testing required under § 75.21 and Appendix B to Part 75. The bias test requirement in Section 7.6 of Appendix A to Part 75 also applies to the SO_2, NO_x, and flow rate monitoring systems installed on nonaffected units.

References: § 75.20, § 75.21; Appendix A, Section 7.6

Question 20.7

Topic: Unit/Stack EDRs

Question: Should all the units and stacks involved in the subtractive configuration be included together in the same quarterly report?

Answer: Yes. Based on EPA guidance, all stack-level and associated unit-level data must be contained in a single quarterly report.

References:

Question 20.8

Topic: Reporting Hourly Emissions Data

Question: How do I report hourly emissions data for a subtractive stack configuration?

Answer: Report hourly data for the subtractive stack configuration at each monitored location (i.e., at the common stack and at each nonaffected unit monitoring location), as you would for any other configuration. Report *only* the measured data. Do *not* report the hourly mass emission values determined by subtraction for the *affected* units. If you have additional reporting questions, contact EPA.

References: § 75.64

Question 20.9

Topic: Cumulative Emissions Data Reporting

Question: What quarterly, annual, and ozone season summary emissions and heat input data should I report for a subtractive configuration?

Answer: For *each* stack, pipe, or unit in the subtractive stack configuration (including both affected and nonaffected units), report a separate <SummaryValueData> record for each parameter, as required by the applicable program(s).

References:

Question 20.10

Topic: Missing Data Requirements

Question: What missing data requirements apply to nonaffected units in a subtractive stack configuration?

Answer: For the common stack, use the standard missing data procedures in § 75.33.

For the nonaffected unit(s), use inverse missing data procedures for SO_2, NO_x, CO_2 and flow rate missing data (i.e., substitute the tenth percentile value when the standard missing data procedures in § 75.33 require the 90th percentile value, use the fifth percentile value in lieu of the 95th percentile value, use the minimum value in the look back periods instead of the maximum value, and use zeros for the minimum potential NO_x emission rate, minimum potential flow rate or minimum potential concentration for any hours in which maximum potential values would ordinarily be used under Subpart D of Part 75). The owner or operator may petition the Administrator under § 75.66 to use minimum potential values other than zero.

If O_2 data, rather than CO_2 data, are used in the heat input rate calculations, use the regular missing data algorithm, rather than the inverse algorithm to provide substitute O_2 data for the heat input rate determinations.

For moisture missing data, use the regular missing data algorithm, unless Equation 19-3, 19-4, or 19-8 is used for NO_x emission rate determination, in which case, use the inverse missing data algorithm.

Use the missing data method of determination codes specified in Table 4a in Part 75.

References: § 75.33, § 75.66; 40 CFR Part 60, Appendix A, RM 19

Question 20.11

Topic: Representation of Subtractive Stack Configuration

Question: How do I identify a subtractive stack configuration in the electronic monitoring plan?

Answer: Enter a <MonitoringPlanCommentData> record identifying the configuration as a subtractive stack.

References:

SECTION 21
BYPASS STACKS

Page

21.1 Bypass Stacks.. 21-1

[This page intentionally left blank.]

Question 21.1

Topic: Bypass Stacks

Question: What are the RATA requirements for an SO_2 CEM system used for monitoring scrubber bypass conditions?

Answer: In accordance with the provisions of § 75.16(c) and § 75.17(d), bypass stacks are subject to the same monitor installation and initial certification deadlines as monitors on primary stacks. The rule, however, includes two provisions that reduce the amount of testing that must be performed on bypass stacks. According to Section 6.5.2(b) of Appendix A to Part 75, flow rate RATAs for bypass stacks have to be performed at only one load level instead of two or three. In addition, Section 2.3 and Figure 1 of Appendix B to Part 75 allow RATA deadline extensions for monitors installed on bypass stacks. According to this section of the rule, only the quarters during which a bypass stack operates enough to meet the definition of a QA operating quarter are considered when determining RATA deadlines. For bypass stacks, the requirement that a RATA be completed semiannually or annually means that a RATA must be completed every two or four QA operating quarters, respectively (with an upper limit of eight calendar quarters between successive RATAs).

Note: As an alternative to monitoring the bypass stack, § 75.16(c) and § 75.17(d) allow an unmonitored bypass option which is strongly recommended for bypass stacks that are infrequently used.

References: § 75.16(c); § 75.17(d); Appendix A, Section 6.5.2(b); Appendix B, Section 2.3

[This page intentionally left blank.]

SECTION 22
NO_x APPORTIONMENT

Page

22.1 Purpose of Common Stack NO_x Apportionment Policy........................ 22-2

22.2 NO_x Apportionment Methodologies.. 22-3

22.3 Reporting of Hourly Heat Input Rate.. 22-12

22.4 Common Stack NO_x Apportionment for Other Configurations 22-15

22.5 Monitoring Plan Requirements... 22-16

22.6 QA Requirements... 22-17

22.7 Unit/Stack EDRs.. 22-17

22.8 Reporting of Hourly NO_x Emission Rate and Heat Input Rate Data.. 22-17

22.9 Cumulative Emissions Reporting 22-18

22.10 Missing Data Requirements... 22-19

[This page intentionally left blank.]

BACKGROUND

I. Sections 75.17(a)(1) and 75.17(a)(2)(i) allow the owner or operator of a group of NO_x affected units (see definition below) that exhaust into a common stack to demonstrate compliance with the applicable NO_x emission limits in the following ways:

A. Monitor the NO_x emission rate separately for each unit, in the duct from the unit to the common stack; or

B. Monitor the NO_x emission rate at the common stack *and* submit a compliance plan for approval by the permitting authority which indicates that:

(1) Each unit will comply with the most stringent NO_x emission limitation of any unit using the common stack; or

(2) Each unit will comply with the applicable NO_x emission limit by averaging its emissions with other units utilizing the common stack, pursuant to 40 CFR Part 76; or

(3) A petition will be submitted to determine each unit's NO_x compliance by an alternative method, satisfactory to the Administrator, using apportionment of the common stack NO_x emission rate and ensuring complete and accurate estimation of emissions.

II. Section 75.17(a)(2)(iii) allows an owner or operator of one or more NO_x affected units that exhaust into a common stack with NO_x nonaffected units (see definition below) to demonstrate that the NO_x affected unit(s) meet the applicable NO_x emission limitation(s) in the following ways:

A. Monitor the NO_x emission rate in the duct from each unit to the common stack; or

B. Petition the Administrator for approval of an alternative method to determine each unit's NO_x emission rate by an alternative method using apportionment of the common stack NO_x emission rate and ensuring complete and accurate estimation of emissions.

III. Section 75.17(b) allows an owner or operator of one or more Acid Rain units (see definition below) that exhaust into a common stack with one or more non-Acid Rain units (see definition below) to determine the NO_x emission rate(s) of the Acid Rain unit(s) in the following ways:

A. Monitor NO_x emission rate in the duct from each Acid Rain unit to the common stack; or

B. Petition the Administrator for approval of an alternative method to determine each unit's NO_x emission rate by an alternative method using apportionment of the common stack NO_x emission rate and ensuring complete and accurate estimation of emissions.

DEFINITIONS

Acid Rain Unit: A unit subject to any Acid Rain emissions limitation under 40 CFR Parts 72 and 74, or 76.

Main Common Stack: A stack through which the combined emissions from a group of units discharge to the atmosphere.

Non-Acid Rain Unit: A unit not subject to any SO_2 or NO_x Acid Rain emission limitation under 40 CFR Parts 72, 74, or 76.

NO_x Affected Unit: An Acid Rain unit which is subject to a NO_x emission limitation under 40 CFR Part 76.

NO_x Nonaffected Unit: An Acid Rain unit which is not subject to a NO_x emission limitation under 40 CFR Part 76.

Secondary Common Stack: A location in the ductwork, upstream of the main common stack, where the combined heat input rate and/or combined emissions from two or more units are monitored.

Question 22.1

Topic: Purpose of Common Stack NO_x Apportionment Policy

Question: What is the purpose of this policy?

Answer: If you have a common stack exhaust configuration consisting of either: (1) a group of NO_x affected units; or (2) a combination of NO_x affected units and NO_x nonaffected units; or (3) a combination of Acid Rain units and non-Acid Rain units, *and if* you wish to use common stack NO_x apportionment to determine unit-specific NO_x emission rates (see options I.B (3), II.B, and III.B under Background section, above), this policy provides guidance on emissions monitoring and reporting.

Common stack NO_x apportionment is a methodology by which unit-specific NO_x emission rates are determined for a group of units that exhaust into a common stack, without monitoring each unit in the group separately.

You must petition the Administrator under § 75.66 for permission to use common stack NO_x apportionment. If your petition is consistent with the provisions of this policy, you have reasonable assurance that the petition will be approved and your monitoring will be consistent with other facilities using common stack NO_x apportionment.

References: § 75.17(a), § 75.17(b), § 75.66

Question 22.2

Topic: NO_x Apportionment Methodologies

Question: For an exhaust configuration in which NO_x affected units and NO_x nonaffected units share a common stack, are there any common stack NO_x apportionment methodologies that may be approved by petition?

Answer: EPA considers two common stack NO_x apportionment methodologies to be approvable for the configuration: (1) the subtractive apportionment methodology; and (2) the simple NO_x apportionment methodology.

A. Subtractive Apportionment Methodology

(1) Summary of Method and Basis for Approval

Under the subtractive apportionment methodology, the hourly NO_x emission rate, heat input rate, and operating time are monitored at both at the common stack and at the NO_x nonaffected unit(s). These values are used to determine the total heat input and NO_x mass emissions at these locations. The hourly NO_x mass emissions and total heat input for the NO_x affected units are then determined by subtracting the measured NO_x mass emissions and total heat input values for the NO_x nonaffected units from the corresponding values measured at the common stack. Finally, the hourly NO_x emission rate for the NO_x affected units is calculated by dividing the NO_x mass emissions for the NO_x affected units by the total heat input for the NO_x affected units.

This methodology is approvable because it is based on a mass balance approach and uses Part 75 monitoring methodologies for both heat input and NO_x emission rate.

(2) Main Common Stack Monitoring Requirements

(a) Monitor the hourly NO_x emission rate at the main common stack using NO_x-diluent CEMS.

(b) Determine the hourly heat input rate at the common stack using a diluent monitor and a flow monitor.

(3) NO_x Nonaffected Unit NO_x Emission Rate and Heat Input Rate Monitoring Requirements

There are two options for monitoring NO_x emission rate at the NO_x nonaffected units:

(a) Option 1: You may install a NO_x-diluent CEMS in duct leading from each NO_x nonaffected unit to the main common stack. When this option is selected, determine the heat input rate for each NO_x nonaffected unit using one of the following methods:

(i) Install a flow monitor and a diluent monitor in the duct leading from each NO_x nonaffected unit to the main common stack; or

(ii) Use *individual* fuel flowmeters and the procedures of Appendix D of 40 CFR Part 75 (oil or gas-fired units only) to determine the heat input rate at each NO_x nonaffected unit. Heat input rate apportionment from a common pipe is not allowed in this case; or

(iii) Use Equation F-21a or F-21b in Appendix F of 40 CFR Part 75 (see Table 22-1) to apportion the heat input rate measured at the main common stack to *all* units in the configuration (i.e., both NO_x affected and NO_x nonaffected units). Note that this method may only be used if the following three conditions are met:

(A) All units exhausting to the main common stack combust the same type of fuel and use the same F-factor;

(B) All units exhausting to the main common stack have similar combustion efficiencies (± 10%); and

(C) There is no suitable location for a flow monitor and diluent monitor in the existing ductwork where NO_x emission rate is monitored.

If none of these three methods can be used to determine heat input rate, contact EPA for guidance.

(b) Option 2: If the emissions from a group of NO_x nonaffected units are combined prior to exhausting to the main common stack, you may monitor the combined NO_x emission rate for the group of units using a single NO_x-diluent CEMS. When this option is selected, designate the monitored location as a "secondary common stack" (see Definitions, above) and determine the heat input rate at the secondary common stack *and* at each NO_x nonaffected unit using one of the following methods:

(i) Monitor the heat input rate at the secondary common stack directly, using a flow monitor and diluent monitor. If this option is selected, use Equation F-21a or F-21b to apportion the heat input rate measured at the secondary common stack to the individual units. Replace the term t_{CS} in Equation F 21a or F-21b with the term t_{CS*}, where t_{CS*} is the stack operating time at the secondary common stack. Also, in the summation term in the denominator of Equation F-21a or F 21b, include only the hourly unit loads for the units associated with the secondary common stack.

Note that the restrictions listed under Paragraph (A)(3)(a)(iii) of this Question on the use of Equations F-21a and F-21b do not apply in this case; or

(ii) Monitor the heat input rate at each NO_x nonaffected unit using a fuel flowmeter and the procedures of Appendix D (oil and gas-fired units only), and determine the heat input rate at the secondary common stack using Equation F-25 (see Table 22-1, below); or

(iii) Monitor the heat input rate at a common pipe which serves only the units associated with the secondary common stack, using a fuel flowmeter and the procedures of Appendix D (oil and gas-fired units, only). In this case, you must first determine the individual unit heat input rates using Equation F-21a or F-21b and then use these rates, in conjunction with Equation F-25, to derive the heat input rate at the secondary common stack. In using Equations F-21a and F-21b, replace the term "t_{CS}" with the term "t_f", which is the fuel usage time for the common pipe.

Note that the restrictions listed under Paragraph (A)(3)(a)(iii) on the use of Equations F-21a and F-21b do not apply in this case; or

(iv) Use Equation F-21a or F-21b to apportion the heat input rate measured at the main common stack to *all* units in the configuration (i.e., both NO_x affected and NO_x nonaffected units). Then use the apportioned unit level heat inputs and Equation F-25 to determine the heat input rate at the secondary common stack. Note that this option may only be used if the following three conditions are met:

(A) All units exhausting to the main common stack combust the same type of fuel and use the same F-factor;

(B) All units exhausting to the main common stack have similar combustion efficiencies (± 10%); and

(C) There is no suitable location for a flow monitor in the existing ductwork.

If none of these three methods can be used to determine the heat input rate for the NO_x nonaffected units, contact EPA for guidance.

(4) Hourly Heat Input Rate and Operating Time Reporting

Report hourly heat input rate and operating time for the main common stack, any secondary common stack(s), any common pipe(s) and for each unit in the configuration (i.e., for both NO_x affected and NO_x nonaffected units). Determine the hourly heat input rates for the main common stack, secondary common stack(s), common pipe(s) and for the individual NO_x nonaffected units as described in paragraphs (A)(2) and (A)(3) of this question. See Question 22.3 for a discussion of how to determine the hourly heat input rates for the NO_x affected units.

Table 22-1: Hourly Heat Input Rate Apportionment and Summation Formulas

Equation Code	Formula	Where
F-21a	$HI_i = HI_{CS}\left(\frac{t_{CS}}{t_i}\right)\left[\frac{MW_i\, t_i}{sumfromi=1?nMW_i\, t_i}\right]$	HI_i = Heat input rate for a unit (mmBtu/hr) HI_{CS} = Heat input rate at the common stack or pipe (mmBtu/hr) MW_i = Gross electrical output for a particular unit (MWe) t_i = Operating time at a particular unit (hour or fraction of an hour) t_{CS} = Operating time at common stack (hour or fraction of an hour) n = Total number of units using the common stack or pipe i = Designation of a particular unit
F-21b	$HI_i = HI_{CS}\left(\frac{t_{CS}}{t_i}\right)\left[\frac{SF_i\, t_i}{\sum_{i=1}^{n} SF_i\, t_i}\right]$	HI_i = Heat input rate for a unit (mmBtu/hr) HI_{CS} = Heat input rate at the common stack or pipe (mmBtu/hr) SF_i = Gross steam load for a particular unit (klb/hr) t_i = Operating time at a particular unit (hour or fraction of an hour) t_{CS} = Operating time at common stack (hour or fraction of an hour) n = Total number of units using the common stack or pipe i = Designation of a particular unit
F-25	$HI_{cs} = \frac{\sum_{all\text{-}units} HI_u t_u}{t_{cs}}$	HI_{CS} = Heat input rate at the common stack (mmBtu/hr) HI_u = Heat input rate for a unit (mmBtu/hr) t_u = Operating time at a particular unit (hour or fraction of an hour) t_{CS} = Operating time at common stack (hour or fraction of an hour)

(5) Determination of NO_x Affected Unit(s) NO_x Emission Rate

Calculate the hourly, quarterly, and year-to-date NO_x emission rates for the NO_x affected units as follows:

(a) Determine a single hourly NO_x emission rate which applies to all NO_x affected units using Equation NS-1 (see Table 22-2). The terms NOX_{nonaff}, HI_{nonaff}, and t_{nonaff} in Equation NS-1, must be used consistently. For example, when NO_x emission rate and heat input rate are monitored at the unit level, NOX_{nonaff}, HI_{nonaff}, and t_{nonaff} are, respectively, the NO_x emission rate, heat input rate, and operating time for an individual NO_x nonaffected unit. When a group of NO_x nonaffected units is monitored at a secondary common stack, NOX_{nonaff}, HI_{nonaff}, and t_{nonaff} are, respectively, the NO_x emission rate, heat input rate, and operating time at the secondary common stack.

(b) Record, but do not report, the hourly NO_x emission rates determined from Equation NS-1 for the NO_x affected units. Maintain these data in a format suitable for inspection. It is sufficient to record these values in your DAHS if they can be retrieved upon request during an audit.

(c) Calculate the quarterly and year-to-date NO_x emission rate for each NO_x affected unit using Equation F-9 in Appendix F of 40 CFR Part 75. Report these values as described in Question 22.9.

Table 22-2: Hourly NO_x Apportionment Formula for NO_x Affected Units Using the Subtractive Methodology

Equation Code	Formula	Where
NS-1	$$NOx_{aff} = \frac{(NOx_{CS} \times HI_{CS} \times t_{CS}) - \sum_{all-nonafected}\left(NOx_{nonaff} \times HI_{nonaff} \times t_{nonaff}\right)}{\sum_{allaffected}(HI_{aff} \times t_{aff})}$$	NOx_{aff} = Hourly NO_x emission rate for the NO_x affected units (lb/mmBtu) NOx_{CS} = Hourly NO_x emission rate at the common stack for the quarter (lb/mmBtu) HI_{CS} = Hourly heat input rate at the common stack (mmBtu/hr) t_{CS} = Common stack operating time (hr) NOx_{nonaff} = Hourly NO_x emission rate at the NO_x nonaffected unit or second common stack. (lb/mmBtu) HI_{nonaff} = Hourly heat input for the NO_x nonaffected unit (mmBtu) t_{nonaff} = NO_x nonaffected unit or second common stack

B. Simple NO_x Apportionment

(1) Summary of Method and Basis for Approval

Under simple NO_x apportionment, the hourly NO_x emission rate and heat input rate are monitored at the common stack and the hourly heat input rates for the individual units in the configuration are determined by direct measurement or by apportionment. The hourly emission rate of the NO_x affected unit(s) is calculated by dividing the total NO_x mass emissions from all units (in lb) by the total heat input (in mmBtu) from *only* the NO_x affected units.

This methodology is environmentally beneficial because it assures compliance of the NO_x affected units, by overestimating the NO_x emission rates for these units. The method assumes that all of the NO_x mass emissions measured in the common stack come from the NO_x affected units (i.e., that the NO_x nonaffected units contribute zero NO_x emissions to the total NO_x emissions measured at the common stack). The methodology may also provide environmental benefits by encouraging owners and operators of NOX affected units to lower NO_x emissions at the NO_x affected units.

Despite these environmentally beneficial aspects, approval of this methodology must still be on a case-by-case basis. Section 75.17(a)(iii)(B) requires "complete and accurate" estimation of the regulated emissions (i.e., for the emissions from the NO_x affected units). EPA must therefore make a case-by-case determination of whether the assumption that all emissions come from the NO_x affected units will cause significant error that may preclude the use of this option.

EPA anticipates that simple NO_x apportionment will likely be used for common stack configurations involving low capacity, small, or low emitting NO_x nonaffected units.

(2) Main Common Stack Monitoring Requirements

(a) Monitor the hourly NO_x emission rate at the main common stack using a NO_x-diluent CEMS.

(b) Determine the hourly heat input rate at the main common stack using a flow monitor and a diluent monitor.

(3) Heat Input Rate Determination for the Individual Units

Determine the hourly heat input rate for each unit which exhausts to the main common stack (i.e., both NO_x affected and NO_x nonaffected units), using any of the following methods:

(a) Install a flow monitor and a diluent monitor in the duct leading from the unit to the main common stack; or

(b) Use a fuel flowmeter and the procedures of Appendix D (oil or gas-fired units only), to determine the heat input rate at the unit; or

(c) Monitor the heat input rate for a group of NO_x nonaffected units at a secondary common stack (see Definitions section, above) using a flow monitor and diluent monitor, and then apportion the heat input rate measured at the secondary common stack to the individual units, using Equation F-21a or F-21b. Replace the term t_{CS} in Equation F-21a or F-21b with the term $_{tCS*}$, where t_{CS*} is the stack operating time at the secondary common stack. Also, in the summation term in the denominator of Equation F-21a or F-21b, include only the hourly unit loads for the units associated with the secondary common stack.

Note that the restriction under Paragraph (B)(3)(e) of this question on the use of Equations F-21a and F-21b does not apply in this case; or

(d) Monitor the heat input rate at a common pipe which serves a group of NO_x nonaffected gas or oil fired units using the procedures of Appendix D. In this case, determine the individual unit heat input rates using Equation F-21a or F-21b.

Note that the restriction under Paragraph (B)(3)(e), below, on the use of Equations F-21a and F-21b does not apply in this case; or

(e) Use Equation F-21a or F-21b to apportion the heat input rate measured at the main common stack to *all* units (i.e., both NO_x affected and NO_x nonaffected units.

Note that this method may only be used if the following condition is met: all units exhausting to the main common stack combust the same type of fuel and use the same F-factor.

(4) Hourly Heat Input Rate and Operating Time Reporting for all Units

Report hourly heat input rate and operating time for the main common stack, any secondary common stack(s), any common pipe(s) and for each unit in the configuration (i.e., both NO_x affected and NO_x nonaffected units). Determine the hourly heat input rates for the main common stack, secondary common stack(s), common pipe(s) and for the individual units as described in Paragraphs (B)(2) and (B)(3) of this question.

(5) Determination of NO_x affected Unit(s) NO_x Emission Rate

Calculate the hourly, quarterly and year-to-date NO_x emission rates for the NO_x affected unit(s) as follows:

(a) Determine the hourly NO_x emission rate for the NO_x affected units using Equation NS-2 (see Table 22-3). Equation NS-2 calculates a single NO_x emission rate which applies to all NO_x affected units.

(b) Record, but do not report, the hourly NO_x emission rates determined from Equation NS-2. Maintain these data in a format suitable for inspection. It is sufficient to record these values in your DAHS if they can be retrieved upon request during an audit.

(c) Calculate the quarterly and year-to-date NO_x emission rate for each NO_x affected unit using Equation F-9 in Appendix F of 40 CFR Part 75. Report these values as described in Question 22.9.

Table 22-3: Hourly NO_x Apportionment Formula for NO_x Affected Unites Using Simple NO_x Apportionment

Equation Code	Formula	Where
NS-2	$$NO_{x_{aff}} = \frac{NO_{x_{cs}} \times HI_{cs} \times t_{cs}}{\sum_{all-affected} HI_{aff} \times t_{aff}}$$	NOx_{aff} = Hourly NO_x emission rate for the NO_x affected unit(s) (lb/mmBtu) NOx_{CS} = Hourly NO_x emission rate at the common stack (lb/mmBtu) HI_{CS} = Hourly heat input rate at the common stack (mmBtu/hr) t_{CS} = Common stack operating time (hr) HI_{aff} = Hourly heat input rate for the NO_x affected unit(s) (mmBtu/hr) t_{aff} = NO_x affected unit operating time (hr)

References: § 75.17

Question 22.3

Topic: Reporting of Hourly Heat Input Rate

Question: How do I determine hourly heat input rate for the NO_x affected and NO_x nonaffected units in the configuration described in Question 22.2?

Answer: **A. Heat Input Rate Measured at the Main Common Stack Only**

For a qualifying configuration under Section A (subtractive apportionment) or Section B (simple apportionment) of Question 22.2, in which heat input rate is measured *only* at the main common stack, apportion the hourly heat input rate at the common stack to each of the units in the configuration (both NO_x affected and NO_x nonaffected units) using Equation F-21a or F-21b in Appendix F of 40 CFR Part 75, for each stack operating hour (i.e., each hour in which fuel is combusted by any unit in the configuration). The summation term in the denominator of these equations must include *all* unit loads (for both the NO_x affected and NO_x nonaffected units).

B. Heat Input Rate Measured at the Main Common Stack and the NO_x Nonaffected Unit(s)

Use the procedures of this section to determine the heat input rate at the NO_x affected units *only* when heat input rate is monitored or measured at both the main common stack and at the individual NO_x nonaffected units (or at a secondary common stack serving only the NO_x nonaffected units).

(1) For all hours in which *any* NO_x affected unit is operating, use Equation SS-3a (see Table 22-4) to calculate the total heat input to the NO_x affected unit(s).

The term on the left side of the minus sign in Equation SS-3a is the hourly total heat input (mmBtu) at the main common stack and is the product of the measured heat input rate and the stack operating time in.

The term on the right side of the minus sign is the total hourly heat input for the NO_x nonaffected units and is the sum of the products of the measured heat input rates (as determined under Question 22.2) and the unit operating times for all of the NO_x nonaffected units.

When a group of NO_x nonaffected units is monitored at a single location, then, for those units, replace the term HI_{nonaff} t_{nonaff} in Equation SS-3a with the term HI_{CS*} t_{CS*}, where HI_{CS*} is the hourly heat input rate measured at the NO_x nonaffected units' monitoring location (designated as a secondary common stack) and t_{CS*} is the stack operating time at the secondary common stack.

Use the guidelines in the following three scenarios to ensure proper application of Equation SS-3a:

<u>Scenario #1</u>: For any hour in which the total heat input in mmBtu measured at the main common stack is greater than the total heat input of the NO_x nonaffected unit(s), use Equation SS-3a to obtain the total hourly heat input for the NO_x affected units.

For each hour in which Scenario # 1 applies, calculate the individual NO_x affected unit heat rates using Equation SS-3b (see Table 22-2). Note that the summation term in the denominator of Equation SS 3b includes *only* the hourly loads for the NO_x affected unit(s).

<u>Scenario #2</u>: For any hour in which the total heat input at the main common stack is less than or equal to the total heat input for the NO_x nonaffected unit(s), causing Equation SS-3a to give a negative or zero total heat input value for the NO_x affected units, follow these procedures:

(a) Invalidate the result obtained from Equation SS-3a;

(b) Consider the heat input rate measured at the main common stack to be correct;

(c) Disregard all heat input rate(s) measured at the NO_x nonaffected unit(s); and

(d) Apportion the heat input rate measured at the main common stack to all units (NO_x affected and NO_x nonaffected) in the subtractive stack configuration, using Equation F-21a or F-21b.

<u>Scenario #3</u>: For any hour in which *only* NO_x affected units are operating, set the summation term in Equation SS-3a equal to zero, so that the total heat input for the NO_x affected units equals the heat input measured at the main common stack. Then, use Equation SS-3b to determine the hourly heat input rate for each NO_x affected unit.

(2) For any hour in which *only* NO_x nonaffected units are exhausting to the common stack, do not use Equation SS-3a. Assign a value of zero to the heat input rates for the NO_x affected units. Then, for the NO_x nonaffected units:

(a) Disregard all measured heat input rate values for the NO_x nonaffected units; and

(b) Assume that the heat input rate at the main common stack is correct and apportion this heat input rate to the NO_x nonaffected units using Equation F-21a or F-21b.

Table 22-4: Hourly Heat Input Formulas for NO_x Affected Units

Equation Code	Formula	Where
SS-3a	$$HItot_{aff-hr} = HI_{CS}t_{CS} - \sum_{all-nonaff} HI_{nonaff}t_{nonaff}$$	$HItot_{aff\text{-}hr}$ = Total hourly heat input for the NO_x affected units (mmBtu) HI_{CS} = Hourly heat input rate at the common stack (mmBtu/hr) HI_{nonaff} = Hourly heat input rate for a particular NO_x nonaffected unit (mmBtu/hr) t_{CS} = Operating time for the common stack (hr) t_{nonaff} = Operating time for a particular NO_x nonaffected unit (hr)
SS-3b	$$HI_{aff} = \frac{1}{t_i} \times HItot_{aff-hr} \times \left(\frac{L_i t_i}{\sum_{all-aff} L_i t_i} \right)$$	HI_{aff} = Hourly heat input rate for a particular NO_x affected unit (mmBtu/hr) $HItot_{aff\text{-}hr}$ = Total hourly heat input for all NO_x affected units (mmBtu) t_i = Operating time for a particular NO_x affected unit (hr) L_i = Hourly unit load for a particular NO_x affected unit in the subtractive stack configuration (MW or klb of steam per hour)

References: § 75.16(e)

Question 22.4

Topic: Common Stack NO_x Apportionment for Other Configurations

Question: Question 22.2 addresses only common stack NO_x apportionment for a configuration consisting of NO_x affected and NO_x nonaffected units. What are the similarities and differences in the common stack NO_x apportionment methodologies for other configurations? In particular, address the following cases: (1) a configuration in which Acid Rain units share a common stack with non-Acid Rain units; and (2) a configuration in which a group of NO_x affected units share a common stack.

Answer: For the first configuration (Acid Rain and non-Acid Rain units sharing a common stack), the procedures and mathematics are exactly analogous to the case described in Question 22.2. Simply replace the term "NO_x affected unit" with the term, "Acid Rain unit" and replace the term "NO_x nonaffected unit" with the term "non-Acid Rain unit."

However, the second configuration (NO_x affected units sharing a common stack) is not analogous to the case described in Question 22.2, as there are no NO_x nonaffected units. Options (1), (2), and (3) in Background section (I)(B), above, apply. If Option (3) is chosen, the owner or operator must submit a petition for an alternate apportionment method, satisfactory to the Administrator, ensuring complete and accurate estimation of emissions and no underestimation of any unit's emissions.

References: § 75.17

Question 22.5

Topic: Monitoring Plan Requirements

Question: What are the monitoring plan requirements for the common stack NO_x apportionment described in Question 22.2?

Answer: For all units, including the NO_x nonaffected unit(s), report all standard unit-level record types including unit data, program data, monitoring methodologies, controls, and fuels.

For the main common stack serving both NO_x affected and NO_x nonaffected units, define the relationship between the stack and units and submit all the standard monitoring plan information to support continuous emission monitoring systems (CEMS) at the common stack.

For each NO_x nonaffected unit monitoring location, report all the standard monitoring plan information to support the CEMS, other monitoring systems or apportionment formulas at that location. For each NO_x affected unit, report the appropriate heat input apportionment formula (see Question 22.3).

If the combined emissions from a group of units are monitored at a "secondary common stack" (see Definitions, above), define the relationship between the unit and the secondary common stack.

If a group of oil or gas-fired NO_x nonaffected units receives fuel from a common pipe, define the relationship between the unit and the common pipe.

If you petition and receive approval to use a minimum NO_x rate for missing data purposes, include the approved minimum rate, and use the code "MNNX" as the parameter and "APP" (approved) as the source of data code.

Also include a narrative description of the NO_x apportionment configuration and reporting approach.

References:

Question 22.6

Topic: QA Requirements

Question: When common stack NO_x apportionment is used, what are the quality assurance requirements for monitoring systems installed in the duct(s) leading from NO_x nonaffected unit(s) or non-Acid Rain unit(s) to the common stack?

Answer: The monitoring systems located at the NO_x nonaffected unit or non-Acid Rain unit must be fully certified in accordance with testing required under § 75.21 and Appendix B to 40 CFR Part 75. The bias test requirement in Section 7.6 of Appendix A to 40 CFR Part 75 also applies to NO_x and flow rate monitoring systems installed on NO_x nonaffected units.

References:

Question 22.7

Topic: Unit/Stack EDRs

Question: Should all of the units, pipes and stacks involved in a common stack NO_x apportionment configuration be included together in the same quarterly report?

Answer: Yes. All stack or pipe-level and associated unit-level data should be contained in a single quarterly report.

References:

Question 22.8

Topic: Reporting of Hourly NO_x Emission Rate and Heat Input Rate Data

Question: How do I report hourly data for a common stack NO_x apportionment?

Answer: Report hourly NO_x emission rate and heat input rate data for a common stack NO_x apportionment at each location where NO_x emission rate and/or heat input rate is measured (i.e., at the main common stack, any secondary common stack(s), any common pipe(s) and each unit monitoring location), as you would for any other NO_x monitoring configuration. Report *only* the measured data. Do *not* report hourly apportioned NO_x emission rate values for the NO_x affected units.

References:

Question 22.9

Topic: Cumulative Emissions Reporting

Question: What quarterly and annual NO_x emission rate data, operating hours, and total heat input data should I report for the common stack NO_x apportionment described in Question 22.2?

Answer: Report separate <SummaryValueData> record for the main common stack, any secondary common stack(s), any common pipe(s), and each unit in the common stack configuration.

For the main common stack, report separate <SummaryValueData> records for the NO_x emission rate (lb/mmBtu), total operating hours, and total heat input (mmBtu) derived from the common stack monitors. Report all quarterly and cumulative emissions and heat input values in accordance with the applicable sections of the ECMPS Emissions Reporting Instructions.

For each NO_x nonaffected unit, report <SummaryValueData> records for the quarterly and cumulative heat input (either measured or apportioned as appropriate) and operating hours. Also report a <SummaryValueData> record for the NO_x emission rate if it is individually monitored.

For a secondary common stack location at which a group of NO_x nonaffected units is monitored (if applicable), report <SummaryValueData> records for quarterly and cumulative NO_x emission rate, operating hours, and heat input derived either from the hourly CEMS measurements made at the monitoring location, or apportioned to that location.

For a common pipe, report <SummaryValueData> records for quarterly and cumulative heat input and operating hours derived from the hourly heat input rate measurements and fuel usage times at the common pipe.

For each NO_x affected unit, report <SummaryValueData> records for quarterly and cumulative heat input and operating hours that were derived using one of the accepted methodologies in this policy. Also report a <SummaryValueData> record for NO_x emission rate, as apportioned to the unit.

References: ECMPS Emissions Reporting Instructions

Question 22.10

Topic: Missing Data Requirements

Question: What missing data requirements apply in the common stack NO_x apportionment stack configuration described in Question 22.2?

Answer: For the common stack, use the standard missing data procedures in § 75.33.

For monitors located at either the individual NO_x nonaffected units or at a secondary common stack serving only the NO_x nonaffected units use "inverse" missing data procedures for NO_x, CO_2, and flow rate missing data (i.e., substitute the tenth percentile value when the standard missing data procedures in § 75.33 require the 90th percentile value, use the fifth percentile value in lieu of the 95th percentile value, use the minimum value in the look back periods instead of the maximum value and use zeros for the minimum potential NO_x emission rate or minimum potential flow rate for any hours in which maximum potential values would ordinarily be used under Subpart D of Part 75). The owner or operator may petition the Administrator under § 75.66 to use minimum potential values other than zero.
If O_2 data, rather than CO_2 data is used in the heat input rate calculations, use the "regular" missing data algorithm, rather than the inverse algorithm, to provide substitute O_2 data for the heat input rate determinations.

For moisture missing data, use the regular missing data algorithm, unless Equation 19-3, 19-4, or 19-8 is used for NO_x emission rate determination, in which case, use the inverse missing data algorithm.

Use the missing data method of determination codes specified in Table 4a in Part 75.

References: § 75.33, § 75.66

[This page intentionally left blank.]

SECTION 23
APPENDIX D

Page

23.1 GVC Smapling Frequency for Pipeling Natural Gas 23-1

23.2 Measuring Gas Sulfur Content 23-1

23.3 Diesel Fuel Sampling 23-1

23.4 Fuel Usage Time 23-2

23.5 Appendix D Fuel Sampling -- Usage of Multiple Fuels 23-3

23.6 Appendix D Fuel Sampling --Time for Results 23-3

23.7 Backup Fuel 23-3

23.8 Use of Billing Fuel Flowmeter 23-4

23.9 Vendor-supplied Sulfur Values 23-4

23.10 Certified Fuel Flowmeter -- Emergency Fuel Exemption 23-4

23.11 Failure of Fuel Flow-to-load Test 23-5

23.12 Use of Quarterly Fuel Flow-to-load Test 23-5

23.13 Alternative Calibration Method for Coriolis Meters 23-6

23.14 Fuel Flowmeter Acuracy Testing -- Use of Billing Meter 23-6

23.15 Definition of a "Fuel Flowmeter QA Operating Quarter" 23-7

23.16 Fuel Flowmeter Calibration -- Rotation of Fuel Flowmeters 23-8

23.17 Fuel Flow-to-load Ratio Test -- Baseline Data Collection 23-8

23.18 Default Minimum Fuel Flow Rate 23-9

Page

23.19 Appendix D -- Sampling Methodologies 23-9

23.20 Fuel Flow-to-load Ratio Test 23-10

Question 23.1

Topic: GCV Sampling Frequency for Pipeline Natural Gas

Question: If I have a unit using a default emission rate to calculate SO_2 emissions from pipeline natural gas, how often does fuel sampling and analysis have to be performed to determine the GCV?

Answer: For gas, monthly fuel sampling and analysis is required for every month that gaseous fuel is combusted. The sampling and analysis may be done either by the owner or operator or by the fuel supplier. This requirement does not apply for any month in which pipeline natural gas is combusted for a period less than 48 hours, provided that at least one analysis for GCV is done each quarter that the unit operates. Oil sampling still must be done in accordance with the procedures in Section 2.2 of Appendix D.

References: Appendix D, Section 2.3.4.1; Appendix F, Section 5.5

Question 23.2

Topic: Measuring Gas Sulfur Content

Question: Must the sulfur content of pipeline natural gas be measured after the addition of sulfur-containing compounds or is it permissible for a gas supplier to estimate the amount of sulfur-containing compounds added to pipeline natural gas to calculate the sulfur content of the gas combusted?

Answer: Appendix D requires sampling of gaseous fuel as supplied to the unit (including any added sulfur-containing compounds) by specified methods.

References: Appendix D, Section 2.3.1.4(e)

Question 23.3

Topic: Diesel Fuel Sampling

Question: How should the sulfur content be determined for the as-delivered oil sampling option in Appendix D?

Answer: Appendix D, Section 2.2.4.3(c) states: "Oil sampling may be performed either by the owner or operator of an affected unit, an outside laboratory, or a fuel supplier, provided that samples are representative and that sampling is performed according to either the single tank composite sampling procedure or the all-levels sampling procedure in ASTM D4057-95 (Reapproved 2000). . ."

This may be accomplished by taking a sample from the:

(1) Shipment tank or container upon receipt.

(2) Supplier's storage container that holds the fuel (provided that no fuel is added to the container between the time that the sample is taken and the time the shipment is prepared for delivery -- otherwise, a new sample must be taken).

SO_2 mass emissions then should be calculated using either the highest value sampled during the previous calendar year or the maximum value indicated in the fuel supply contract unless the actual value obtained from the most recent sample is higher.

References: Appendix D, Section 2.2.4.3(c)

Question 23.4

Topic: Fuel Usage Time

Question: Do invalid one-minute fuel flow data points get counted in the determination of the hourly fuel usage time? For example, if for a particular fuel (oil or gas) we have valid one-minute data from minute one through 28, invalid data from minute 29 through 35 and the unit was not operating on that fuel from minute 36 through 60, what fuel usage time should be recorded in the <HourlyFuelFlowData> record for that fuel?

Answer: You may report the actual portion of each clock hour in which the unit combusted fuel, to the nearest hundredth of an hour (0.58 in this example, based on minutes one through 35), or you may report the number of quarter hours in which the unit combusted fuel, rounded up to the next highest quarter hour (0.75 in this example). Note that while the hourly average fuel flow rate is based upon the valid data points collected while the fuel was being burned (i.e., the average of the data collected between minutes one and 28), the fuel usage time is based upon the time during which fuel was burned regardless of whether or not valid fuel flow rate data were obtained.

References: Appendix D; ECMPS Emission Reporting Instructions

Question 23.5

Topic: Appendix D Fuel Sampling -- Usage of Multiple Fuels

Question: Section 2.2.4.1 of Appendix D states that if multiple oil supplies with different sulfur contents are combusted in one day, the source should sample the fuel with the highest sulfur content. If it is not obvious which fuel has the highest sulfur content, which fuel(s) should be sampled?

Answer: If different types of fuel with different expected sulfur contents are combusted on one day (e.g., #2 fuel oil and #6 fuel oil), the source may sample only the type of fuel with the expected higher sulfur content. If it is not clear which fuel has the highest sulfur content (e.g., when the same type of fuel from different suppliers is burned), the utility must sample each of the fuels to determine which has the highest sulfur content.

References: Appendix D, Section 2.2.4.1

Question 23.6

Topic: Appendix D Fuel Sampling -- Time for Results

Question: Appendix D requires results of sampling within 30 days of sampling. Does this mean onsite or entered into the DAHS for processing?

Answer: The results of sampling should be available onsite at the plant within 30 days of sampling. Also, in the event of an audit, EPA may request that these values be made available to the Agency within five days of the request. As a standard operating procedure it is acceptable to enter the data at the end of the quarter. However, in the event of an onsite audit by EPA or state agency staff, the operator must be able to enter the data in the DAHS and generate the calculated values. Furthermore, the data must be retrievable from the DAHS the day of an onsite audit.

References: Appendix D, Sections 2.2.8, 2.3.3.1.4

Question 23.7

Topic: Backup Fuel

Question: What is backup fuel, as referred to in various sections of 40 CFR Part 75? Do Appendix D fuel flowmeters measuring backup fuel qualify for less frequent fuel flowmeter calibrations?

Answer: The term backup fuel is defined in § 72.2. For Part 75, backup fuel means "the fuel provides less than 10.0 percent of the heat input to a unit during the three calendar years prior to certification testing of the primary fuel and the fuel provides less than 15.0 percent of the heat input to a unit in each of those three calendar years." For example, for a gas-fired unit, oil may be a backup fuel.

Fuel flowmeters that measure the flow of backup fuel are calibrated at the same frequency as flowmeters that measure the flow of primary fuel. (See Section 2.1.6 of Appendix D.)

References: § 72.2, Appendix D, Section 2.1.6

Question 23.8

Topic: Use of Billing Fuel Flowmeter

Question: Does Part 75 allow the use of a billing fuel flowmeter for oil?

Answer: Yes, provided that the requirements of Section 2.1.4.2 of Appendix D are met.

References: Appendix D, Section 2.1.4.2

Question 23.9

Topic: Vendor-supplied Sulfur Values

Question: Does Part 75 allow the use of vendor-supplied values for Appendix D fuel sampling requirements (e.g., percent sulfur)?

Answer: Yes.

References: Appendix D, Sections 2.2 and 2.3

Question 23.10

Topic: Certified Fuel Flowmeter -- Emergency Fuel Exemption

Question: Our plant generally burns only natural gas but also has the capability to burn oil. Section 2.1.4.3 of Appendix D has an option for emergency fuels which does not require the use of a certified fuel flowmeter. How is this monitoring option implemented?

Answer: First, the fuel must qualify as an emergency fuel as described in Appendix D Section 2.1.4.3. This means accepting a permit restriction which limits the use of the fuel to emergency situations in which the primary fuel is not available. EPA considers the following circumstances to be emergency situations: (1) if the supplier of the primary fuel cannot provide that fuel (e.g., gas curtailment); and (2) if the primary fuel handling system is inoperable and is being repaired. Note that the permit restriction may also contain provisions which allow the unit to combust the emergency fuel for short test periods as a normal maintenance practice to verify that the unit is capable of combusting the emergency fuel.

If the necessary permit restriction is in place, then, according to Section 2.1.4.3 of Appendix D, the use of a certified fuel flowmeter is not required when the emergency fuel is combusted, and the maximum rated hourly heat input may be used for emissions reporting.

References: Appendix D, Section 2.1.4.3

Question 23.11

Topic: Failure of Fuel Flow-to-load Test

Question: If a quarterly fuel flow-to-load ratio test is failed, when does data invalidation begin?

Answer: The data are invalidated starting with the first hour of the quarter following the quarter in which the test was failed.

References: Appendix D, Section 2.1.7.4(b)

Question 23.12

Topic: Use of Quarterly Fuel Flow-to-load Test

Question: May a source perform quarterly fuel flow-to-load ratio tests (as described in Section 2.1.7 of Appendix D) for one or more quarters and then discontinue use of the flow-to-load ratio method before reaching the maximum allowable extension of the accuracy test deadline?

Answer: Yes, as long as you fulfill the QA requirements for the fuel flowmeter. If, at the beginning of a calendar quarter you decide to discontinue reporting the fuel flow-to-load ratio test results, and a historical lookback shows that four or more "fuel flowmeter QA operating quarters" have passed since the last fuel flowmeter calibration, then you must recalibrate the fuel flowmeter prior to the end of the quarter in which the fuel flow-to-load ratio analysis is discontinued. If fewer than four "fuel flowmeter QA operating quarters" have passed since the last fuel flowmeter calibration you may wait until the fourth fuel flowmeter QA operating quarter to perform the required recalibration.

Note, however, that if your decision to discontinue performing the quarterly fuel flow-to-load data analysis is based on the results of a failed fuel flow-to-load test, you may *not* ignore these test results. In this case you must report the results of the failed test and you must follow the procedures of Appendix D, Section 2.1.7.4, "Consequences of Failed Fuel Flow to Load Ratio Test." This applies even if the failed fuel flow-to-load test occurs prior to the completion of four fuel flowmeter QA operating quarters.

References: Appendix D, Sections 2.1.7.3, 2.1.7.4

Question 23.13

Topic: Alternative Calibration Method for Coriolis Meters

Question: Is there an alternative calibration method for Coriolis meters (i.e., calibration by design in lieu of using a flowing fluid)?

Answer: The Agency is not aware of any current voluntary consensus standards (ASTM, AGA, ANSI ISO, etc.) that provide an alternative method for calibration of Coriolis type fuel flowmeters by design. Therefore, the acceptable methods for calibrating Coriolis fuel flowmeters are the methods described in Appendix D, Section 2.1.5.2 (i.e., (1) calibration against a reference meter installed in line with the Coriolis meter; or (2) laboratory calibration by the manufacturer).

References: Appendix D, Section 2.1.5.2

Question 23.14

Topic: Fuel Flowmeter Accuracy Testing -- Use of Billing Meter

Question: May I use a billing meter as an in-line reference meter to test the accuracy of a Part 75 fuel flowmeter?

Answer: You may use any in-line meter (including a billing meter) as a reference meter to calibrate a Part 75 fuel flowmeter, if the billing meter meets the criteria in Section 2.1.5.2(a) of Appendix D and the quality assurance requirements in Sections 2.1.6.1 and 2.1.6.4 of Appendix D. That is:

(1) If the billing meter is an orifice, nozzle or venturi-type meter, you may use it as a reference meter if:

   (a) It meets the design criteria of AGA Report No. 3 or ASME MFC-3M-1989;

   (b) Calibrations of the temperature, pressure, and differential pressure transmitters (or transducers) are performed and passed according to Section 2.1.6.1 of Appendix D, immediately prior to the comparison between the billing meter and the Part 75 fuel flowmeter; and

(c) A visual inspection of the meter's primary element has been performed and passed within the previous three years (12 calendar quarters) prior to the comparison.

(2) A billing meter other than an orifice, nozzle, or venturi-type may be used as a reference meter, provided that the billing meter either:

(a) Has passed an accuracy test within the last 365 days, using one of the standards listed in Section 2.1.5.1 of Appendix D; or

(b) Qualifies for a waiver from accuracy testing, under Section 2.1.5.2(c) of Appendix D.

References: Appendix D, Sections 2.1.5.1, 2.1.5.2, 2.1.6.1, and 2.1.6.4

Question 23.15

Topic: Definition of a "Fuel Flowmeter QA Operating Quarter"

Question: Please clarify the term "fuel flowmeter QA operating quarter" as defined in 40 CFR § 72.2.

Answer: The term "fuel flowmeter QA operating quarter" is both fuel-specific and monitoring system-specific. For example, a unit that burns gas for 500 hours in a quarter and oil for 100 hours in a quarter has a gas "fuel flowmeter QA operating quarter" (because gas was burned for $\geq$ 168 hours), but does not have an oil "fuel flowmeter QA operating quarter."

In the example above, if the gas fuel flowmeter system had consisted of multiple fuel flowmeters the "fuel flowmeter QA operating quarter" would have been counted against each of the installed meters in the system even if one or more of the individual meters (e.g., a return meter) may have operated for less than 168 hours in the quarter. Each time that a "fuel flowmeter QA operating quarter" is charged against a particular flowmeter, it counts toward the determination of the deadline for the next accuracy test of the flowmeter.

References: § 72.2

Question 23.16

Topic: Fuel Flowmeter Calibration -- Rotation of Fuel Flowmeters

Question: Section 2.1.6 of Appendix D requires fuel flowmeters to be recalibrated, at a minimum, once every four "fuel flowmeter QA operating quarters." If I calibrate a fuel flowmeter and temporarily put it in storage, how long can the meter remain in storage without being recalibrated? When the meter is returned to service, how do I determine the deadline for the next flowmeter accuracy test?

Answer: Manufacturers of fuel flowmeters recommend that the flowmeters not be kept too long in storage without recalibrating them. Estimates of how long is "too long" vary from vendor to vendor. You may keep a flowmeter in storage without recalibrating it for up to five years (20 calendar quarters) after the quarter in which it was last calibrated, unless more frequent recalibration is recommenced by the manufacturer.

When a calibrated flowmeter is brought back into service after being in storage, its next accuracy test will be due, as specified in Section 2.1.6 of Appendix D, within four "fuel flowmeter QA operating quarters" (beginning with the quarter in which the meter is brought into service), not to exceed 20 calendar quarters from the quarter of the last accuracy test of the flowmeter (see also Question 23.15).

References: Appendix D, Section 2.1.6

Question 23.17

Topic: Fuel Flow-to-load Ratio Test -- Baseline Data Collection

Question: If I have a fuel flowmeter system consisting of multiple components (e.g., a system having a main fuel flowmeter and a recirculating meter), and I elect to extend the deadline for the next fuel flowmeter quality assurance test by using the optional fuel flow-to-load ratio test in Section 2.1.7 of Appendix D, which fuel flowmeter quality assurance test date should be used as the reference point for the baseline data collection?

Answer: Begin collecting baseline data only after all component meters in the system have passed their required QA tests. To ensure that the baseline data are collected in a timely manner, EPA recommends that all of the flowmeters in the system be calibrated within a 30 calendar day period. The baseline data collection period should start with the first operating hour after the last meter in the system has been QA tested and (if applicable) re-installed. The baseline data should capture any seasonal and operational variations, to ensure that the reference ratio or GHR represents the average operation of the unit.

References: Appendix D, Sections 2.1.6 and 2.1.7

Question 23.18

Topic: Default Minimum Fuel Flow Rate

Question: When an Appendix D fuel flowmeter is used to measure unit heat input, occasionally, during unit start-up, the gas fuel flow rate is below the detection limit of the fuel flowmeter. If this occurs near the end of a clock hour, it can result in zero fuel flow rate and zero heat input being recorded for the hour, which will trigger error messages. May I define and report a minimum default fuel flow rate for any on-line period in which the fuel flow rate is below the flowmeter's detection limit?

Answer: Yes. You may define a minimum default fuel flow rate for periods when fuel is being combusted but the flow rate is below the detection limit of the fuel flowmeter. See Section 2.5.4 of the ECMPS Reporting Instructions for Emissions Data.

References: Appendix D, Section 2.1

Question 23.19

Topic: Appendix D -- Sampling Methodologies

Question: Once I have selected an Appendix D sampling methodology to determine fuel sulfur content, GCV, or density, under what circumstances may I change methodologies?

Answer: Once you have selected a sampling methodology you must continue to use that methodology and the missing data routines associated with it, unless you choose to make a permanent change in your approach. You may not switch methodologies to avoid reporting substitute data.

References: Appendix D, Sections 2.3 and 2.4

Question 23.20

Topic: Fuel Flow-to-Load Ratio Test

Question: I have a combined-cycle turbine with a duct burner. Both the turbine and the duct burner combust only natural gas, and fuel flow to the turbine and duct burner are metered separately. In my monitoring plan, I have represented this as a single "GAS" monitoring system, with two component meters. If I want to use the optional fuel flow-to-load ratio test in Section 2.1.7 of Appendix D to extend the accuracy test deadline for my gas fuel flowmeters, may I perform the fuel flow-to-load data analysis using just the fuel flow to the CT and the electrical load generated by the turbine?

Answer: Yes, provided that the duct burner is used, on average, for 25 percent of the unit operating hours, or less. If you perform the fuel flow-to-load test in this manner, apply the test result to both the turbine flowmeter and the duct burner flowmeter. Report the baseline data for the fuel flowmeter system, and report the *same* flow-to-load test result for each flowmeter component separately.

References: Appendix D, Section 2.1.7

SECTION 24
APPENDIX E

Page

24.1 Appendix E -- Testing 24-1

24.2 Expected Methods -- Applicability 24-1

24.3 Expected Methods -- Traverse Points 24-2

24.4 Appendix E Testing and Common Stacks 24-2

24.5 Appendix E -- Missing Data 24-2

24.6 Appendix E -- Quality Assurance/Quality Control Parameters 24-3

24.7 Appendix E -- Maximum NO_x Emission Rates 24-3

24.8 Appendix E -- Redetermination of Correlation 24-4

24.9 Comparison of QA Parameters to Defined Ranges 24-5

24.10 Appendix E Correlation Tests -- Fuel Mixtures 24-5

24.11 Reporting of NO_x Emissions After Fuel Charge 24-6

24.12 Use of Default NO_x Emission Factor 24-6

24.13 Calculation of Appendix E NO_x Emission Rate Data Availability 24-7

[This page intentionally left blank.]

Question 24.1

Topic: Appendix E -- Testing

Question: In the procedures in Appendix E to Part 75, how many sample runs of Method 7E need to be run at each load level? How long does each run last?

Answer: Conduct three sample runs at each load level as stated in Section 2.1.2.3 of Appendix E.

When the sampling points specified in Section 2.1.2.1 of Appendix E are used, first purge the system for at least twice the average measurement system response time before recording any data. Then, sample and record data at the first traverse point for at least one minute. For each additional point on a traverse, move the probe to the point, purge the system for at least one response time, and then record data for at least one minute.

However, if permission is obtained through a petition under § 75.66 to use fewer sampling points than are specified in section 2.1.2.1 of Appendix E, ensure that the total sampling time for each test run is ≥ 15 minutes, and divide the total sampling time for the run evenly among all sample points.

References: Appendix E, Section 2.1.2.3

Question 24.2

Topic: Excepted Methods -- Applicability

Question: Can a gas-fired unit performing testing to meet the requirements of Appendix E be exempt from including this period of testing in the calculation of unit operating hours for the purpose of determining eligibility as a peaking unit (or as a gas-fired unit)?

Answer: No. All unit operating hours, including those hours during the performance tests required to establish NO_x-load correlations used for the Appendix E procedure must be included in the determination of continued eligibility as a peaking unit (or as a gas-fired unit).

References: § 75.12(d); Appendix E

Question 24.3

Topic: Excepted Methods -- Traverse Points

Question: For NO_x stack testing for Appendix E to Part 75, how should I select sampling locations for each point in a traverse for each run?

Answer: In accordance with Part 75, Appendix E, Sections 2.1.2.1 and 2.1.2.2, you must use a minimum of 12 sampling points located in accordance with Method 1 in Appendix A-1 of 40 CFR Part 60.

For boilers, the designated representative may petition the Administrator under § 75.66 to use fewer traverse points. The petition must include a proposed alternative sampling procedure and information demonstrating that stratification is absent at the sampling location (see the stratification test in Appendix A to Part 75, Section 6.5.6.1).

References: 40 CFR Part 60, Appendix A; Part 75, Appendix A, Section 6.5.6.1; Part 75, Appendix E, Sections 2.1.2.1 and 2.1.2.2

Question 24.4

Topic: Appendix E Testing and Common Stacks

Question: For two oil-fired units sharing a common stack may the Appendix E testing be performed at the common stack with both units operating and then apply the results to each unit separately?

Answer: No. In order to use Appendix E you must test and report data separately from every unit even if those units share a common stack. Perform correlation load curves for each unit separately and then report the data separately for each unit. You may test in the stack while operating one unit at a time.

References: Appendix E

Question 24.5

Topic: Appendix E -- Missing Data

Question: For an oil and gas-fired peaking unit, is a retest of the Appendix E NO_x correlation curve needed if the unit operates at a load beyond the highest heat input rate on the curve?

Answer: No. If the unit operates at a higher-than-expected load, such that the hourly heat input rate is higher than the highest value on the correlation curve, the unit is considered to be in a missing data situation. When this occurs, Section 2.5.2.1 of Appendix E requires that you report the NO_x emission rate for each hour of the missing data period using one of the following methodologies:

(1) Report the higher of: (a) the linear extrapolation of the emission rate at the maximum load from the applicable correlation graph, or (b) the maximum potential NO_x emission rate, or MER (as calculated in the monitoring plan and defined in § 72.2); or

(2) Report 1.25 times the highest NO_x emission rate on the correlation curve, not to exceed the MER. For units with NO_x controls, this option may only be used if the controls are documented (e.g., by means of parametric data) to be working during the missing data period. If the controls are not documented to be working, report the MER.

References: Appendix E, Sections 2.3 and 2.5.2.1

Question 24.6

Topic: Appendix E -- Quality Assurance/Quality Control Parameters

Question: Is it necessary to track excess O_2 when the heat input is lower than the lowest tested heat input point from the Appendix E correlation curve?

Answer: In the Technical Support Document for the 1995 Direct Final Rule, section M, item 7, it is explained that linear interpolation can be used to determine expected excess O_2 at load or heat input levels that fall between test levels. However, it is not necessary to keep track of excess O_2 when the heat input is lower than the lowest heat input point. Presumably, the heat input will be less than the minimum heat input point only during start-up and shutdown conditions. The EPA intended for the quality assurance/quality control parameters to apply to the normal unit operation covered by the most recent Appendix E testing.

References: Appendix E, Section 2.3.3

Question 24.7

Topic: Appendix E -- Maximum NO_x Emission Rates

Question: What is the difference between the maximum Appendix E curve value and the maximum potential NO_x emission rate (MER) for a unit. How should the maximum potential NO_x emission rate be determined?

Answer: The maximum curve value is a measured value which appears as the highest NO_x emission rate on the NO_x correlation curve developed for

Appendix E estimation of NO_x. The maximum curve value corresponds to the greatest NO_x emission rate measured during Appendix E testing.

The maximum potential NO_x emission rate is a theoretical calculated value defined in § 72.2, calculated using the maximum potential concentration of NO_x, as specified in Section 2.1.2.1 of Appendix A, and the minimum carbon dioxide concentration (from historical information or diluent cap value of 5.0% for boilers or 1.0% for turbines) or maximum oxygen concentration (from historical information or diluent cap value of 14% for boilers or 19.0% for turbines). As a second alternative when the NO_x MPC is determined from emission test results or from historical CEM data, quality-assured O_2 or CO_2 data recorded concurrently with the NO_x MPC may be used to calculate the MER.

References: § 72.2; Appendix A, Section 2.1.2.1; Appendix E, Sections 2.1.1, 2.1.6, and 2.5.2.

Question 24.8

Topic: Appendix E -- Redetermination of Correlation

Question: Appendix E requires redetermination of the NO_x emission rate-heat input correlation whenever the unit operates for more than 16 hours outside the acceptable QA ranges specified in the QA plan for any of the parameters that are indicative of a stationary gas turbine's NO_x formation characteristics. Do the 16 operating hours have to be successive? May they be interrupted by periods of non-operation? Does the redetermination clock reset to zero if the parameters return to normal for even one hour?

Answer: Section 2.3.1 of Appendix E states that redetermination is necessary when any of the parameters is outside the acceptable QA ranges for ". . . one or more successive operating periods totaling more than 16 unit operating hours." This is interpreted to mean that the 16 unit operating hours must be consecutive, but may be interrupted by periods of non-operation. If the parameter(s) in question return to normal for even one hour prior to the 16th consecutive hour, then the redetermination clock resets to zero.

References: Appendix E, Section 2.3.1

Question 24.9

Topic: Comparison of QA Parameters to Defined Ranges

Question: For Appendix E, should the QA parameters be compared to defined ranges on an hourly basis and if they are out of spec then should missing data be used? Should this be done on an hourly basis or for every 15 minutes?

Answer: Compare the hourly average value of each QA parameter with its specification. Section 2.3.3 of Appendix E requires the correlation curve between NO_x emission rate and heat input rate to be re-determined when the excess oxygen level continuously exceeds the level recorded during the previous Appendix E test by more than two percent O_2 for a period of greater than 16 consecutive *unit operating hours*. Therefore, the determination of whether a particular parameter meets the specification is made on an hourly basis.

References: Appendix E, Section 2.3.3

Question 24.10

Topic: Appendix E Correlation Tests -- Fuel Mixtures

Question: For a unit that normally co-fires fuels, to what extent can a mixture of fuels differ from the mixture of fuels combusted during the Appendix E test without requiring a retest to establish a new correlation curve? Also, during the test how is the F-factor to be determined for calculation of the NO_x emission rate?

Answer: Section 2.1.2.1 of Appendix E allows a unit which burns a consistent fuel mixture to determine a heat input NO_x emission rate correlation for that consistent mixture of fuels. A consistent mixture of fuels is considered to be one with a composition that does not vary by more than ± 10%. For example a unit normally fires a 50 – 50 (by heat input) mixture of natural gas and #2 fuel oil. To be considered a consistent mixture under normal operations the unit should fire a mixture of between 40 – 60, gas oil and 60 – 40 gas oil. In this case, for testing purposes, use a pro-rated F-factor based on either the normal mixture of fuel (i.e., 50 – 50, heat input-weighted F-factor). If a source burns two fuels simultaneously but does not maintain a consistent mixture, test both fuels separately and combine the emissions using the procedures for multiple fuel hours (see Equation E-2).

EPA does not recommend that you use Appendix E when you use variable fuels and/or processes. If you elect to use this method, you should consult with EPA before performing the required test. At a minimum, you may be required to submit information on the variability of the fuels and processes and test using the variable fuels and/or processes.

References: Appendix E, Section 2.1.2.1

Question 24.11

Topic: Reporting of NO_x Emissions After Fuel Change

Question: For a unit that is converted from oil combustion to natural gas and oil, how do we report the NO_x emissions from natural gas from the time of the conversion until we are able to test and generate a NO_x curve? The quarter ended prior to the completion of NO_x testing required to establish the curve for natural gas.

Answer: In the absence of the NO_x emission rate curve required for Appendix E reporting, use the maximum NO_x emission rate (MER) for natural gas as determined from the maximum potential concentration values defined in Table 2-2 of Appendix A, Section 2.1.2.1 for your unit type. In the MER calculation, you may either: (1) use the minimum CO_2 concentration or maximum O_2 concentration (as applicable) under typical operating conditions; (2) use the appropriate diluent cap value; or (3) when the NO_x MPC is determined from emission test results or from historical CEM data, quality-assured O_2 or CO_2 data recorded concurrently with the NO_x MPC may be used to calculate the MER.

References: Appendix A, Section 2.1.2.1

Question 24.12

Topic: Use of Default NO_x Emission Factor

Question: Our company is building a new combined-cycle gas turbine, which is subject only to the Acid Rain Program. We want to operate the turbine in the simple cycle mode for several months while the Heat Recovery Steam Generator (HRSG) is being built. The unit will operate as a peaking unit prior to the completion of the HRSG, but will be base-loaded after the HRSG is available. May we use a default emission factor for NO_x, while the HRSG is being constructed since my NO_x CEMS will reside on a stack that will not be available until the HRSG is finished?

Answer: Yes. However, note that such reporting will only be necessary if the period of simple cycle operation extends beyond the CEMS certification deadline specified in § 75.4 (b)(2) -- since you must begin reporting NO_x emissions data if the NO_x CEMS has not been certified by the deadline (see § 75.64 (a)). For a new Acid Rain Program unit, the certification deadline is 90 unit operating days or 180 calendar days (whichever occurs first) from the date on which the unit commences commercial operation.

If simple cycle operation extends beyond the CEMS certification deadline, you should report the maximum potential NO_x emission rate (MER) for each unit operating hour until the CEMS is certified. Determine the MER in accordance with Section 2.1.2.1(b) of Appendix A, and report this value, using a Method of Determination Code (MODC) of "12".

References: § 75.4(b)(2), § 75.64(a); Appendix A, Section 2.1.2.1(b)

Question 24.13

Topic: Calculation of Appendix E NO_x Emission Rate Data Availability

Question: How does EPA calculate the percent data availability for an Appendix E unit?

Answer: The Agency calculates the Appendix E NO_x emission rate data availability from the most recent 2,160 hours of data or, if there are less than 2,160 hours of data in the previous three years, EPA will base the calculation on all of the data from those three years.

References: Appendix E, Section 2.3

[This page intentionally left blank.]

SECTION 25
NO_x MASS MONITORING

Page

25.1 Capacity Factor Analyses 25-1

[This page intentionally left blank.]

Question 25.1

Topic: Capacity Factor Analyses

Question: How should the capacity factor be determined? Should the analysis always be done on a calendar year basis or might it be done for just the ozone season for ozone season only reporters?

Answer: For sources that are required to report on an annual basis under § 75.74(a), § 75.71(d)(2) requires that the capacity factor analysis is to be done on an annual basis. For sources that report data only during the ozone season under § 75.74(b), § 75.71(d)(2) requires that these analyses be done on an ozone season basis. When performing the analysis on an ozone season basis, § 75.74(c)(11) specifies that 3672 hours should be used in lieu of 8760 for the purpose of calculating the capacity factor as defined in § 72.2.

References: § 75.71(d)(2)

[This page intentionally left blank.]

SECTION 26
MOISTURE MONITORING

Page

26.1 Reporting Requirements for Hourly Stack Moisture 26-1

[This page intentionally left blank.]

Question 26.1

Topic: Reporting Requirements for Hourly Stack Moisture

Question: Is hourly stack moisture reporting required?

Answer: No. Only sources using formulas that require moisture corrections are required to determine hourly moisture. In addition, for units that require moisture corrections, moisture default values may be used for coal, wood, and natural gas in lieu of reporting hourly moisture monitoring data. See § 75.11(b) and § 75.12(b).

References: § 75.11(b) and § 75.12(b)

[This page intentionally left blank.]

SECTION 27
LOW MASS EMITTERS

Page

27.1 LME Methodology Start Dates 27-1

[This page intentionally left blank.]

Question 27.1

Topic: LME Methodology Start Dates

Question: May I use the LME methodology for a unit that comes on-line in the middle of a year?

Answer: Yes, provided that you begin using LME when the unit starts up. You must use the LME methodology to account for all emissions during a year (or ozone season); therefore, it is acceptable to use it starting in the middle of a year if the unit did not operate until then. If your unit is operating on January 1 (or May 1 for Subpart H only units), you must start using LME then or wait until the next year.

References: § 75.19

[This page intentionally left blank.]

APPENDIX A
MISCELLANEOUS SUPPORT DOCUMENTS

Quick Reference Guide to Flow Span

Definitions:

Maximum Potential Velocity (MPV) -- represents the maximum stack gas velocity for a given unit or stack. It can be determined either through velocity traverse testing or a formula calculation. It is expressed in units of standard feet per minute (sfpm), wet basis.

Maximum Potential Flow Rate (MPF) -- is the maximum stack gas flow rate in standard cubic feet per hour (scfh), wet basis. It is used for missing data purposes and to set the flow rate span value.

Calibration Units -- refers to the actual units of measure used in daily calibration error testing of a flow monitor (sfpm, ksfpm, scfm, kscfm, scfh, kscfh, acfm, kacfm, acfh, kacfh, inH_2O, mmscfh, mmacfh, afpm, kafpm).

Calibration MPF -- is the maximum potential flow rate expressed in calibration units. This value is not calculated for differential pressure (DP) type flow monitors.

Calibration Span Value -- is a calculated value which is used to determine the zero-level and high-level reference signal values for calibration error testing. It ensures that calibration tests are performed at levels that are representative of the actual values that the monitor is expected to be reading. It is expressed in calibration units

Flow Rate Span Value -- is a calculated value used to set the full-scale reporting range of a flow monitor, in scfh.

Full-Scale Range -- represents the largest value that a particular scale on the instrument is capable of measuring. It is a result of the design and construction (and subsequent modification) of the monitor itself. The full-scale range used for daily calibration error tests is expressed in calibration units. The full-scale range used for flow rate reporting is expressed in units of scfh, wet basis. The full-scale range must be greater than or equal to the corresponding span value.

Determination of Important Values:

- **MPV**

  Test Results -- MPV may be determined based on velocity traverse testing. If this method is chosen, use the highest average velocity measured at or near the maximum unit operating load. (Part 75, Appendix A, Section 2.1.4.1)

  Formula -- MPV may be determined using Equation A-3a or A-3b in Part 75, Appendix A, Section 2.1.4.1.

  Historical Data -- MPV may be determined using historical data. If this method is used, the historical data must include operation at the maximum load level and the MPF must represent the highest observed flow rate. (Part 75, Appendix A, Section 2.1.4.3.)

- **MPF**

  Multiply MPV (in sfpm, wet basis) by the inside cross sectional area (in square feet) of the flue at the flow monitor location. Then multiply this value by 60 to convert to scfh on a wet basis. That is:

$$MPF(scfh_{wet}) = MPV(sfpm_{wet}) \times A(ft^2) \times 60(m/h)$$

  Round the MPF upward to the next highest multiple of 1000 scfh.

- **Calibration MPF (Non-DP type monitors, only)**

  Multiply MPF (in scfh, wet basis) by the appropriate conversion factors to convert to calibration units. That is:

$$\text{Calibration MPF (cal units)} = MPF(scfh_{wet}) \times [\text{Conversion to cal units}]$$

  This value should not be calculated if a DP type flowmeter is used.

- **Calibration Span Value (Non-DP type monitors)**

Convert MPV into the units that will be used for the daily calibration test. Then multiply this value by a factor no less than 100 percent and no greater than125 percent and round up the result to no less than two significant figures. In other words, the rounded result should have at least two significant figures and should follow engineering convention by not having more non-zero figures than the precision of the measured values used in the calculation. (Part 75, Appendix A, Section 2.1.4.2) That is:

Calibration Span = MPV($sfpm_{wet}$) x [Conversion to cal units] x [Multiplier 1.00 to 1.25]
Value (cal units)

<u>or</u>

= Calibration MPF (cal units) x [Multiplier 1.00 to 1.25]

- **Calibration Span Value (DP type monitors)**

For DP-type monitors, multiply the MPV (sfpm) by a factor no less than 1.00 and no greater than 1.25. Convert the result from sfpm to units of actual feet per second (afps). Then, use Equation 2-9 in Reference Method 2 (40 CFR 60 Appendix A) to convert the actual velocity to an equivalent delta P value in inches of water. Retain at least two decimal places in the resultant delta P, which is the calibration span value.

- **Flow Rate Span Value (All flow monitors)**

Calculate the flow rate span value as follows:

Flow Rate = MPF ($scfh_{wet}$) x [Multiplier 1.00 to 1.25]
Span Value ($scfh_{wet}$)

Round the flow rate span value upward to the next highest multiple of 1000 scfh.

- **Full-Scale Range for Reporting**

Select the full-scale range for reporting hourly flow rates so that the majority of readings obtained during normal operation will be between 20 and 80 percent of full-scale (Part 75, Appendix A, Section 2.1). The full-scale range must be equal to or greater than the flow rate span value.

[This page intentionally left blank.]

APPENDIX B
OCTOBER 2003 POLICY MANUAL CROSSWALK

Current Reference (2009)	Past Reference (2003)	Notes
Section 1		
1.1	1.2	
1.2	1.3	
1.3	1.4	
1.4	1.15	Revised
1.5	1.16	Revised
Section 2		
2.1	2.6	Revised
2.2	2.16	Revised
Section 3		
3.1	3.2	
3.2	3.3	Revised
3.3	3.4	
3.4	3.5	Revised
3.5	3.6	Revised
3.6	3.8	
3.7	3.9	
3.8	3.10	
3.9	3.12	
3.10	3.13	
3.11	3.14	
3.12	3.15	
3.13	3.16	
3.14	3.17	
3.15	3.18	
3.16	3.19	

Current Reference (2009)	Past Reference (2003)	Notes
3.17	3.20	
3.18	3.21	
3.19	3.22	
3.20	3.23	Revised
3.21	3.24	
3.22	3.25	
3.23	3.26	
3.24	3.27	Revised
3.25	3.28	
3.26	3.29	
3.27	3.30	
3.28	3.31	
3.29	3.32	Revised
3.30	3.33	
3.31	3.34	
3.32	3.35	
3.33	3.36	Revised
3.34	3.37	Revised
3.35	3.38	Revised
3.36	3.39	Revised
3.37	3.40	Revised
3.38	3.41	
3.39	3.42	
3.40	3.43	
3.41	3.44	Revised
Section 4		
4.1	4.2	Revised
4.2	4.9	
4.3	4.23	Revised

Current Reference (2009)	Past Reference (2003)	Notes
Section 5		
5.1	5.1	Revised
5.2	5.2	
5.3	5.3	
5.4	5.4	
5.5	5.5	
5.6	5.6	
Section 6		
6.1	6.1	
6.2	6.2	
6.3	6.3	
6.4	6.4	Revised
6.5	6.5	Revised
Section 7		
7.1	7.1	Revised
7.2	7.3	
7.3	7.4	Revised
7.4	7.5	
7.5	7.6	
7.6	7.7	
7.7	7.8	
7.8	7.9	
7.9	7.10	Revised
7.10	7.11	
7.11	7.14	Revised
7.12	7.15	
7.13	7.22	Revised
Newly Retired: 7.2, 7.12, 7.13, 7.16, 7.17, 7.18, 7.19, 7.20, 7.21		
Section 8		
8.1	8.2	Revised
8.2	8.4	
8.3	8.5	
8.4	9.1	Moved from Section 9

Current Reference (2009)	Past Reference (2003)	Notes
8.5	9.2	Moved from Section 9
8.6	8.6	
8.7	8.7	Revised
8.8	8.8	Revised
8.9	8.9	
8.10	8.11	
8.11	8.12	
8.12	8.15	
8.13	8.16	Revised
8.14	8.17	Revised
8.15	8.18	Revised
8.16	8.19	Revised
8.17	8.20	Revised
8.18	8.21	
8.19	8.22	
8.20	8.23	
8.21	8.24	
8.22	8.25	
8.23	8.26	
8.24	8.27	
8.25	8.28	Revised
8.26	8.29	
8.27	8.31	Revised
8.28	8.32	Revised
8.29	8.34	
8.30	8.35	
8.31	8.36	Revised
8.32	8.37	
8.33	8.38	
8.34	8.38	
8.35	8.38	
8.36	8.39	

Current Reference (2009)	Past Reference (2003)	Notes
Section 9 (Previously Section 10)*		
9.1	10.2	
9.2	10.3	
9.3	10.4	
9.4	10.5	
9.5	10.8	Revised
9.6	10.10	
9.7	10.11	Revised
9.8	10.12	Revised
9.9	10.13	Revised
9.10	10.15	
9.11	10.16	
9.12	10.17	
9.13	10.18	Revised
9.14	10.19	
9.15	10.21	Revised
9.16	10.22	Revised
9.17	10.24	
9.18	10.26	
9.19	10.27	Revised
9.20	10.28	Revised
9.21	10.29	
9.22	10.30	Revised
9.23	10.31	
9.24	10.32	Revised
9.25	10.1	Revised
9.26	10.33	Revised
9.27	10.34	Revised
9.28	10.35	
9.29	10.37	
9.30	10.38	Revised
9.31	10.39	Revised
Newly Retired: 10.7, 10.25		

Current Reference (2009)	Past Reference (2003)	Notes
Section 10 (Previously Section 11)		
10.1	11.1	
10.2	11.2	Revised
10.3	11.3	Revised
10.4	11.4	
10.5	11.6	Revised
Section 11 (Previously Section 12)		
11.1	12.1	Revised
11.2	12.3	Revised
11.3	12.7	Revised
11.4	12.8	
11.5	12.9	
11.6	12.11	
11.7	12.12	
11.8	12.13	Revised
11.9	12.14	Revised
11.10	12.17	Revised
11.11	12.18	
11.12	12.27	
11.13	12.30	Revised
Note: Sections 12.19, 12.23, 12.26 moved to Appendix D		
Section 12 (Previously Section 13)		
12.1	13.3	Revised
12.2	13.4	Revised
12.3	13.5	Revised
12.4	13.14	
12.5	13.15	
12.6	13.16	Revised
12.7	13.17	Revised
12.8	13.18	Revised
12.9	13.20	
12.10	13.21	Revised
Newly Retired: 13.7		

Current Reference (2009)	Past Reference (2003)	Notes
Section 13 (Previously Section 14)		
13.1	14.2	Revised
13.2	14.3	
13.3	14.4	Revised
13.4	14.5	Revised
13.5	14.6	Revised
13.6	14.7	
13.7	14.8	Revised
13.8	14.12	Revised
13.9	14.19	Revised
13.10	14.32	
13.11	14.33	Revised
13.12	14.36	Revised
13.13	14.38	Revised
13.14	14.39	Revised
13.15	14.40	
13.16	14.46	Revised
13.17	14.51	Revised
13.18	14.72	Revised
13.19	14.75	
13.20	14.84	Revised
13.21	14.91	Revised
13.22	14.96	Revised
13.23	14.103	
Newly Retired: 14.16, 14.17, 14.18, 14.20A, 14.20B, 14.21, 14.24, 14.26, 14.27, 14.30, 14.31, 14.37, 14.41, 14.47, 14.49, 14.52, 14.53, 14.54, 14.58, 14.60, 14.61, 14.62, 14.63, 14.64, 14.65, 14.66, 14.69, 14.73, 14.80, 14.81, 14.82, 14.86, 14.87, 14.88, 14.89, 14.92, 14.98, 14.100, 14.101, 14.102		
Section 14 (Previously Section 15)		
14.1	15.1	Revised
14.2	15.2	
14.3	15.3	Revised
14.4	15.7	Revised
14.5	15.12	
14.6	15.14	Revised

Current Reference (2009)	Past Reference (2003)	Notes
14.7	15.22	
14.8	15.24	Revised
14.9	15.26	Revised
14.10	15.30	Revised
Newly Retired: 15.4, 15.5, 15.6, 15.8, 15.9, 15.10, 15.17, 15.19, 15.20, 15.21, 15.23		
Section 15 (Previously Section 16)		
15.1	16.1	Revised
15.2	16.3	Revised
15.3	16.4	
15.4	16.14	Revised
15.5	16.15	Revised
15.6	--	New
15.7	16.16	
Newly Retired: 16.2		
Section 16 (Previously Section 17)		
16.1	17.1	
16.2	17.3	
16.3	17.5	Revised
16.4	17.6	Revised
16.5	17.7	Revised
16.6	17.9	Revised
16.7	17.10	Revised
16.8	17.11	Revised
16.9	17.12	
16.10	17.14	Revised
Newly Retired: 17.2, 17.8		
Section 17 (Previously Section 18)		
17.1	18.1	
17.2	18.4	Revised
17.3	18.5	
17.4	18.7	
Newly Retired: 18.6		

Current Reference (2009)	Past Reference (2003)	Notes
Section 18 (Previously Section 19)		
18.1	19.1	Revised
18.2	19.2	
Section 19 (Previously Section 21)*		
19.1	21.2	Revised
19.2	21.6	Revised
19.3	21.7	Revised
19.4	21.8	Revised
19.5	21.9	Revised
19.6	21.10	Revised
19.7	21.11	Revised
19.8	21.12	Revised
19.9	21.13	Revised
19.10	21.14	Revised
19.11	21.15	Revised
19.12	21.16	Revised
19.13	21.17	Revised
19.14	21.18	Revised
19.15	21.19	Revised
19.16	21.20	Revised
19.17	21.21	Revised
19.18	21.22	Revised
19.19	21.24	Revised
19.20	21.25	Revised
19.21	21.26	Revised
19.22	21.28	Revised
19.23	21.29	Revised
19.24	21.30	Revised
19.25	21.31	Revised
19.26	21.32	Revised
19.27	21.33	Revised
19.28	21.34	Revised
19.29	21.35	Revised

Current Reference (2009)	Past Reference (2003)	Notes
19.30	21.36	Revised
19.31	21.37	Revised
19.32	21.38	Revised
19.33	21.39	Revised
Newly Retired: 21.1, 21.3, 21.4, 21.5, 21.23, 21.27		
Section 20 (Previously Section 22)		
20.1	22.1	
20.2	22.2	
20.3	22.3	Revised
20.4	22.4	Revised
20.5	22.5	Revised
20.6	22.6	
20.7	22.7	
20.8	22.8	
20.9	22.9	Revised
20.10	22.10	
20.11	22.11	Revised
Section 21 (Previously Section 23)		
21.1	23.1	Revised
Section 22 (Previously Section 24)		
22.1	24.1	
22.2	24.2	
22.3	24.3	
22.4	24.4	
22.5	24.5	Revised
22.6	24.6	
22.7	24.7	Revised
22.8	24.8	Revised
22.9	24.9	Revised
22.10	24.10	
Newly Retired: 24.11, 24.12, 24.13		

Current Reference (2009)	Past Reference (2003)	Notes
Section 23 (Previously Section 25)		
23.1	25.1	
23.2	25.2	Revised
23.3	25.3	Revised
23.4	25.4	Revised
23.5	25.5	Revised
23.6	25.6	
23.7	25.7	Revised
23.8	25.8	Revised
23.9	25.9	Revised
23.10	25.10	Revised
23.11	25.12	Revised
23.12	25.14	Revised
23.13	25.15	Revised
23.14	25.16	
23.15	25.17	Revised
23.16	25.18	Revised
23.17	25.19	Revised
23.18	25.21	Revised
23.19	25.22	
23.20	25.23	Revised
Newly Retired: 25.13, 25.20		
Section 24 (Previously Section 26)		
24.1	26.1	Revised
24.2	26.2	
24.3	26.3	Revised
24.4	26.4	Revised
24.5	26.7	Revised
24.6	26.8	Revised
24.7	26.9	Revised
24.8	26.10	Revised
24.9	26.13	
24.10	26.14	Revised

Current Reference (2009)	Past Reference (2003)	Notes
24.11	26.15	Revised
24.12	26.16	
24.13	26.19	Revised
Newly Retired: 26.5, 26.6, 26.11, 26.17, 26.20		
Section 25 (Previously Section 27)		
25.1	27.1	Revised
Section 26 (Previously Section 28)		
26.1	28.1	Revised
Section 27 (Previously Section 29)		
27.1	29.1	Revised

* Sections 9, 20, 30, 31, 32, 33, and 34 were retired from the October 2003 version.