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.

On-line vs. Off-line Calibration: The basic requirement of Part 75 is that calibration error tests must be done on-line (i.e., 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 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 peaking units that are frequently operated for only a few hours at a time.

Startup Grace Period: 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* the minimum data requirements of § 75.10(d)(1) are met for the clock hour (i.e., at least two valid data points are obtained during the hour, at least 15-minutes apart). In the case where a calibration error test is failed, followed by corrective actions and a subsequent successful calibration, all within the same clock hour---the hour may be reported as valid provided that sufficient data are collected *after* the subsequent successful calibration to validate the hour.

(4) Except as specified in paragraph (5), below, a passed calibration error test may not be used to validate data if the monitor is out-of-control with respect to any of its other required QA tests (e.g., linearity checks, RATAs).

(5) 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 a monitor previously declared to be out-of-control 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.   If the required tests are then passed in succession within the window of time allotted under § 75.20(b)(3)(iv), with no failures, the out-of-control period ends at the

date and hour of the probationary calibration error test. [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). Examples 1 through 5 are not connected in any way---each represents a different scenario.

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. Four possible scenarios are shown in Examples 6 through 10:

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 <u>thru</u> 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 <u>thru</u> 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 <u>thru</u> 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 <u>thru</u> Day 3 Hr 15

[a] Qualifying start-up grace period begins.
[b] Unit operating time in <OperatingTime> = "0."
[c] New start-up "event" begins (Unit operating time in <OperatingTime> = 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

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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