ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 60, 63, 260, 261, 264, 265, 266, 270 and 271

[FRL–5711–5]

Hazardous Waste Combustors; Continuous Emissions Monitoring Systems; Proposed Rule—Notice of Data Availability and Request for Comments

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of data availability and request for comments.

SUMMARY: This announcement is a notice of availability and invitation for comment on the following reports pertaining to the proposed requirement for continuous emissions monitoring systems for hazardous waste combustors (61 FR 17358 (April 19, 1996)): *Site-specific Quality Assurance Test Plan: Method 301 Validation of a Proposed Method 101B for Mercury Speciation,* with Appendices, dated September 27, 1996; *Site-specific Quality Assurance Test Plan: Total Mercury CEMS Demonstration,* Volumes 1 and 2, dated October 11, 1996; *Site-specific Quality Assurance Test Plan: Particulate Matter CEMS Demonstration,* Volume 1, dated August 7, 1996; and *Status Report IV: Particulate Matter CEMS Demonstration,* Volumes 1, 2, and 3, dated February 12, 1997.

Readers should note that only comments about new information discussed in this notice will be considered. Issues related to the April 19, 1996, proposed rule and subsequent notices that are not directly affected by the documents or data referenced in this Notice of Data Availability are not open for further comment.

DATES: Written comments on these documents and this Notice must be submitted by April 21, 1997.

ADDRESSES: Commenters must send an original and two copies of their comments referencing Docket Number F–97–CS3A–FFFFF to: RCRA Docket Information Center, Office of Solid Waste (5305G), U.S. Environmental Protection Agency Headquarters (EPA, HQ), 401 M Street, SW., Washington, DC 20460. Comments may also be submitted electronically through the Internet to: rcra-docket@epamail.epa.gov. Comments in electronic format should also be identified by the docket number F–97–CS3A–FFFFF. All electronic comments must be submitted as an ASCII file avoiding the use of special characters and any form of encryption. Commenters should not submit electronically any confidential business information (CBI). An original and two copies of the CBI must be submitted under separate cover to: RCRA CBI Document Control Officer, OSW (5305W), 401 M Street, SW., Washington, DC 20460. For other information regarding submitting comments electronically, viewing the comments received, and supporting information, please refer to the proposed rule (61 FR 17358 (April 19, 1996)). The RCRA Information Center is located at Crystal Gateway One, 1235 Jefferson Davis Highway, First Floor, Arlington, Virginia and is open for public inspection and copying of supporting information for RCRA rules from 9:00 a.m. to 4:00 p.m. Monday through Friday, except for Federal holidays. The public must make an appointment to view docket materials by calling (703) 603–9230. The public may copy a maximum of 100 pages from any regulatory document at no cost. Additional copies cost $0.15 per page.

FOR FURTHER INFORMATION CONTACT: For general information, call the RCRA Hotline at 1–800–424–9346 or TDD 1–800–553–7672 (hearing impaired) including directions on how to access electronically some of the documents and data referred to in this notice electronically. Callers within the Washington Metropolitan Area must dial 703–412–9810 or TDD 703–412–3323 (hearing impaired). The RCRA Hotline is open Monday–Friday, 9:00 a.m. to 6:00 p.m., Eastern Time.

Documents referred to in this notice are available from two electronic sources: the CLU–IN and EMTIC bulletin boards. The CLU–IN bulletin board is accessible by modem at phone number 301–589–8366 or by Telnet at clu-in.epa.gov. The EMTIC bulletin board is accessible by modem at phone number 919–541–5742 or over the Internet at http://ttnwww.rtpnc.epa.gov/. The reader should note that figures, diagrams, and appendices may not be available in these electronic documents.

For other information on this notice, contact H. Scott Rauenzahn (5302W), Office of Solid Waste, 401 M Street, SW., Washington, DC 20460, phone (703) 308–8477, e-mail: rauenzahn.scott@epamail.epa.gov.

SUPPLEMENTARY INFORMATION: On April 19, 1996, EPA proposed revised standards (herein referred to as ''the proposed rule'') for hazardous waste combustors (HWCs, i.e., incinerators and cement and lightweight aggregate kilns that burn hazardous waste). See 61 FR 17358.

I. Introduction and Background

In the proposed rule, EPA proposed requiring that continuous emissions monitoring systems (CEMS) for particulate matter (PM) and total mercury (Hg) be used for compliance with the proposed PM and mercury emission standards. To require CEMS for compliance the Agency, among other things, determines that the CEMS are commercially available and meet certain performance specifications. To make these determinations, the Agency routinely tests CEMS available in the marketplace. EPA published a notice inviting vendors of PM and Hg CEMS to participate in a CEMS demonstration test program. (See 61 FR 7232, February 27, 1996). Ten vendors responded to the Agency's invitation. They donated nine devices for the test program: six PM CEMS and three Hg CEMS.[1]

Today the Agency is providing notice and opportunity to comment on the following documents resulting from its CEMS demonstration test program: (1) *Site-specific Quality Assurance Test Plan: Method 301 Validation of a Proposed Method 101B for Mercury Speciation,* with Appendices, dated September 27, 1996; (2) *Site-specific Quality Assurance Test Plan: Total Mercury CEMS Demonstration,* Volumes 1 and 2, dated October 11, 1996; (3) *Site-specific Quality Assurance Test Plan: Particulate Matter CEMS Demonstration,* Volume 1, dated August 7, 1996; and (4) *Status Report IV: Particulate Matter CEMS Demonstration,* Volumes 1 and 2, dated February 12, 1997. The purpose of this notice of data availability (NODA) is to obtain comment on the Agency's approach, as described in these documents, prior to the end of the demonstration tests. Comments received will, to the extent possible, be incorporated into the demonstration test programs. EPA plans to follow this NODA with a second notice after the testing program has completed or is near completion. That final notice will contain what EPA believes will be final draft performance specifications for these CEMS.

The reader should note that one of these documents, the PM CEMS demonstration test status report, is a draft report which is evolving over time. The report will be added to and modified substantially as the program progresses. Therefore, conclusions and discussions in this report do not necessarily represent EPA's final views. They are included in this NODA so the reader can fully evaluate the Agency's

[1] One Hg CEMS vendor was unable to participate.

approach and comment on this approach prior to the end of the testing program.

The remainder of this notice describes the demonstration test programs for PM and Hg CEMS. It serves as an overview for the reader and brings to the reader's attention certain areas where EPA requires input.

II. The PM CEMS Demonstration Tests

A. Background

EPA previously tested PM CEMS at two other sites, the Rollins incinerator in Bridgeport, NJ, and the LaFarge cement kiln in Fredonia, KS. Both were short-term tests to determine whether further testing is warranted.

The purpose of the Rollins Bridgeport tests was to qualitatively determine whether vendor claims that PM CEMS can be used for compliance with a PM standard was feasible and to gain insights on the scope and nature of future tests. Three devices were tested at Rollins: a Sick RM200 light-scattering CEMS; a BHA CPM1000 time dependant optical transmission CEMS; and an Emissions SA Beta 5M β-gage CEMS.[2] Due to the limited nature of this investigation, though, there were certain deficiencies in these tests which make quantitative comparisons of this data to other data difficult. For instance a calibration of the instruments cannot be performed because manual method data was obtained over only two particulate emission loadings, the measured range of emissions was less than one-third of the proposed HWC PM standard, and only eight valid manual method measurements were made. However, we did determine that optically based PM CEMS, such as the light-scattering and time dependant optical transmission instruments, had a step function increase in their output when entrained water droplets were encountered in the gas stream.

Additional tests were conducted in May 1995 at the LaFarge cement kiln in Fredonia, KS. The purpose of these tests was to conduct a full calibration of the instruments in accordance with the ISO (International Standards Organization) specification, to better determine whether these CEMS could be used for compliance with a PM standard and whether the ISO performance specification could be used as a basis of a proposed PM CEMS performance specification, and to gain insights on future testing. Two devices were tested at LaFarge: the Sick monitor used in the Rollins tests and an ESC P5A.[3] Both are light-scattering devices. Both devices were installed in April 1995 and were operated continuously on the cement kiln through July 1995. At these tests, EPA successfully calibrated these devices in May 1995 using nine valid pairs of M5 runs at three PM loadings. Additional PM measurements were made approximately one and two months after the initial calibration. EPA gained the following insights during this test program:

—The ISO specification can be used as a basis for any performance specification EPA develops and that the instruments could be calibrated to particulate emissions obtained from manual method data.

—Response of the instruments to changing PM concentrations was generally better at this cement kiln than at the previous Rollins test.

—Statistics resulting from these calibrations barely passed the ISO specification. Other countries (such as Germany) suggest that 15 measurements be made instead of 9 to improve calibration statistics. Therefore, more than 9 measurements may be necessary.

—The current Method 5(M5) had limitations in measuring low-level particulate emissions due, in large part, to the difficulty of the extraction, filter recovery, and weighing steps. This limitation likely lowered the calibration statistics determined from the data obtained during these tests.

—PM CEMS could be used for compliance with a PM standard, but longer term demonstration testing is necessary to ascertain the device's long-term durability.

The calibration results are summarized in Table 1, below.

TABLE 1.—MAY 1995 CALIBRATION RESULTS FROM THE LAFARGE PM CEMS TESTS

CEMS	Correlation coefficient (r)	Confidence interval ($CI_{0.95}$) (percent)	Tolerance interval ($TI_{0.95}$) (percent)
ISO Performance Specification	0.90	25	35
Sick RM200	0.92	17	29
ESC P5A	0.90	20	32

B. Site Selection

For the PM CEMS demonstration tests, EPA selected the DuPont Experimental Station hazardous waste incinerator in Wilmington, DE. The DuPont incinerator receives a variety of wastes from many DuPont facilities in northern Delaware. As such the waste input to the incinerator is like that of many commercial incinerators.

The DuPont incinerator has a Nichols Monohearth as its primary combustion chamber. Waste is fed to this combustion chamber using a ram feeder for solid waste, a cylindrical chute for batched waste material, and a Trane Thermal liquid/gas waste burner. The primary chamber exhausts to a secondary chamber (afterburner) where waste is fed using a Trane Thermal burner. The flue gas then travels through a spray dryer, then through a cyclone separator, where dissolved and suspended solids are removed. The cyclone system discharges to a reverse jet gas cooler/condenser which reduces the gas temperature to the dew point. The flue gas then travels through a variable throat venturi scrubber which removes additional particulate and some acid gasses. The venturi scrubber exhausts into an absorber neutralized with soda ash scrubbing solution to absorb acid gasses. The absorber also subcools the flue gas before traveling through a chevron-type mist eliminator. After passing through the mist eliminator, the gas travels through a set of electro-dynamic venturis (EDVs) which are used to remove fine particulate along with metals that condense onto the fine particulate as a result of the gas subcooling. The gas then travels through a set of centrifugal droplet separators and an induction fan, is reheated to eliminate any visible plume, and is finally discharged to the atmosphere through the stack. A full description of the incinerator as well as

[2] The Beta 5M CEMS is participating in this demonstration as well.

[3] The ESC P5A CEMS is participating in this demonstration as well.

a diagram of the system is contained in section 2.2 of the PM Test Plan.

EPA chose to perform the PM CEMS tests at an incinerator because, under a normal range of operating conditions, incinerators present a worse case exhaust stream to challenge multiple PM CEMS technologies in a long-term test program. For the purpose of demonstrating the capabilities and limitations of PM CEMS, a worse case exhaust stream would consist of high moisture (i.e., greater than 20%), average PM levels below the proposed emission limit, and PM with a wide variation in physical properties (such as composition, particle size distribution, shape, color). Incinerators fulfill this worst-case need in three main ways. First, commercial incinerators and some on-site incinerators, including the DuPont facility, burn a wide variety of waste as their primary feedstream. The wide variety of the primary feedstock[4] has a higher potential to produce highly variable particulate, which is a worst case test for PM CEMS. This is not the case for cement or light-weight aggregate kilns (CKs or LWAKs, respectively.) These sources primarily feed particulate rich process ingredients (limestone and fly ash for CKs and slate, shale, and clay for LWAKs). As a result, PM in the flue gases from both CKs and LWAKs are likely to be overwhelmed by the process dust and be more uniform than those from an incinerator. Second, many incinerators are equipped with wet air pollution control system (APCS) technologies which are able to meet the proposed PM emission limit and produce high moisture. Finally, these APCS technologies produce a narrow PM size distribution (i.e., primarily less than 1 micron). This narrow size distribution is typical of emission levels from wet APCS technologies that are expected to be installed on HWCs to meet the upcoming MACT standards.

The DuPont incinerator was chosen because:

—PM emissions were expected to range from 0.005 to 0.075 gr/dscf (that is, 17 to 250% of the proposed HWC PM standard), depending on how the facility operated;
—The facility accepts ''small'' batches of many waste streams and has limited capacity to burn many waste streams simultaneously, thereby assuring more dramatic changes in particulate concentrations and physical characteristics in shorter time intervals, relative to a larger commercial facility;
—The facility has no ESP or fabric filter for PM control;
—The facility was willing to participate in the test program and allow necessary modifications to be made;
—The facility was willing and able to vary operating conditions as required to perform the PM CEMS calibrations; and
—Physical access, both for sampling in the stack and for equipment and personnel on the adjacent platform, was available to locate six PM CEMS and a test crew.

A detailed description of the site selection is located in section 1.4 of the PM Test Plan.

C. Revised Manual Method for PM

One issue which PM CEMS vendors raised and which was noted during the LaFarge tests was that the current manual method for PM (Method 5, herein refered to as M5,) may be inadequate to make the low-level measurements required for PM CEMS calibrations. EPA determined that much of this error comes from sample recovery and analysis. Stacks with high acid gas, water, and/or adhesive concentrations (i.e., cement kiln clinker) in the flue gas make the filter stick to the filter housing. As a result, filter recovery is difficult. For this reason, EPA chose to modify M5 slightly.

The modification employs the use of a light-weight filter assembly. The front-half and filter assembly are first pre-tared. The filter assembly then replaces the current M5 filter housing in the heated box. After measurement, the entire assembly is desiccated and weighed. This way the M5 extraction step is eliminated without making fundamental modifications to M5 itself. Given that this change to M5 is minor and only affects the extraction and analysis steps, EPA does not believe that a full field validation of the modification was necessary. Instead the Agency tested those parts of the method which changed to ensure that those parts of the process are as good as the current M5. EPA has initially determined that this modification is acceptable. Completion of this analysis, including a full write-up of the new method, is expected soon. A full description of this method will be given in the later CEMS NODA.

EPA expects this modified method for particulate measurements would be required for use when calibrating PM CEMS.

D. The PM CEMS Demonstration Test

The PM CEMS demonstration tests started in September 1996 and are expected to continue until May 1997 or later. The test program started with an initial calibration of the instruments and followed with response calibration audits (RCAs) and absolute calibration audits (ACAs) every four weeks. The program also involves continuously recording the CEMS data for the duration of the program, documenting daily calibration and zero checks, documenting all performed maintenance/adjustments, and documenting all periods in which data was not available.

A second important aspect of the demonstration tests is to evaluate the proposed performance specification and data quality objectives themselves. Proposed performance specification 11 (PS 11) was drafted and proposed with the idea that it would be modified based on what these tests showed. The final promulgated specifications will be based on the data obtained through these tests.

E. PM CEMS Technologies Tested

The six PM CEMS being tested represent three separate PM CEMS technologies: light-scattering, beta gage (β-gage), and impaction energy devices. Each technology is described below. Full descriptions of each PM CEMS are found in section 2.7 of the PM CEMS Test Plan and in the proposals submitted by the vendors. Vendor proposals are found in docket item S0205. All instruments participating in this program are provided to the government at no charge.

Light scattering devices work by sending a light beam across the flue gas and measuring the amount of light reflected back to a detector located at some angle (other than straight-path transmissivity) from the light source. These devices can be used either in-situ (i.e., in the stack) or extractively. These devices are not complex, relative to other instruments, and as such are relatively inexpensive to purchase. They also have few moving parts and consequently require little maintenance. These CEMS are, however, sensitive to PM characteristics, including composition, density, size distribution, and index of refractory. Three light scattering devices are participating in the program: Sigrist Photometer AG model KTNR (supplied by Lisle-Metrix), Durag model DR–300, and Environmental Systems Corporation (ESC) model P5A. All three CEMS are installed on more than a hundred stacks worldwide.

β-gage instruments continuously sample extracted flue gas PM on a filter tape. After the PM sample is collected, the tape moves so that the collected PM is located between a carbon-14 beta

[4] Feeds which affect PM emissions include metals, other solids, and chlorinated solvents.

radiation source and a detector. This measurement is compared to a measurement done on the blank filter to obtain the mass of the collected particulate. As such, these CEMS are continuous samplers but batch analyzers. These devices are quite complex and as a result cost more than light-scattering devices. Their complexity also means they require more maintenance and, as a result, experience more down-time than light-scattering devices. However, these devices are relatively independent of the PM characteristics and vendors claim a site-specific PM calibration is generally not required.[5] Two β-gage devices are participating in the program: Verewa model F–904–KD (supplied by Monitor Labs), and Emissions SA model Beta 5M (supplied by Environnement USA). Both CEMS are installed on more than a hundred facilities worldwide.

The third type of PM CEMS technology is an impaction energy device supplied by Jonas Consultants, Inc. This monitor operates by detecting shock waves caused by particles impacting a probe inserted into the flue gas. The device counts the number of impacts and the energy of each impact. This information, coupled with the knowledge of flue gas velocity, allows the calculation of particulate mass and thus concentration. However, the probe does alter the velocity profile of the flue gas near the probe which, in principle, affects the instrument's response. Thus, EPA believes a site-specific calibration is necessary to ensure good instrument response. This device has been installed at few locations, mainly for process control use in steam, and not for compliance with a flue gas PM standard.

F. Demonstration Test Report

EPA seeks comment on the document *Particulate Matter CEMS Demonstration: Status Report IV,* provided in the above referenced docket. This document describes the interim results from the PM CEMS demonstration tests EPA is conducting. It contains an analysis of data obtained from the initial calibration through the Relative Calibration Audit (RCA) in January 1997. Specific aspects of the report are discussed below. Subsection 1 describes the limitations EPA has experienced in this test program. Subsection 2 discusses general testing issues. Subsection 3 describes the PM CEMS performance characteristics observed during the initial (and subsequent) calibration and the RCAs. Subsection 4 describes issues associated with the proposed performance specifications.

Note that many of the issues described in this section may also apply to other CEMS, such as the Hg CEMS described in the next section. Consistency between the two programs will be maintained by handling similar issues in a similar manner in both programs.

Overall, EPA believes the PM CEMS demonstration is making progress. EPA was able to calibrate all of the installed devices. The subsequent RCAs have proved those calibrations to be reliable over time. EPA also believes that the proposed performance specifications will need to be modified based on the data and experiences coming out of this program.

1. Limitations of the Test Program

a. CEMS downtime. One limitation of the program is that, unlike facility personnel, EPA is not on-site all the time. As described in the test plans, EPA travels to the site every two weeks to, among other things, perform any maintenance the instruments might require. This causes CEMS downtime occurring during the program to be overstated relative to what a real facility would experience if it were using one of these instruments for compliance.

In addition, CEMS purchased by a facility usually come with a supply of spare parts so the facility can make minor repairs without incurring substantial downtime. In this program however, EPA was not supplied with many of the spare parts it would otherwise get if it had purchased the instruments. Parts required for routine maintenance must be ordered from the supplier as needed rather than drawing them from the facility's store of spare parts. It takes more time to order parts than to draw from the store of spare parts on-site, so the CEMS are down longer than they would be if the CEMS were purchased by a facility for compliance.

Finally, there tends to be no US-based, trained service technicians to conduct major repairs on many of these instrument. Technicians from the CEMS manufacturer's native country are often flown in to provide specialized service. Many of the parts must also be ordered from suppliers in other countries. This means that, if a major repair is required, service and parts must be obtained from overseas. This takes more time than it would if service and parts were available in this country, and further overstates CEMS downtime.

This is important because one thing EPA is trying to gage in this program is data availability. Data availability is one minus the CEMS downtime, expressed as a percentage. If downtime is overstated, data availability will be understated. EPA anticipates remedying this situation by subtracting out downtime associated with these limitations. For instance, if a CEMS requires a minor repair and goes down soon after EPA leaves the facility, the CEMS will be inoperable for two weeks, until EPA arrives back at the facility. If the repair takes eight hours to perform, then EPA will count the downtime as 8 hours, not two weeks. The same approach will be used for the Hg CEMS program as well.

b. Absolute Calibration Audits. In the proposed rule, EPA proposed requiring facilities to conduct ''Absolute Calibration Audits'' (ACAs) every quarter. These tests would be conducted with NIST traceable standards to ensure the analytical parts of the instrument were still working properly. Unfortunately, only two vendors (Sigrist and Durag) have supplied us with these standards. EPA will conduct ACAs on the instruments as the standards arrive.

At this time, NIST does not have traceable standards for these instruments. However, German TuV versions of these standards (called ''linearity test kits'') exist for most of these CEMS. We believe that these TV standards are sufficient substitutes for the yet-to-be-developed NIST standards to conduct the ACAs.

If these test kits are generally not available to facilities, then EPA solicits comment on whether the ACA approach should be modified. For instance, it might be adequate to require a device to make daily internal zero and span drift measurements and corrections. Most devices are already configured to make both zero and span drift measurements and corrections.

c. Inability to repeat tests. It is infeasible to repeat a test conducted under a set of conditions at this facility due to the wide variety of ''small'' batches of waste the facility processes and the hysteresis effect of the APCD. Like a commercial facility, this incinerator accepts a wide variety of wastes, both hazardous and industrial, from all DuPont facilities in northern Delaware. The incinerator often incinerates multiple wastes concurrently. Those wastes arrive at the incinerator in a random fashion. Batches are also quite small relative to what would be experienced at a commercial facility, meaning that transients in PM concentrations and characteristics are

[5] All PM CEMS in this testing program will be calibrated against the manual method. The claim that β-gage PM CEMS do not require a calibration will be tested as part of this test program.

more pronounced and shorter in duration.

Further complicating this is the fact that this incinerator is a zero water discharge facility. This means wastewater from the wet scrubber is recycled to the spray dryer (upstream from the scrubber) and injected back into the incinerator exhaust gas. This results in a hysterisis effect; wastes fed to the incinerator at one time accumulate in the pollution control system and affect the emissions later. Both situations affect our ability to repeat tests and, consequently, to show that CEMS have the same response to the same particulate at a later time.

d. Inability to test with entrained water droplets. One thing that attracted EPA to this facility was that it is an incinerator with a wet air pollution control system and a reheat system to vaporize water droplets that would otherwise be entrained in the stack gas. EPA anticipated being able to conduct tests with entrained water droplets in the stack by turning off the reheat system. The Rollins tests showed that entrained water droplets are mistaken as particulate by light-scattering PM CEMS. EPA wished to test the light-scattering devices with entrained water droplets so it could quantify the effects of entrained water droplets on light-scattering PM CEMS.

Such tests were planned and conducted in November 1996. But no entrained water droplets formed despite turning the reheat off. EPA and DuPont have since concluded that we are unable to predict when entrained water droplets will occur at the incinerator as currently configured.[6] Therefore, it is unlikely that EPA will be able to conduct tests with entrained water droplets as part of this program.

One approach EPA may take is to use the limited data EPA has from its earlier Rollins Bridgeport tests of PM CEMS and draw whatever conclusions it can from that data.[7] However, EPA believes this data is insufficient to quantify the effects of entrained water droplets. For this reason, EPA requests data which quantifies the effects of entrained water droplets on the calibration of light-scattering PM CEMS.

2. General Test Issues

a. Handling of Outliers. Two types of outliers were experienced so far in the program: paired data and statistical outliers. Each is discussed below.

i. Paired Data Outliers. EPA is conducting its PM measurements in such a way that a pair of (two) trains concurrently sample the flue gas at the same time in the same plane of the stack. The average of these two concurrent trains is the PM emissions measured by the manual method for a given run. This methodology usually means the results from the two trains are similar. This conclusion is substantiated by most of the data obtained during the test program.

However, there were instances when the results from the pair of concurrent trains differed substantially. This leads EPA to believe that there was a problem with one or both of the trains which comprise such a run. As a result, EPA developed a quality criteria requiring that the pair of trains which comprise a run not differ substantially. EPA quantitatively defined this substantial difference by looking at historical M5 data. Data indicate that results from paired trains such as these agree with a relative standard deviation (RSD) of 10%. Therefore, nearly all data should agree to within three times this RSD, or to within 30% of each other. If the results of paired trains disagree by more than 30%, the whole run would be thrown out.

EPA anticipates that other situations will arise in which it will need to disregard data which substantially differs from the historical data in other ways. The Agency would have serious reservations regarding this practice of defining what is or is not acceptable data after the fact if this were a compliance determination. However, this is not a compliance evaluation, and EPA does not believe the same cautions apply. In addition, EPA is unable to develop these quality criteria prior to the start of the program because it does not have a history of PM data from this facility upon which to base such quality criteria. EPA believes this approach of developing quality criteria as the program progresses is reasonable given the unique situation here.

ii. Statistical Outliers. Another type of outlier data experienced during the program is referred to as ''statistical outliers.'' Statistical outliers are data which are more than three (3) standard deviations away from the linear regression line that represents the calibration of the instruments. EPA does not have an opinion on how to handle statistical outliers and requests comment on how to proceed.

In implementing manual calibration tests for other CEMS, EPA routinely allows outliers of this kind to be disregarded when developing the calibration curve. The Agency's logic for disregarding this data is that it is known that the manual method sometimes dramatically under-reports emissions for unknown reasons.[8] Using this outlier data in the calibration of other CEMS is unwise because: (1) The error cannot be accounted for by known science; and (2) eliminating the data causes the slope of the calibration curve to be steeper (i.e., numerically larger), therefore it is protective of the environment to exclude this outlier data. In the case of other CEMS, the statistical difference is reasonable justification for proving that a problem occurred while obtaining that data point.

Upon closer examination here, however, it is not clear whether the fact that the data appears to be statistically different is ample justification to disregard the data. Statistical tests usually involve the testing of a sample population to see if the sample data is from the same population as data you are comparing it to. It involves establishing a null hypothesis which states that the sample is part of the population (H_0: $\mu_s = \mu_p$ or $\sigma_s^2 = \sigma_p^2$, that the mean or variance, respectively, of the sample data is equal to that of the population). If the statistical test infers that the null hypothesis is not true, then an alternate hypothesis, stating that the data is from a different population than the one you are comparing it to, is accepted (H_A: $\mu_s \neq \mu_p$ or $\sigma_s^2 \neq \sigma_p^2$, that the mean or variance, respectively, of the sample data is different than that of the population). In our case here, the

[6] Apparently, there is a 35°F temperature increase across the induction fan that can not be overcome.

[7] Based on the Rollins data, EPA qualitatively concluded that while entrained water droplets did induce a step function increase in the output from in-situ light-scattering PM CEMS, it did not affect the calibration so much as to cause the calibration to fail under this condition. The step function increase was caused by the in-situ light-scattering PM CEMS mistaking entrained water droplets for particulate.

This leads EPA to believe that a facility which uses an in-situ light-scattering PM CEMS for compliance and has entrained water droplets in the stack gas may experience situations where the actual PM emissions are lower than those reported by the monitor. The risk for a such a facility which is in compliance with the PM standard is that it may experience an increased number of false non-compliances with the PM standard. EPA hopes to quantify the effects of entrained water droplets on light-scattering PM CEMS so it can quantify the risks associated with a false non-compliance in this situation.

This possible false non-compliance possibility can be avoided if the light-scattering PM CEMS is configured such that it extracts flue gas from the stack, heats it to above the highest possible dew point temperature, and measures the heated, extracted gas. One light-scattering PM CEMS in the program is so configured. Others can be similarly configured to avoid this potential problem. The trade-off is that extractive light-scattering PM CEMS cost more than in-situ units.

[8] It is believed that the cause is a manual method sample is not obtained due to spacial differences between the sampling locations of the manual method and CEMS.

fact that a statistical outlier is more than three standard deviations away from the linear regression line would likely lead one to reject the null hypothesis and say that the outlier is from a different population than what is represented by the linear regression line. After determining the data are different, one must determine why. This analysis is important because it will help determine whether the data should be kept in the original sample or disregarded.

This situation differs from the other CEMS case because PM CEMS have known sensitivities to changes in what they are measuring, i.e., moisture and the particle's characteristics, such as density, shape, size distribution, refractory (color), etc. Unfortunately, we do not know the effects of these changes on the outputs of PM CEMS.[9] In other words, EPA is uncertain whether the statistical outliers were caused by an error in the manual method measurement process (in which case the data would be thrown out) or if the error was caused by the CEMS overstating (or understating) the PM emissions due to changing particulate properties (in which case the data would be kept in the data set). In addition, most of the statistical outliers experienced in this program are ones in which the manual method result is higher than what the PM CEMS report. Therefore, it would likely be more appropriate to keep the data in the data set in this case.

EPA is currently pursuing statistical ways of dealing with outliers and requests comment on how to deal with this situation. One alternative is to establish a stringent specification for the correlation coefficient (yet within the bounds of the data obtained in this program) and allow facilities to throw out, but report, data that is farthest away from the linear regression line. ''Farthest away'' could be defined on either a relative or absolute standard deviation basis. The facility would then substitute in better data if needed to meet the minimum number of samples or other performance specification requirements.

b. Extrapolating Data. Another issue is that this facility, while having a PM permit limit of 0.08 gr/dscf, cannot emit that much particulate. We expect that similar situations exist throughout the industry. This is a concern because EPA proposed that facilities calibrate their PM CEMS to up to two (2) times the emission limit. If it is physically impossible for a facility to emit this much particulate, it obviously cannot calibrate the instruments that high.

Therefore, the Agency seeks comment on whether the following approach is acceptable. EPA believes a facility should calibrate the CEMS up to the point where, based on historical data the facility has, the facility is producing the most particulate. This point will serve as the ''high'' calibration range for this facility's PM CEMS. In addition, the facility would use the available data and extrapolate the linear regression line beyond the high calibration range for instances where the emissions are higher than the historical data indicate. As the historical data grow for this facility, the facility may notice times when the PM emissions are more than what the previous historical data indicated. In this event, the facility would re-calibrate the CEMS under the previously unknown condition(s) which result in higher emissions than the old historical data indicated.

A unique case exists when the highest possible emission level is less than the emission standard. In this case the calibration data point resulting in the highest PM CEMS output would be the point where the confidence and tolerance interval tests would be conducted.[10]

c. Correcting for temperature and dry basis. Some of the PM CEMS need to correct their output for stack temperature and moisture. These corrections have not been done for the data in this report. While these corrections will have a minor effect, the data will change slightly after the corrections are made. EPA is now correcting the data to account for changes in temperature and moisture. Future reports will report all data properly corrected for temperature and moisture.

3. PM CEMS Performance Characteristics

One important aspect of the program is to test and verify that the performance of these devices meet the characteristics described in the proposed performance specification (PS) 11. It also serves as a test of the performance specification itself and proposed data quality objectives for CEMS described in the proposed Appendix to Subpart EEE. Data from this demonstration test program will be used to revise PS 11 and the data quality objectives as necessary.

Table 2 lists each of the monitors being tested, the proposed performance requirement for the devices, and the actual performance observed during the test program.[11] The results in Table 2 do not include data outliers which have been excluded from the analysis, such as ''paired data outliers.'' The reader should note that the correlation coefficient, confidence interval, and tolerance interval tests apply only to the calibration. These values are reported, however, for subsequent RCAs even though they do not apply in this situation. Specific discussion on each performance specification is discussed, below.

EPA has been able to generate a linear regression line for the various PM CEMS. Performance of the devices are nearly identical when one compares the performance of an in-situ device to the other in-situ device and extractive devices to one another. In-situ units seem to show better performance than extractive units regardless of technology of the CEMS.

[9] EPA's Office of Research and Development recently concluded a study of how changes in particulate properties affect the output of PM CEMS. The report describing the results of this study is not expected to be completed until September 1997.

[10] The proposed performance specification states that the 95% confidence interval for the calibration curve must be no more than ± 20% of the emission limit at the emission limit. This is a single point test. In the case where a facility cannot calibrate up to or above the emission limit, the 95% confidence interval test for the calibration curve would be ± 20% of the emission limit at the point resulting in the highest PM CEMS output. The same approach would be used for the tolerance interval test as well.

[11] Results from the Jonas analyzer, however, is not reported. The Jonas analyzer reported results in terms of emission rate (g/s) rather than emission concentration (mg/dscm). Time is needed to analyze and correct how to correct these values to the proper units.

TABLE 2.—PERFORMANCE CHARACTERISTICS OF THE PM CEMS BEING TESTED

Performance specification		Correlation coefficient (r)	Confidence interval ($CI_{0.95}$)	Tolerance interval ($TI_{0.95}$)	RCA test ($TI_{0.95}$)	Calibration drift (CD)	Zero drift (ZD)
CEMS	Date of test						
		>0.90	±20% at emission limit	±35% at emission limit	≥75% of data within $TI_{0.95}$	±2% of the calibration standard	±2% of the emission limit
ESA	Cal.	0.55	26	38		Pass	Pass.
	01/97	0.92	21	25	75	Pass	Pass.
	All Data	0.46	35	40			
Verewa	Cal.	0.69	27	32		No data	Pass.
	12/96	0.86	24	20	100	No data	Pass.
	01/97	0.93	18	25	100	Fail	Pass.
	All data	0.76	18	23			
Durag	Cal.	0.72	22	36		Pass	Pass.
	11/96	–0.38	52	77	75	Pass	Pass.
	12/96	0.91	45	73	100	Pass	Pass.
	01/97	0.93	20	22	100	Pass	Pass.
	All data	0.61	20	35			
ESC	Cal.	0.71	22	36		Pass	Pass.
	11/96	0.87	24	31	88	Pass	Pass.
	12/96	0.92	42	69	100	Fail	Pass.
	01/97	0.93	20	23	100	Pass	Pass.
	All data	0.68	18	32			
Sigrist	Cal.	0.64	25	40		Pass	No data.
	11/96	0.87	24	31	88	Pass	No data.
	12/96	0.90	47	77	100	Pass	No data.
	01/97	0.92	21	24	100	Pass	No data.
	All data	0.64	19	33			

Note to Table 2: The initial calibration for the Durag, ESC, and Sigrist units was performed in September and October 1996. The initial calibration for the Verewa unit was performed in September and November. The initial calibration for the ESA unit was performed in September and December.

a. Correlation Coefficient (r). Proposed PS 11 states that the correlation coefficient be at least 0.90 (See § 4.2.1). Tests to date indicate that EPA may be unable to produce a linear regression line which correlates as well as the proposed performance specification indicates.[12] EPA believes this is caused by the fact that this facility is a worst-case facility for this demonstration test program. EPA believes the correlation coefficient specification may have to be lower based on the results of this testing.

Particulate properties depend largely on the wastes fed and the accumulated particulate in the APCS. These properties vary considerably at this facility, just as the types of wastes fed to the unit vary. This variability in the particulate properties causes a varied response from the PM CEMS, which in turn causes the correlation coefficient to be lower than anticipated. This can be avoided by developing a calibration curve for every possible set of particulate properties. However as described in the next paragraph, this may not be possible at this facility.

The calibration tests were done under as wide a variety of operating conditions as possible. The proposed performance specifications and data quality objectives would make a facility such as this incinerator to have one calibration for every given operating condition, not one that fits all situations as EPA did here. The Agency now believes the proposed approach may not be possible for this source. As mentioned, particulate does accumulate in the APCS causing wastes fed at one time to influence the type of particulate that is emitted later. In addition, the wastes arrive at the incinerator in a random, uncontrollable manner and in ''small'' batches. This makes it extremely difficult for a facility such as this one to determine what calibrations it needs and which of those calibrations to use at any given time. It might be best for a facility such as this one to have one, not many, calibrations to simplify compliance. EPA seeks comment on whether this approach, having one calibration curve to cover every circumstance rather than several for each circumstance, is acceptable.

b. Confidence Interval ($CI_{0.95}$). Proposed PS 11 states that $CI_{0.95}$ be within ± 20% of the emission limit at the emission limit. (See § 4.2.2). This test is done by taking the data from the initial (or subsequent) calibration, calculating the 95% confidence interval for the regression line, and verifying that the upper confidence limit at the emission standard is less than the emission standard plus 20% and that the lower confidence limit at the emission standard is more than the emission limit minus 20%. In other words, this is a single point test at the emission limit.[13] Based on standards proposed for HWCs, this means the upper confidence limit must be less than 83 mg/dscm and the lower confidence limit more than 55 mg/dscm calculated at the emission limit.

Confidence intervals calculated for these PM CEMS are higher than, but close to the proposed specification. This higher value for the confidence interval is probably the result of EPA's approach of generating one calibration curve at this worst-case facility.

c. Tolerance Interval ($TI_{0.95}$). Proposed PS 11 states that $TI_{0.95}$ be within ±35% of the emission limit at the emission limit. (See § 4.2.3). This test is done by taking the data from the initial (or subsequent) calibration, calculating the 95% tolerance interval for the regression line, and verifying that the upper tolerance limit at the emission standard

[12] Time constraints have required the Agency to temporarily ignore the quadratic regression approach described in the performance specification. This analysis will be done for the final report and the curve which best fits the data will be presented.

[13] See above for the discussion of what to do when it is not possible to calibrate to the emission limit.

is less than the emission standard plus 35% and that the lower confidence limit throughout the calibration range is more than the emission limit minus 35%. Like the correlation interval test this is also a single point test.[14]

The calculated tolerance intervals for the various PM CEMS being tested are, like the confidence interval, higher than but close to the proposed specification.

d. Relative Calibration Audit (RCA) Tests. The proposed data quality objectives state that, to pass an RCA, 75% of the RCA data must lie within the 95% tolerance interval. (See § 5.2.3.1 of the proposed appendix to Subpart EEE.) All the CEMS passed all the RCAs. Therefore, the initial calibration is still valid over time despite the changing operating conditions at the facility.

e. Calibration and Zero Drift (CD and ZD). Proposed PS 11 states that CD be within ±2% of the calibration standard and that the ZD be within ±2% of the emission limit. (See §§ 4.3 and 4.4, respectively). This test would be done during the ACA tests, which the proposed quality assurance requirements stated would be done on a quarterly basis.

As discussed above, most of these CEMS internally check zero and/or calibration drift every day. In cases where one or more of the checks are not internally done, traceable standards are required to perform the check. Most vendors have not supplied these NIST traceable standards (or an acceptable substitute) for the ACAs. The ACAs for this test program will be done every 4 weeks for these missing parameters as soon as EPA obtains these standards from the vendors.

Where data is available, most CEMS routinely pass the zero and calibration checks. In instances where the drift test is failed, the CEMS automatically adjusts the failed parameter to within specifications. EPA is now quantifying the ''Pass'' and ''Fail'' indicators shown in the table. Future reports will quantify values for zero and calibration drift rather than express them in the qualitative terms ''Pass'' and ''Fail''.

f. Response Time—Continuous CEMS. Proposed performance specification 11 states that continuous-type CEMS respond to a step increase in such a way that the CEMS achieve 95% of the final stable reading within 2 minutes of the start of the step increase. (See § 4.5.1). This requirement is to be certified by the vendors. The vendors participating in this program have done so. This specification will not be tested during this program unless EPA believes the response time is suspect.

g. Response Time—Batch CEMS. Proposed performance specification 11 states that the response (i.e., sampling) time for batch-type CEMS be no more than one-third of the averaging period. (See § 4.5.2). The sampling time for these CEMS are on the order of minutes while the averaging period for the PM standard was proposed to be two hours, so this requirement has been met.[15] But this specification does raise several issues which deserve consideration here.

While the response time requirement is met for the averaging period associated with the standard, ten minute and one hour averages were proposed for PM CEMS when used as an operating parameter, i.e., all times other than during a comprehensive performance test. The sampling time for these devices is less than one third of the one hour average, but not less than one third of the short term ten minute average. Further complicating this is the fact that the sampling period for these devices, while less than ten minutes, is more than half of ten minutes. The result is that no averaging could be done to assure compliance with a ten minute average. This raises the issue of whether the sampling period for PM CEMS needs to be less than one third of the ten minute average. EPA believes not, since this requirement is based on EPA's belief that a facility will want to base compliance on the average of at least three data points. If a facility is willing to base compliance on fewer than three data points, it could be allowed to do so. This is particularly true for a ten minute average which is likely to be quite high relative to the standard or the one hour average. Nonetheless, EPA seeks comment on how to address this for the final rule.

4. Issues Relative to the Draft Performance Specification 11 for PM CEMS

a. Performance Specifications which Apply for the Calibration Curve. The proposed data quality objectives were specific that a tolerance interval test be used during an RCA to determine whether the calibration curve is still valid. However, the data quality objectives were silent on what tests apply to determine whether the initial calibration is valid. For this reason, EPA wishes to clarify this point.

To test the validity of the calibration curve, one must check to make sure the calibration curve passes the correlation coefficient (r), confidence interval, and tolerance interval tests. The correlation coefficient is a test of the curve's overall fit. If the calculated correlation coefficient is greater than the one published in the performance specification, the calibration curve is acceptable. The confidence interval test is a single point test at the emission limit.[16] This verifies the fit of the calibration at the emission limit, a critical point when using a CEMS for compliance. The tolerance interval test is similar to the confidence interval test in that it is a single point test.

The confidence interval and tolerance interval tests, though, may be redundant. Therefore, we seek comment on whether only one of these tests should be used. There is merit to keeping both tests, though. The confidence interval test, for instance, ensures that the calibration curve is accurate at the standard, a point where a high degree of accuracy is required. The tolerance interval test is unique in that it sets the maximum deviation the tolerance interval lines can be from the linear regression curve at 35% of the emission limit. Therefore, commenters should focus their comments on whether these tests are indeed redundant. Would a failure of one test conclusively mean the other test is also failed? Conversely, would passing one conclusively mean a facility would pass the other? If so, which of these tests is more stringent?

b. Number of Tests for the RCA. During the course of this test program, EPA has learned that it might be wise to standardize the number of tests required for the RCA.[17] Other Appendix B performance specifications require that 12 tests be performed for relative accuracy test audits (RATAs). (RATAs are the equivalent to the RCA here.)

EPA believes the following approach would be acceptable for RCAs and requests comment on it. A facility

[14] Again, see above for the discussion of what to do when it is not possible to calibrate to the emission limit.

[15] One of the β-gage devices has two sample collection tapes to allow for the continuous sampling of flue gas, but the other does not. The truly continuous unit collects particulate on one tape as the second tape is being analyzed. The unit with one tape samples the extracted gas onto that tape and then analyzes it. This unit is not a continuous sampler since it is not sampling stack gas while measuring the accumulated particulate on the tape. The device with one tape could be configured with two tapes to allow for the continuous sampling of stack gas. It was not configured with two tapes for this test program because the vendor was unwilling to incur the cost of supplying such a device for this test program.

[16] See above for the special case where a facility cannot calibrate the PM CEMS to the emission limit.

[17] Section 7.3 of the proposed performance specification 11 for PM CEMS states that the number of tests required for a response calibration is 15. This should not be confused with the number of tests for a relative calibration audit. Section 7.3 does not apply to RCAs.

would perform up to 12 manual method measurements. Manual method tests may be disqualified and fewer than 12 used if they fail method QA/QC or the facility's internal data quality standard, but in no case may the number of RCA tests be lower than 9. If fewer than 9 measurements remain after the quality audit of the data, a new RCA test is required. To pass an RCA, more than 75% of the qualifying, good data must lie within the tolerance interval lines.

III. The Hg CEMS Demonstration Tests

A. Site Selection

For the Hg CEMS demonstration tests, EPA selected the Holnam cement kiln #2 in Holly Hill, SC. This cement kiln co-fired hazardous waste with other fuels, including fossil fuels such as coal. As such, this cement kiln is like many other hazardous waste burning cement kilns.

Holnam Holly Hill kiln #2 is 18.5 feet wide and 580 feet long with a design capacity of 2,100 tons of clinker per day. The main ingredients in the cement production are limestone, clay, alumina, and iron. The facility also obtains additional raw materials, such as fly ash, to supplement raw materials. Raw materials are ground, mixed with water, and fed to the cold end of the kiln at a solids content of about 65%. The hot (discharge) end of the kiln is fired primarily by coal, but petroleum coke, waste carbon, shredded tires, hazardous waste, fuel oil, and natural gas can also be fired. Kiln #2 has a rated capacity of 600 M–Btu/hr. Gases pass through the electrostatic precipitators (ESPs) specifically designed and built for this facility, through a transfer duct, and out the exhaust stack.

EPA chose to perform the Hg CEMS tests at a cement kiln for many reasons. CKs tend to have higher levels of mercury in their flue gas, relative to an incinerator or an LWAK, because mercury is fed to the kiln in the raw material used for cement production. Other HWCs can better avoid mercury in their feed materials, so it is less likely that mercury would be present in the flue gases of those sources. Therefore, a useful Hg CEMS demonstration program can be conducted at a CK since it has mercury in the flue gas. CKs also have higher PM emissions relative to other sources. The PM is also likely to contain mercury. This is because the PM is derived in large part from the raw material that, in turn, can be a significant source of the mercury fed to the kiln. Particle bound mercury is difficult for Hg CEMS to measure, so this represents a worst case for these instruments. Finally, CKs tend to have air pollution control equipment to control PM only. Other pollutants are uncontrolled and may be present at high concentrations. Since these pollutants, such as SO_2 and NO_X, may interfere with the Hg CEMS's ability to measure mercury, this again is a worst case situation for Hg CEMS.

The Holnam Holly Hill cement kiln #2 was chosen because:

—Data indicated the mercury concentration in the flue gas is 17 μg/dscm without the need to spike mercury;
—The facility was willing to host the demonstration and allow the necessary facility modifications;
—Physical access was available at the transfer duct and stack; and
—There was room for installing the Hg CEMS analyzers close enough to the sampling point to meet the monitor's maximum sample line requirements.

A detailed description of this selection decision is found in Section 1.3 of the Hg Test Plan.

B. Speciated Hg Manual Method.

One aspect of the program is to determine how well these Hg CEMS measure all species of mercury.[18] Some mercury monitors measure just elemental mercury. Total mercury monitors, or Hg CEMS like those participating in this program, measure all mercury regardless of species. Most Hg CEMS measure total mercury by first converting all mercury to elemental mercury and measuring the amount of elemental mercury in the treated flue gas. Converting all mercury to elemental mercury adds much complexity to the instrument.

At the start of this program, no method had been validated to measure mercury by species. Many types of speciated mercury methods are currently being developed, so EPA chose to validate one of those methods to use in this program. This speciated mercury method is tentatively called Method 101B.[19] The report, *Site-specific Quality Assurance Test Plan: Method 301 Validation of a Proposed Method 101B for Mercury Speciation, describes the methodology used to validate the method.*

While EPA is not ready to release the final report on this validation, some mention of its validation status is warranted here. The method passed all Method 301 criteria without correction with the exception of ionic mercury. The Agency has not yet concluded whether the method passed for ionic mercury. The issue for ionic mercury is that the $HgCl_2$ spiking used for the validation varied so much that it caused the calculated relative standard deviation to be much greater than Method 301's criteria of 0.50. EPA is now studying how to eliminate the effects of $HgCl_2$ spiking from the data. We will release the final validation report after this concern has been addressed.

Finally, EPA has not yet determined whether this validation at this cement kiln can be transferred to other sources. Mercury species, primarily ionic forms such as $HgCl_2$, are very difficult to generate, transport, and measure. EPA plans to use this method at other sources. Prior to doing so, though, we will perform tests to determine how well the validation at the cement kiln transfers to these other sources. After this work is completed, EPA will be able to determine whether this method should work at other sources. Until this is done, however, EPA recommends that a facility wishing to measure mercury by species first conduct a full Method 301 validation of the speciated mercury method prior to using it.

The reader should note that EPA has no plans to require facilities to use M101B. It was validated so EPA could answer questions it had regarding the ability of the Hg CEMS to measure all species of mercury simultaneously. A facility would continue to use Method 29[20] to measure stack mercury emissions, including any stack tests required for Hg CEMS.

C. The Test Plan

Testing started in August 1996 and continued through September. In October we discovered that all the Hg CEMS had suffered equipment failures. EPA met with the Hg CEMS vendors soon after the problem was discovered, and vendors responded to EPA's data availability concerns by increasing the ruggedness of their equipment. Testing resumed in December 1996. The monitors have responded with less failures since the modifications were made.

As was the case in the PM CEMS testing program, relative accuracy test

[18] For the purposes of this discussion, mercury species are defined as particle bound, ionic, and elemental mercury.

[19] The reader should note that many methods are currently being developed to speciate mercury emissions. One of those other methods may be better than the method chosen here. This method was chosen because EPA knows how to perform this method. Other methods are not so well documented. Eventually a method other than the one used here may be adopted as the EPA method for mercury speciation.

[20] Likewise, a facility could also use Method 101A. M101A is a mercury-only emission measurement method. M101A is identical to M29 except it uses mini-impingers.

audit (RATA) and ACA tests are being performed every four weeks. Testing is expected to continue through May 1997 or later.

An important aspect of the Hg CEMS demonstration tests is to test the performance specifications themselves. Revised specifications will be promulgated based on the data obtained here and comments received in response to the CEMS NODAs.

Vendor proposals for this test program are found in docket number S0205.

D. Hg CEMS Demonstration Test

Due to the sudden stop and restarting of the Hg CEMS demonstration test program, EPA is not prepared to release an interim report for this test program. EPA does request comment on the approach we are using to demonstrate these Hg CEMS and how to address the variability of spiking during the ACA test.

1. Hg CEMS Demonstration Test Approach

The Agency's approach to demonstrating the Hg CEMS can be found in the document, *Site-specific Quality Assurance Test Plan: Total Mercury CEMS Demonstration.*

2. ACA Tests and Spike Variability

As described in the section above concerning the Method 101B validation, similar problems have been encountered spiking known concentrations of elemental (Hg^0) and ionic (Hg^{+2}) mercury to the CEMS. NIST traceable permeation tubes are available for Hg^0, but not for Hg^{+2}. As a result, performing ACA tests on the Hg CEMS with Hg^{+2} is very difficult. EPA believes it may need to modify the proposed performance specification to take this into account.

Therefore, EPA now believes it is prudent to have facilities conduct ACA (i.e., linearity) tests with Hg^0 only. Facilities would then use this ACA to determine whether the calibration of the monitor is still valid and, if it fails the ACA (or if this ACA is the first performed), use the ACA results as the basis for a new calibration. Spiking with Hg^{+2} would be done only for the purposes of ensuring the Hg CEMS adequately measured Hg^{+2}. In other words, the Hg^{+2} test would resemble the NO_X converter efficiency test prevalent for NO_X CEMS. In this case a facility would spike an amount of Hg^{+2} within some range (for instance, within 75 to 125% of the emission standard) and ensure that the measured amount of Hg reported by the analyzer is within an acceptable range (for instance, within ±20%) of the actual Hg^{+2} spike determined by the manual method. The actual ranges will be determined based on data obtained from these tests. EPA requests comment on whether this approach is appropriate.

Dated: March 12, 1997.

Elizabeth Cotsworth,

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[FR Doc. 97–7215 Filed 3–20–97; 8:45 am]

BILLING CODE 6560–50–P