Particulate Matter CEMS

1. Particulate Matter CEM General Requirements

a. General Requirements

CEM1.004(097)(b) Another consideration to the use of CEMS is that neither industry nor regulatory agencies have considerable experience with PM CEMS technologies. PM continuous emission monitors are still relatively new, and their reliability falls far short of more proven CEMS monitors such as oxygen and CO. This unreliability may require several backup units, adding significantly to the cost of PM monitoring. Until PM continuous monitoring devices become more refined and their reliability improved, a requirement to use CEMS would be unnecessarily costly and impractical.

CEM2.007(125)(b) 2. EPA Lacks a Valid Technical or Legal Basis for Its Proposal to Require PM CEMS. EPA has proposed to require hazardous waste combustors to install and operate CEMS to demonstrate compliance with the PM emissions standard. 61 Fed. Reg. 17,520 (proposed 40 C.F.R § 63.1210(a)). This proposed requirement is insupportable because PM CEMS generally are not commercially available and have not been demonstrated to be effective or reliable.

The Technical Support Document for this rulemaking reports EPA's evaluation of 9 different CEMS for PM. Tech. Supp. Doc., Vol. IV, at 2-1 to 2-8. According to EPA, PM CEMS are commercially available. The Agency admits, however, that "none of these devices have received EPA approval for stack PM mass emissions monitoring." Id. at 2-1. Instead, it is necessary to calibrate the PM CEMS against EPA Method 5, an isokinetic filter collection method, meaning that mass emissions ultimately are measured "Indirectly" even using a CEMS. In short, the PM CEMS that EPA would have hazardous waste combustion facilities install is dependent on a monitoring method that the Agency in this proposal would have the industry abandon for general use in demonstrating compliance with PM emissions standards. This makes no sense, particularly given that such filter-based stack sampling methods have been proven to work, are in place throughout the hazardous waste combustor industry, and provide results that are more reliable than the CEMS described in EPA's Technical Support Document.

CEM5.017(114)(a) 2.5. PM CEM's -- Concerns EPA has proposed the use of PM CEM's for all hazardous waste combustion facilities. This requirement is based both on the commercial availability of these devices and their demonstration and use for compliance purposes in Germany. An international standard (ISO 10155) describes performance characteristics, test methods, and specifications for these systems and a technical inspection agency (TUV) has been charged by the German government with the environmental testing and certification of CEM's. In evaluating the assessments of these technologies, there are a number of issues which are not clear. Much or all of the information that has been generated during the development of performance specifications is proprietary and many performance issues cannot be adequately evaluated.

CEM5.NOD.001(147) EPA is also concerned that absent a CEMS, the feedrate of ash in liquid feeds and the rate at which CKD is returned to the kiln may have significant effect on the loading of small particles. (Attachment G/36) For waste minimization activities and combustion zone

temperature control, Continental Cement insulates CKD from select ESP compartments which contain larger particles with reduced alkali salt and metals concentrations -- PM CEMS are, therefore, not justified.

CEM5.003(091)(b) Systems for continuous monitoring of particulate emissions have been used in Europe for the past 20 years, and are commercially available in the U.S. At least six vendors sell particulate monitoring systems based on light scattering and beta gauge technologies (at least three vendors offer each).

CEM5.006(097)(c) Another consideration to the use of CEMS is that neither industry nor regulatory agencies have considerable experience with PM CEMS technologies. PM continuous emission monitors are still relatively new, and their reliability falls far short of more proven CEMS monitors such as oxygen and CO. This unreliability may require several backup units, adding significantly to the cost of PM monitoring. Until PM continuous monitoring devices become more refined and their reliability improved. a requirement to use CEMS would be unnecessarily costly and impractical.

CEM5.011(111) The Particulate CEM is a cornerstone of the PM standard. There has been much debate about the adequacy of the instruments that are on the market today. No long-term operating experience with these instruments is highlighted, therefore the industry has no comfort level with the mandated installation. In addition RES is concerned that even if the CEMs were ready for commercial use, their calibration and maintenance will be problematic. Method 5, the method of calibration, is increasingly inaccurate at the levels of PM we are looking to measure.

RES recommends a controlled phase-in of these CEMs - for example seeking several volunteer facilities as 'alpha' sites, to install and operate for 18 months before a decision is made - would reduce some of the chaos and wasted effort that will result from a requirement for use prior to field verification of their effectiveness.

The EPA tested three different PM CEMs in 1995 at the RES subsidiary New Jersey incineration facility. These tests revealed serious problems with the CEMs that indicated significant further development is needed prior to their commercial use. In addition, the Department of Energy ("DOE") is conducting CEM tests in 1996 along with continuing studies by the EPA. At this point, it is concluded that PM CEMs are not currently satisfactory for routine plant applications. The CEM problem is compounded by the performance specification. Fifteen measurements, at three different PM loadings, are required to generate a "calibration curve" for the analyzer at any specific facility. This is costly and time consuming. It is not practical to vary actual PM emission, to the extent needed, in most operating plants. Such attempts will not be repeatable, will require shutdown of the HWI between conditions, and will be confounded by other variabilities in the process, most notably waste feeds. Changes in fuel- especially in the HWI sector will make the whole method impractical.

Unless a PM CEM can be 'plugged in' like any conventional stack gas CEM, and compared to a fixed standard, it is doomed to become an anachronism with statistics - expensive statistics - confusing rather than clarifying the utility of the measurement.

CEM5.016(114)(b) The survey of available particulate CEM's turned up 11 vendors of instruments that conceivably could be used to meet the requirements of the MACT rule. Two of these

instruments are still prototype units (Jonas Model 5 and the Ruprecht & Pataschnick PM monitor) and are thus not yet in Commercial use. Three of these instruments are presently being used as "alarms" for broken bags in fabric filtration units or faulty ESP performance (P-5A, CPM, and Triboflow units). Of the remaining six CEM'S, four currently meet EPA's definition of a continuous monitor and can extract a sample isokinetically. All of the instruments appear to be affected by moisture, which would be a serious interference since virtually all hazardous waste combustors have high moisture gas streams.

The survey of users of these PM instruments included nine facilities, five in the United States, three in Germany, and one in Canada. All of the U.S. users are employing one of the three instruments typically used as baghouse or ESP alarms. The Canadian user is a pilot facility for PM removal by fabric filtration. This user employs the Insitec monitor, but it only operates 12 hours per day. They claim that the unit is difficult to calibrate and requires a high level of maintenance. All three German users contacted use the Sigrist instrument. The Bayer Lever Kussen facility was concerned about the level of maintenance required and the fact that calibration must be performed manually. They also noted that aerosols and water droplets tend to be included as dust.

CEM5.020(118) i. <u>EPA Should Eliminate the Monitoring Requirements for Particulates.</u> As explained above in comment II.B., Allied Signal believes that rule should be modified to eliminate the use of a B.F. PM standard as a surrogate for HAPS. More flexible and more cost-effective standards, based on feed stream analysis, can be developed to provide adequate protection to the environment and to meet the requirements of the Clean Air Act. For the SMFPI subcategory, a cost-effectiveness analysis must start with the fact that other metals, PIC and D/F are not present. For these facilities the benefit of installing and maintaining a continuous emission monitor for particulates does not justify its cost.

Allied Signal is concerned that EPA is proposing PM CEMS to demonstrate compliance with PM standards even though their use as a compliance tool has not been proven in the United States. EPA conducted a limited evaluation of three PM CEMS at the Rollins Bridgeport, NJ facility, which is discussed in Volume IV of the Background Information Document. Allied understands that this was the only study conducted by EPA for PM CEMS in the United States. The PM CEMS evaluation at Bridgeport lasted for only a two week period. This test period is too short to determine equipment reliability, dependability or to demonstrate the applicability of CEMS for use at other locations. From the Bridgeport study EPA concluded the following:

- The calibration data did not meet the minimum requirements.
- The data obtained from the CEMS operations in general are inconclusive.

Further, EPA's own survey of PM CEMS, which is also discussed in Volume IV of the Background Information Document, concluded the following:

- The devices using Tapered Oscillating Element Microbalance (TOEM) approach is not suitable for stack sampling, and opacity monitoring devices lack the required sensitivity.
- Other devices evaluated by EPA require a site-specific calibration against manual gravimetric measurements, and the accuracy that can be obtained in this manner is unknown.
- None of the approaches considered by EPA make a direct measurement of particle mass

concentration.

Therefore, EPA must remove the requirement to install PM CEMS at HWC facilities from the final rule.

CEM5.024(125) Second, UARG members are concerned about EPA's statements that PM CEMS are sufficiently advanced to use for compliance monitoring. Moreover, UARG members believe that the proposed PS 1 calibration requirements for PM CEMS would not result in PM data that are accurate and reliable enough for compliance determinations.

CEM5.026(125)(a) As a substantive matter, UARG has many concerns about the proposal. Most fundamentally, UARG disagrees with EPA's preliminary conclusion that PM CEMS are sufficiently advanced to be used as a compliance method for PM emissions. At the request of UARG, RMB Consulting has reviewed the status of PM CEMS development, has examined PS 11, and has evaluated the available test data that EPA obtained from its two PM CEMS demonstration projects. See Memorandum, Technical Comments on EPA's Proposed Rule to Require Continuous Particulate Matter Monitoring (August 15, 1996), Attachment 1 to these comments (hereinafter referred to as the "RMB Memo"). The following conclusions can be drawn from RMB's analysis.

CEM5.026(125)(d) In light of these conclusions, UARG does not believe that the rulemaking record demonstrates that PM CEMS technology has matured sufficiently to provide reliable and accurate compliance data.

CEM5.026(125)(g) In summary, the rulemaking record does not support, and EPA should not finalize, the proposal to require PM CEMS as a compliance method.

CEM5.038(125A) SUMMARY AND CONCLUSIONS While reliable and accurate continuous PM monitors would be useful for both affected sources and the regulatory community, the technology simply is not sufficiently mature to become a regulatory requirement at this time. This statement is supported by the fact that EPA has proposed very broad confidence and tolerance intervals within PS 11. EPA should acknowledge the dilemma and attempt to solve the problem with adequately-funded research. That is, if the Agency proposes relatively narrow confidence and tolerance intervals, those that could ensure meaningful results, EPA realizes from its own studies that most continuous PM monitors will not meet the performance specifications. EPA has proposed a short-sighted approach; instead of insisting on better technology, EPA has simply relaxed the performance specification requirements.

If you have any questions regarding these review comments or require additional information, please do not hesitate to call me at (919) 510-0376.

CEM5.030(125) BACKGROUND On April 19, 1996, EPA proposed a rule in the Federal Register that would revise standards for hazardous waste incinerators, hazardous waste-burning cement kilns, and hazardous waste-burning lightweight aggregate kilns. [Footnote 1: 61 Fed. Reg. 17358 (April 19, 1996).] Among other things, the rule would require the installation and operation of continuous particulate matter (PM) monitors, conformance with continuous PM monitor specifications (i.e., Performance Specification 11), and compliance determinations with emission limits based on

continuous PM data.

The Utility Air Regulatory Group [Footnote 2: UARG is an ad hoc group consisting of 75 individual utility companies, the Edison Electric Institute, the National Rural Electric Cooperative, and the American Public Power Association. UARG participates on behalf of its members in Clean Air Act rulemakings and related litigation in the best interest of the utility industry.] (UARG) asked RMB Consulting & Research, Inc. (RMB) to review and provide technical comments on the proposed hazardous waste combustor rule. Specifically, UARG asked RMB to focus its review on the continuous PM monitoring aspects of the rule. While the electric utility industry is not directly affected by this proposed rule, almost all utility boilers are subject to particulate emission limitations and requirements to install and operate continuous opacity monitors.

THE FUNDAMENTAL PROBLEM The fundamental problem with EPA's proposed approach to continuous PM monitoring is the fact that commercially available PM monitors only provide an indirect measure of particulate mass. Thus, all of the so called continuous PM monitors must be calibrated against a direct measure (e.g., EPA Method 5) of particulate mass emission rates. The fact that the continuous PM readings are only indirect measures and must be calibrated against direct measures immediately raises two issues: (1) how "good" should the calibration be and (2) how stable should the calibration be. EPA attempts to respond to the first issue by including in the continuous PM performance specifications (PS 11) a series of statistical criteria that the calibration relation must satisfy. RMB will continent on the adequacy of the statistical criteria later in this memorandum. However, EPA fails to adequately address the calibration stability issue.

CEM5.041(128)(d) Perhaps in recognition of the weakness of its administrative record for the proposed PM CEMS requirement, EPA makes much of the fact that PM CEMS have been tested and certified for compliance purposes in Germany by that country's "technical inspection agency" or TUV. However, as the Agency reportedly learned when it visited with a TUV official in 1994, information pertaining to TUV certification of CEMS is "generally not available" because such information is considered "proprietary" by the system manufacturers. Draft Tech. Supp. Doc., Vol. IV, at 2-9 to 2-16. Moreover, because CEMS operating data is withheld from public scrutiny in Germany by the user facilities, EPA reports that "TUV itself has prepared no reports on the general subject of PM CEMS performance." *Id.* at 2-10.

The sole example of a TUV CEMS certification that was provided to EPA involved the use of a light-scattering system used for PM monitoring at a secondary lead smelter (a type of device that is not subject to the proposed rule). Draft Tech Supp. Doc., Vol. IV, at 2-13 to 2-16. As described by EPA, the certification process revealed several problems with the CEMS system which, although perhaps resolved to TUV's satisfaction, [Footnote 14: Of course, as discussed above, actual operating data generated by German facilities using TUV certified CEMS are not publicly available. In the absence of such data, it is not possible to assess the merits of TUV's conclusion that the particular light-scattering CEMS tested in the secondary lead smelting context is, in fact, suitable for use in monitoring PM emissions from such metal recovery furnaces, much less hazardous waste-burning incinerators. Moreover, as noted by EPA, CEMS certified by TUV for use in "esoteric systems, such as metal recover furnaces" must undergo device-specific suitability tests. Draft Tech. Supp. Doc., Vol. IV, at 2-11. The results of such tests are not transferable to incinerators, which occupy the highest rank on TUV's "hierarchy of difficulty in terms of suitability testing " *Id.*]

illustrate the difficulties that will undoubtedly be encountered if such devices are installed for use in complying with EPA's proposed PM emission standard. Among other things, TUV's secondary lead smelter PM CEMS certification process revealed the following CEMS-related problems: mechanical problems; calibration problems attributable to temperature sensitivity and "stray sunlight;" problems with dirt (soot) buildup on the optics, necessitating frequent cleaning and recalibration at 4 week intervals; and uncertainty in the calibration data.

CEM5.051(141)(f) Instead, existing, proven compliance systems should remain acceptable for use in demonstrating compliance with applicable emissions standards. Permissible alternative compliance systems should not be limited to feedstream monitoring, as proposed by EPA, because the feedstream monitoring options are overly restrictive.

...

b. EPA Lacks a Valid Technical or Legal Basis for Its Proposal to Require Hazardous Waste Combustion Facilities to Install and Operate PM CEMS

EPA has proposed to require hazardous waste combustors to install and operate CEMS to demonstrate compliance with the PM emissions standard. 61 Fed. Reg. at 17,520 (proposed 40 C.F.R. 63.1210(a)). This proposed requirement is insupportable because PM CEMS generally are not commercially available and have not been demonstrated to be effective or reliable. [Footnote26: Lilly notes that, as discussed above, even if CEMS were demonstrated technology, current monitoring techniques used on hazardous waste incinerators give an adequate demonstration of compliance, and thus CEMS are not necessary.]

The Technical Support Document for this rulemaking reports EPA's evaluation of 9 different CEMS for PM. Tech. Supp. Doc., Vol. IV, at 2-1 to 2-8. According to EPA, PM CEMS are commercially available. The Agency admits, however, that "none of these devices have received EPA approval for stack PM mass emissions monitoring." Id. at 2-1. Instead, it is necessary to calibrate the PM CEMS against EPA Method 5, meaning that mass emissions ultimately are measured "indirectly" even using a CEMS. Id. In short, the PM CEMS that EPA would have hazardous waste combustion facilities install is dependent on a monitoring method that the Agency in this proposal would have the industry abandon for general use in demonstrating compliance with PM emissions standards. This makes no sense, particularly given that such filter-based stack sampling methods provide results that are more reliable than the CEMS described in EPA's Technical Support Document. [Footnote 27: Lilly believes that the flexibility should be provided for a source to demonstrate that a stack sampling compliance method is more manageable and protective of human health and the environment.]

Perhaps in recognition of the weakness of its administrative record for the proposed PM CEMS requirement, EPA makes much of the fact that PM CEMS have been tested and certified for compliance purposes in Germany by that country's "technical inspection agency" or TUV. However, as the Agency reportedly learned when it visited with a TUV official in 1994, information pertaining to TUV certification of CEMS is "generally not available" because such information is considered "proprietary" by the system manufacturers. Draft Tech. Supp. Doc., Vol.IV, at 2-9 to 2-16. Moreover, because CEMS operating data is withheld from public scrutiny in Germany by the user facilities, EPA reports that "TUV itself has prepared no reports on the general subject of PM CEMS performance." Id. at 2-10.

The sole example of a TUV CEMS certification that was provided to EPA involved the use of a light-scattering system used for PM monitoring at a secondary lead smelter (a type of device that is not subject to the proposed rule). Draft Tech. Supp. Doc., Vol. IV, at 2-13 to 2-16. As described by EPA, the certification process revealed several problems with the CEMS system which, although perhaps resolved to TUV's satisfaction, [Footnote 28: Of course, as discussed above, actual operating data generated by German facilities using TUV-certified CEMS are not publicly available. In the absence of such data, it is not possible to assess the merits of TUV's conclusion that the particular light-scattering CEMS tested in the secondary lead smelting context is, in fact, suitable for use in monitoring PM emissions from such metal recovery furnaces, much less hazardous waste-burning incinerators. Moreover, as noted by EPA, CEMS certified by TUV for use in "esoteric systems, such as metal recovery furnaces" must undergo device-specific suitability tests. Draft Tech. Supp. Doc., Vol. IV, at 2-11. The results of such tests are not transferable to incinerators, which occupy the highest rank on TUV's "hierarchy of difficulty in terms of suitability testing." Id.] illustrate the difficulties that will undoubtedly be encountered if such devices are installed for use in complying with EPA's proposed PM emission standard. Among other things, TUV's secondary lead smelter PM CEMS certification process revealed the following CEMS-related problems: mechanical problems; calibration problems attributable to temperature sensitivity and "stray sunlight;" problems with dirt (soot) buildup on the optics, necessitating frequent cleaning and recalibration at 4 week intervals; and uncertainty in the calibration data.

CEM5.053(143) 2.0 Particulates CEM The HWC proposes the use of a particulate CEM. This is not a simple opacity meter, but a sophisticated device that relates an analyzer reading to particulate emissions as determined by Method 5. A discussion of the added risk to perform the needed calibration tests was presented in another section on human health and environmental impact of the implementation of the proposed regulation. In addition to questioning the need for such a sophisticated device, requiring burdensome (and likely impractical) testing and maintenance, there is also the question of the need to use such a device to achieve the goal of the regulation (reduced emissions).

Again, the EPA is requiring all cement kilns to install a continuous emission monitor to monitor an emission, in this case particulate, when it is known that 30% of the facilities currently meet the proposed regulation (FR17392) while operating under worst case conditions. That is 30% of facilities must purchase, install and maintain a particulate device with no reduction in particulate emissions resulting from the efforts and expense, with however, an increase in negative human health and environmental impact.

In such a situation, the particulate CEM serves purely as a "policing" function imposed upon a facility that has already demonstrated compliance to the proposed regulation. In addition, this particulate CEM is intended to be used as an operational control parameter. As stated in 63.1210, a PM limit is to be established during the comprehensive performance test and is to be set as the lowest set of values over the D/F, SVM and LVM testing. This would seem particularly onerous given that particulate emissions are only one of many factors associated with the emissions of the target pollutants. Indeed the proposed HWC regulation included the requirements for metals emissions monitoring or alternately metals feed rate limits suggesting that the EPA believes these emissions are independent of particulate emissions. To be sure, metal emissions and particulate emissions may be associated at a particular device operated at a given set of conditions. So in that

sense, a site specific correlation between particulate emissions and metal emissions may be able to be made. But such a correlation can also be made for a less sophisticated device such as an opacity meter, a device requiring less burdensome testing and maintenance and producing more reliable readings. A paper presented by a VEREWA GmbH of Germany representative at the 1996 A&WMA BIF conference, pointed out that some PM monitors must be recalibrated for different fuels. This is not the case with opacity monitors which have been successfully used for years in the cement industry.

The proposed HWC regulation, however, specifically requires the installation, testing and maintenance of a very sophisticated PM CEM. It then proposes use of that CEM to maintain operating limits on metal emissions even though metal emissions are limited separately. This is a grossly redundant and expensive form of regulation that adds little or nothing to emissions reduction.

As proposed, the implementation of the PM CEM requirement is predicated on establishing a correlation between "real" emissions as measured by EPA Method 5 and an electronic output from the instrument. Without this correlation, the setting of ten minutes, one and two hourly rolling averages is at best highly questionable.

In Volume IV ("Technical Support Documents for HWC MACT Standards"), chapter two, discusses CEM's for particulate matter, Section 2.1.14 ("Conclusions") states in part:

"Of the approaches surveyed in this report, one is not suitable for stack monitoring (the TOEM), and opacity monitoring lacks the required sensitivity. Of the remaining approaches, none makes a direct measurement of particle mass concentration, although the beta gauge calibration depends so weakly on particulate properties that the calibration is considered universal and absolute (Wedding and Weigand 1993). The other devices require a site specific calibration against manual gravimetric measurements. The accuracy that can be obtained in this manner is not known, as it depends on the stability of the calibration. This depends in turn on a stable relationship between the measured particle properties and particle mass. The best way to determine the feasibility of applying these devices as CEMs for compliance purposes is to conduct field trials at the various types of sources to be regulated. A demonstration of these devices at facilities representative of the various source categories should determine how actual variations in PM size and composition affect the accuracy of mass concentrations inferred from the measured properties. It should be noted that in Germany, light scattering has been deemed sufficiently reliable for this method to have received certification for use as a CEMS.")

It should also noted that in Germany the PM CEM performance specification is considerably different to that published in the proposed HWC regulation. Indeed there are considerable differences in when and how PM CEMs are used in Germany versus that proposed in the HWC regulation. As with any monitoring method or system, its design characteristics are those which meet the regulatory requirements for monitoring the emissions for which they were intended. For example, all of the graphs showing correlation between instrument output and particulate emissions are for emissions sources which emit less than 13 mg/m^3. See Figures 2-1 through 2-8. Indeed in section 2.1.12 which discusses PM CEMs use in Germany. *("In 1986 continuous PM monitoring was required at PM levels too low for opacity monitors.")* These two facts together would indicate that the Germans find opacity monitors acceptable as particulate emission monitors above about 20 mg/m^3. Also that the

Germans use a reference method that is considerably different that the EPA's currently required Method 5. The weakness of Method 5 is to properly quantify particulate emissions at low emission rates has been brought to the EPA's attention by the vendors of various particulate CEMS.

Also, the problems with Method 5 have shown up in the testing conducted by the EPA at various facilities. This is documented in Volume IV ("Technical Support Documents for HWC MACT Standards") chapter 4, section 4.1.6 "Conclusion for the Rollins Bridgeport Facility" "... *the very low PM loadings were difficult to measure using the manual method... "* and *"the results obtained in this study suggest that the RM200 can be successfully calibrated."* emphasis added. In Section 4.2, the testing at the Lafarge Fredonia facility is discussed, although this report states that the *"Preliminary analysis of the PM data indicates a stable calibration relation over a period of eight weeks which met the performance specification."*, the data is not provided. This report does discuss some manual method data *"which are suspected to be inaccurate."* This suspected data is in the 20 to 30 mg/m^3 range. This is decidedly much higher than the suspect data acknowledged in the Rolling Bridgeport test where the *"very low PM loadings"* were in the one to four mg/m^3 range.

In either case the acknowledged inaccuracy of the manual method must be addressed before any correlation can be performed. Also, the tests noted above do not mention how well the CEMs performed, or even whether they performed, the daily zero and calibration draft tests required by the performance specifications. It is reported by the PM CEM vendors that such daily tests are not performed, generally such tests are performed at best at weekly intervals. This also must be addressed as it impacts maintenance requirements.

Taken in all, the difficulty with Method 5; the questionable need for a sophisticated PM CEM versus an opacity meter for PM loadings above 20 mg/m3. The questionable correlation between PM emission rates and metal emission rates; the obvious redundancy in a PM emission rate operating limit to be set during metal emissions testing when metal emissions must be monitored and limited separately; it would appear that a proposed requirement in the HWC for mandatory PM continuous emissions monitoring would be an onerous requirement that would do little if anything to reduce emissions. It becomes even more onerous upon comparison to other less sophisticated technologies such as opacity meters coupled with operating parameter limits as currently promulgated under BIF.

CEM5.054(143)

Parameter	BIF Requirement	HWC Requirement
Particulates	No CEM Required.	1. Install and check out. 2. Conduct 7 Day Calibration Drift/Zero Drift (CD/ZD) 3. Conduct Instrument/Method 5 Correlation Tests. A minimum of 15 runs at a minimum of 3 grain loadings. Requires O_2 and moisture values. 4. Repeat 3 for each condition/fuel type mix. 5. Perform calibration relation calculations; linear relation, possibly quadratic relation.

RSCP-144 (1)(a) 1.0 Particulate Monitors There are a number of different technologies. Some of these may prove to be unsuitable for the purpose, however. At the present time, there is insufficient

data to indicate which technologies will or will not work. The systems range from approximately $25,000 to $57,000. This includes installation as well as recommended spares and training of the instrument technicians.

The data from this instrument would need to be sent to a data manager (computer with software) to compute and compare the rolling averages to the operating limits. This data manager would store data, print reports, initiate alarms and AWFCOs as required.

CEM5.055(144)(a) B. PM CEMS should not be required because they are not necessary and have not been demonstrated to be reliable. PM monitors have been used more than Hg monitors, but they have not been shown to be reliable under all conditions they must operate. In fact, EPA has just begun limited demonstration tests for PM CEMS.

CEM5.055(144)(d) Therefore we believe that there is no justification or necessity for requiring PM monitors. §63.1210(j)(6), §63.1210(i)(A), §63.1210(i)(C) and §63.1210(i)(B) except (2) should also be deleted to remove the PM CEMS requirement.

CEM5.056(145)(a) 63.1210 - Monitoring Requirements Reynolds does not support the use of PM or Hg CEMS to monitor emissions for compliance purposes. Based on the information provided in the *Background Information Document (BID), Volume IV Compliance with the Proposed MACT Standards,* Reynolds does not believe that reliable and affordable CEMS for mercury and particulate matter exist.
...
As with the Hg CEMS, Reynolds does not support the use of a PM CEMS. Based upon the information provided in the BID, it appears that there are several problems with the systems which indicate they are not completely developed. All systems discussed in the BID are located in Germany and used to demonstrate compliance with German standards. PM CEMS have not been proven to be successful in the United States against United States standards. We understand that EPA is currently testing PM CEMS in the U.S. and the tests have revealed problems with the systems. As with the Hg CEMS, we urge EPA to allow operators the flexibility to select whether CEMS or operating parameter limits will be used to demonstrate compliance. EPA must not make these devices mandatory until they have been successfully demonstrated in the U.S. on hazardous waste combustors.

CEM5.057(147) B. Particulate CEM EPA proposes the use of a particulate CEM. This is not a simple opacity meter, but a sophisticated device that relates an analyzer reading to particulate emissions as determined by Method 5. Our comments have addressed the added risks to perform the calibration tests. In addition to questioning the need for such a sophisticated device requiring burdensome (and likely impractical) testing and maintenance, Continental questions the need to use such a device to achieve the goal of the regulation, i.e., reduced emissions.

Again, EPA is requiring all cement kilns to install a continuous emission monitor to monitor particulate when it is known that 30% of the facilities currently meet the proposed regulation (FR17392) while operating under worst case conditions.

In such a situation, a particulate CEM serves purely as a "policing" function imposed upon a facility

that has already adequately demonstrated compliance to the proposed regulation. In addition, the CEM is intended as an operational control parameter. As stated in § 63.1210, a PM limit is to be established during the comprehensive performance test and is to be set as the lowest set of values over the D/F, SVM and LVM testing. This is particularly onerous given that particulate emissions are only one of many factors associated with the emissions of the target pollutants. Indeed the proposed regulation includes other requirements for metals emissions monitoring, or alternately metals feed rate limits, suggesting that EPA admits these emissions are independent of particulate emissions. To be sure, metal emissions and particulate emissions may be associated at a particular device operated at a given set of conditions. In that, sense, a site specific correlation between particulate emissions and metal emissions may be possible, but such a correlation can also be made with less sophisticated devices such as an opacity meter. These require less burdensome testing and maintenance and produce more reliable readings. A paper presented by VEREWA GmbH of Germany at the 1996 A&WMA BIF conference, pointed out that some PM monitors must be recalibrated for different fuels. This is not the case with opacity monitors which have been successfully used for years in the cement industry. Nevertheless, the regulation proposes a grossly redundant and expensive monitor which adds nothing to emission reductions.

As proposed, the implementation of the PM CEM requirement is predicated on establishing a correlation between "real" emissions as measured by EPA Method 5 and an electronic output from the instrument. Without this correlation, the setting of ten minutes, one and two hourly rolling averages is at best highly questionable. Volume IV ("Technical Support Documents for HWC MACT Standards"), chapter two, discusses CEM's for particulate matter. Section 2.1.14 ("Conclusions") states in part:

"Of the approaches surveyed in this report, one is not suitable for stack monitoring (the TOEM, and opacity monitoring lacks the required sensitivity. Of the remaining approaches, none makes a direct measurement of particle mass concentration, although the beta gauge calibration depends so weakly on particulate properties that the calibration is considered universal and absolute (Wedding and Weigand, 1993). The other devices require a site specific calibration against manual gravimetric measurements. The accuracy that can be obtained in this manner is not known, as it depends on the stability of the calibration. This depends in turn on a stable relationship between the measured particle properties antiparticle mass. The best way to determine the feasibility of applying these devices as CEMS for compliance purposes is to conduct field trials at the various types of sources to be regulated. A demonstration of these devices at facilities representative of the various source categories should determine how actual variations in PM size and composition affect the accuracy of mass concentrations inferred from the measured properties. It should be noted that in Germany, light scattering has been deemed sufficiently reliable for this method to have received certification for use as a CEMS.")

It should also noted that in Germany, the PM CEM performance specification is considerably different to that in the proposed regulation. Indeed there are considerable differences in when, and how, PM CEMS are used in Germany versus that proposed in the regulation. The design characteristics are set to meet the regulatory requirements for monitoring the emissions for which they were intended. For example, all of the graphs showing correlation between instrument output and particulate emissions are for emissions sources which emit less than 13 mg/m^3. (See Figures SGY 2-1 through SGY 2-8). Indeed § 2.1.12 regarding German PM CEMS states: *"In 1986*

continuous PM monitoring was required at PM levels too low for opacity monitors. " Together, these two facts indicate that the Germans find opacity monitors acceptable as particulate emission monitors above about 20 mg/m' and that the Germans use a reference method that is considerably different than EPA's Method 5. Method 5's weakness is in properly quantifying particulate emissions at low emission rates and has been brought to EPA's attention by the vendors of various particulate CEMS.

These problems have also shown up in testing conducted by EPA at various facilities. This is documented in Volume IV ("Technical Support Documents for HWC MACT Standards") chapter 4, section 4.1.6 "Conclusion for the Rollins Bridgeport Facility. ... *[T]he very low PM loadings were difficult to measure using the manual method..... and "the results obtained in this study* <u>*suggest*</u> *that the RM200* <u>*can*</u> *be successfully calibrated."* Emphasis added. In Section 4.2, the testing at the Lafarge Fredonia facility is discussed, although this report states that the *"[p]reliminary analysis of the PM data indicates a stable calibration relation over a period of eight weeks which met the performance specification"*, the supporting data is not provided. This report does discuss some manual method data *"which are suspected to be inaccurate."* This suspected data is in the 20 to 30 mg/m3 range. This is significantly higher than the suspect data acknowledged in the Rolling Bridgeport test where the *"very low PM loadings"* were in the one to four mg/m^3 range.

In either case the acknowledged inaccuracy of the manual method must be addressed before any correlation can be performed. Also, the tests noted above do not mention how well the CEMS performed during (or even whether they performed) the daily zero and calibration draft tests required by the performance specifications. PM CEM vendors report that such daily tests are not performed. At best, such tests are performed at weekly intervals. This also must be addressed, because it impacts maintenance requirements.

CEM5.061(163)(a) Medusa-Crescent believes that the requirement of particulate matter (PM) CEM which has not been proven effective on cement kilns is unduly burdensome and unnecessary and should be removed. The only potential location where such a CEM can be located at the Medusa-Crecent facility is the common stack shared by three kilns. Because of the number of different combinations of kiln operations, it will be extremely difficult if not impossible to perform the required calibrations of the CEM.

CEM5.061(163)(c) Medusa-Crecent is also concerned that the currently available CEM technology may potentially require handling of radioactive materials which in turn will pose additional regulatory burden. Medusa-Crecent recommends that compliance demonstration be limited to periodic emission testing as required by current air and hazardous waste regulations.

CEM5.066(177)(b) 6. Cytec's incinerators met the proposed MACT standard for particulate matter during test conditions. Based on the conditions demonstrated during testing, parameters are established to ensure compliance during normal operations. Cytec believes this is still the best method to ensure compliance with the operating parameters. Preliminary testing of the PM CEMS demonstrated an inability to calibrate the available CEMS to the stack sampling method. Reliance on the costly and unproven PM CEMS is unsubstantiated. Cytec requests that the requirement for installation of a PM CEMS be deferred until reliability is proven.

CEM5.069(181)(b) Most of the discussion centers around PM CEMS which are available. A short-lived demonstration of PM CEMS was conducted at a hazardous waste incinerator and summarized in Sec. 4.1 of the support document. The conclusions from this demonstration (Sec.4.1.6) show that this technology may be feasible but is far from being proven. Included in this discussion are phrases such as, "In conclusion, the calibration data did not meet minimum requirements for..", "The check on the stability of the calibration relation for the optical device was inconclusive due to.." and "The results obtained with the beta gauge device were inconclusive.."

Additional background information was presented from a fact-finding trip to Germany (Sec. 2.1.12 and 2.1.13) which yielded very little information. The information obtained was summarized in the following paragraph taken from the support document:

"Although a considerable amount of experience and data exists in connection with the TUV certifications and subsequent operations at various installations, this information is generally not available. TUV certifications are paid for by the CEMS manufacturer and are proprietary. CEMS operating data at facilities belongs to the individual facilities, and is also not public information. Since this data also represents the plant's emissions history, they are reluctant to release it. For these reasons, TUV itself has no prepared reports on the general subject of PM CEMS performance. The only specific information that has been gathered to date comes from the TUV certification report for the Sick RM200 at a secondary lead smelter that Sick Optic-Electronic has made available to the EPA."

CEM5.073(187) 1. Particulate Matter Solite believes that, for a facility using MACT technology to control PM emissions, there is no justification for requiring a PM CEMS. Preliminary testing of the PM CEMS demonstrated that CEMS data could not be calibrated to data generated using EPA Method 5. The reliability of PM CEMS has not been proven for LWAKs or similar units. Where a facility has demonstrated through compliance testing that it can meet the MACT standard under worst-case conditions, with an ample margin of safety, and the same applies to the standards for other emissions that are affected by particulate removal efficiency, a PM CEMS should not be required. Monitoring the effectiveness of the fabric filter system through pressure drop limitations and an opacity monitor is sufficient to ensure adequate removal efficiency.

CEM5.074(188) OxyChem requests that the requirement regarding the installation of PM CEMS be removed from the proposed rule. Quite simply, technically sound and cost effective PM CEMS are not available. Particulate is measured with a modified opacity meter. As such, it has limitations of opacity meters in that it does not work in wet stacks (the current particulate CEMS are only available at adequate detection limits/methods for dry stacks only). Within the opacity meters, the detecting element has to be routinely cleaned, and the light has to be occasionally replaced. Performance certification of such a detection device will likely prove problematic. Due to the difficulty of calibrating the instrumentation, the particulate CEM will not be accurate and /or reliable at the low concentration levels (0.002 to 0.0002 gr/dscf) anticipated for these incinerators. Furthermore, this equipment probably will not be available for some time. Several years ago the Agency proposed CEMS for O2, NOx, CO, and opacity be installed on boilers. Current operations have not been able to eliminate operating and maintenance problems associated with this type of monitoring equipment.

Also, by relying on technology that has not been fully established, the proposed rule poses a serious question concerning the soon-to-be-finalized credible evidence rule. This rule will state that data from CEMS will constitute "proof" of compliance or noncompliance. The installation of unproven monitoring technology will ultimately result in data that may indicate to a facility that it is in compliance when in reality, the opposite could be true. Similarly, data produced by such devices may cause Agency inspectors to believe that a facility is non-compliant, when in reality, the opposite could be the case. As a result the regulated community and the Agency will be in jeopardy of demonstrating compliance with the proposed PM standard. If the Agency does not alter the proposed rule to eliminate this requirement, it will be necessary for both entities to validate unreliable CEMS data on an ongoing basis. This will result in duplicative and costly monitoring requirements. *Therefore, OxyChem believes that by proposing a requirement to install unproven technology - such as light scattering* PM CEMS - *the Agency grossly underestimates the economic impact of the proposed rule.*

CEM5.075(202) An important practical consideration to the use of CEMs is that neither industry nor regulatory agencies have considerable experience with the technology for a PM CEM. PM continuous emission monitors are still relatively new, and their historical reliability falls far short of more proven CEM monitors such as O2, SO2, NOx, and CO. This unreliability may require several back-up units, adding significantly to the cost of PM monitoring. Until PM continuous monitoring devices become more refined and their reliability improved, a requirement to use these devices would be impractical and not a wise use of resources.

EPA should not set a PM CEM standard until this monitoring technology is proven and the expense is justified.

CEM5.078(212B) Lafarge supports the requirement of continuous emission monitors for total mercury and particulate matter. However, facilities should not be limited to the specific monitor designs specified in the MACT Rule preamble, as long as their choice of instrument meets the performance standards proposed in 40 CFR Part 60.

Lafarge believes that the MACT implementation of viable continuous emission monitors (61 FR 17379, 40 CFR 63.1210 (a)) represents compliance policy based on good science. The use of CEMS also represents a more accurate measure of actual emissions than the implementation of limits on operating and feedrate parameters. However, Lafarge does not agree with EPA's specific design recommendations of CEMS (e.g., b-gauge PM CEMS) and the ensuing blanket rejection of transmissometers as a viable instrument for PM emission measurement (61 FR 17436). Lafarge is in the process of gathering data that show appropriately designed transmissometers or opacity monitors are capable of accurately measuring PM emissions within the boundaries appropriate for MACT compliance demonstration. EPA should state clearly in the final MACT rule and preamble that any instrument which measures PM and total mercury emissions within the performance specifications of 40 CFR Part 60 can be certified for MACT compliance.

CS3A-003 (2) [From Appendix A, RMB Consulting and Research Memorandum to UARG, April 18, 1997] ADDITIONAL TECHNICAL COMMENTS Spare Parts and Service. We are somewhat puzzled by the discussion in the Federal Register notice titled, "Limitations of the Test Program". "EPA states that a CEMS purchased by a facility usually comes with a supply of spare parts. This

simply is not true; most CEMS vendors include a recommended list of spare parts which the facility may or may not purchase. Most importantly, EPA's stated inability to secure US based trained service technicians speaks volumes about the maturity of the technology and its supporting infrastructure. The key question is, how many instruments of each type would have to be installed in the various geographic regions of the U.S. before the overseas vendors could justify a network of factory trained technicians? [FN10] 62 Fed. Reg. 13779, Col. 2 (March 21, 1997).

CS3A-003 (3)(a) [From Appendix A, RMB Consulting and Research Memorandum to UARG, April 18, 1997] EPA'S FIELD DEMONSTRATION EPA's continuous PM monitor field demonstration is being conducted on a hazardous waste incinerator at the Dupont Experimental Station in Wilmington, Delaware. The field demonstration began in September 1996. and EPA plans to continue the demonstration through May 1997. Overview of the Field Demonstration on balance, we believe that EPA's experimental design for its continuous PM monitor field demonstration is very good. First, the demonstration includes six individual instruments that utilize three distinctly different measurement principals: (1) light scattering, (2) beta gauge, and (3) acoustic energy. Second, by conducting a long-term (i.e., 8-9 months) field demonstration, the Agency is able to property evaluate the actual operability and reliability of each continuous PM monitor. For example, EPA is able to document how much maintenance each instrument requires; how easy each instrument is to service; how responsive each vendor is to requests for service, spare part orders, etc. Also, one would expect that over the long-term demonstration period, the continuous PM monitors would be exposed to a wide variety of incinerator operating conditions and thus be challenged by a wide variety of particulate emissions.

CS3A-004 (4) The Coalition for Responsible Waste Incineration (CRWI) is pleased to submit comments on the United States Environmental Protection Agency's (EPA Hazardous Waste Combustors; Continuous Emissions Monitoring Systems; Proposed Rule-- Notice of Data Availability and Request for Comments. CRWI represents ten companies with either captive or commercial hazardous waste interests. These companies account for a significant portion of the U.S. capacity for hazardous waste incineration. Since its inception, CRWI has encouraged its members to reduce the generation of hazardous waste. However, for certain hazardous waste streams, CRWI believes that incineration is a safe and effective method of treatment. CRWI seeks to help its member companies both to improve their incineration operations and to provide lawmakers and regulators helpful data and comments. In its activities, CRWI is advised by a number of academic members with research interests in hazardous waste incineration. CRWI supports EPA's desire to promote the development of new technologies, particularly those that have the potential to enhance the information flow to the public. EPA has made a commendable start with demonstration of continuous particulate matter (PM) and mercury emissions monitors. However, only with independent review and unbiased study can the public and operator be assured that these systems will be accurate and reliable. In reviewing the reports published by EPA in the Notice of Data Availability (NODA) on March 21, 1997, CRWI has focused on the "Status Report No IV: Particulate Matter CEM's Demonstration." This report discusses the demonstration project conducted at the DuPont facility. This project is an excellent step toward instituting these CEM's on a broader basis. However, it is not the final step. In fact, this demonstration falls short of proving these systems are ready for commercial installation, although it does point out very clearly what the next steps should be. In these comments CRWI will focus on these next steps. Before presenting these steps, CRWI would like to express our deep concern with the numerous inconsistencies in the data

in the Phase IV report. CRWI believes these problems make it very difficult respond to EPA's notice (See the enclosed letter dated April 7, 1997). In fact, CRWI believes that the corrected data will need to be made available for comment before EPA can use the Phase IV report. Therefore, we encourage the Agency to correct the data and make it available for comment as soon as possible. In addition, EPA states in the NODA that hundreds of combustion units have PM CEM's installed. Most of these units are not used for compliance but are used as event indicators (i.e., broken bags or other catastrophic failures). These issues are addressed in a report written by ENSR. This report has been submitted to the Docket under a separate cover. Our current comments are divided into three broad issues and several specific comments.

CS3A-004 (4)(a) Potential Solutions Because of the problems and data gaps identified above (and in our specific comments), CRWI believes that it is premature to mandate the use of CEM's for compliance with MACT emission limits. At the same time, CRWI understands that reliance on CEM's is important to the Agency. Therefore, CRWI suggests that the Agency pursue a dual track. One, additional testing (as described below and in our attached comments) should be conducted before mandating the use of CEM'S.

CS3A-004-005 (7) I. Based on the DuPont test we cannot conclude that any PM CEM would work in a compliance function at the DuPont plant.

A. Accuracy - In order to reliably measure the typically very low particulate emissions from hazardous waste combustors, EPA modified the traditional Method 5. Additionally, EPA chose to run two modified method 5 (MM5) trains in pairs in an attempt to obtain reliable and accurate reference readings. Comparing results of reference method pairs to CEM outputs brought two problems to light: the paired samples often did not agree with each other; and they showed poor correlation with the CEM outputs. This raises questions about the accuracy of the manual test method under the low particulate concentrations encountered, as well as the accuracy of the CEM's tested. EPA was forced to address certain statistical aberrations such as eliminating outliers, large confidence intervals, small sample size, small r value, etc. While this may be acceptable when conducting a scientific experiment, it raises serious questions of how a facility that had installed a particulate CEM would deal with these data while proving compliance with a permit limit. Would two different people come up with the same results based on a given data set? How would the public respond to the elimination of a high value outlier on the basis of statistical tests? Regulatory compliance with emission limits is too important a factor for a facility operator as well as the Agency to take lightly. It must be clear beyond the shadow of a doubt what constitutes compliance.

CS3A-005 (5) The Dow Chemical Company (Dow) supports EPA's desire to promote the development of new technologies. We appreciate this opportunity to comment on EPA's progress so far. Three copies of these comments are enclosed. The demonstration project of continuous Particulate and Mercury emissions monitors is a good start in the evaluation of these technologies. However, Dow believes that a full meaningful comprehensive study will take several years to complete. As will be commented on later, it is felt that the current studies are much too narrow and are not representative to the majority of operating conditions on hazardous waste combustors. Dow has worked closely with the Coalition for Responsible Waste Incineration (CRWI), helping to draft its comments on this NODA. We fully agree with all of the comments submitted by CRWI and incorporate CRWI's comments by reference into these Dow comments. Dow comments separately

to emphasize the following matters. In reviewing the reports published by EPA in the Notice of Availability (NODA) on March 21, 1997, Dow has focused on the "Status No I Particulate Matter CEMS Demonstration." The work performed under EPA's direction is an essential part of making continuous emissions monitors for particulate matter available to industry. Only with independent review and unbiased study can an operator be assured that these systems will eventually perform to EPA's standards. These comments do not address the mercury continuous emissions monitoring systems (CEMS) studies, because the EPA has admitted that the technologies employed in their study did not work well enough to be used as a compliance tool. More work and additional commenting clearly are needed before mercury CEMS are required. The demonstration project conducted at the DuPont facility is an excellent step toward instituting these CEMS on a broader basis. However, the initial data has many errors, questionable QA/QC procedures, and was not performed on a stack gas that is representative of the majority of hazardous waste combustors. This demonstration falls short of proving these systems are ready for commercial installation.

CS3A-006 (2) Continental also has serious concerns regarding the availability of both parts and technical assistance for the CEMs tested. All units tested were manufactured in Europe -- none were manufactured in the United States. Lack of spare parts for the units renders the down time estimations suspect. No accounting was made for the time that the units were truly down, and no time was accounted for to receive the parts from Europe that are necessary to repair them. Of further concern are the calibration requirements for the units. Reference was made in the NODA to a specific calibration "dust" which apparently does not exist, nor were the units zeroed and spanned daily as required by the proposal. Each of these renders the data essentially useless in terms of showing that the proposed monitoring requirements can be met.

CS3A-006 (3) Continental Cement Company ("Continental") is a manufacturer of cement located in Hannibal, Missouri. In our cement manufacturing process, Continental uses hazardous waste derived fuels as a replacement for conventional fuels such as coal and natural gas. As such, Continental previously commented at length on the April 19, 1996 notice, and subsequent NODA, regarding the proposed rulemaking for revised standards for the hazardous waste combustion industry. The comments we submit today on the March 21, 1997 NODA continues our efforts to ensure that any final standard is achievable in fact, and that it recognizes the significant differences that exist between the cement manufacturing process and other combustion processes. Continental's general observations after reviewing the March 21, 1997 NODA fall into three categories: 1) it appears EPA operated the particulate matter CEMS in a manner that EPA itself would not approve in practice; 2) our prior comments regarding the fundamental between the various combustion processes have been ignored; and 3) the data EPA presents is suspect or unrealistic.

CS3A-006 (3) IV. Summary. As always, Continental stands ready to assist EPA in crafting a workable and economically sensible combustion rule. The above comments again call EPA to withdraw its April 19 proposal and work with the cement industry to arrive at a proposal designed to recognize the unique characteristics and operating envelopes in which this industry must operate. Please feel free to contact us if you have any question.

CS3A-006 (5) Continental also questions whether the data clearly indicate that the CEMS are better than opacity monitors. We note that the CEMS missed the first 35% of the data. Further, each of the monitors, except the light scattering devices, failed during operation. We request clarification of this

and other data issues in subsequent NODA as these revelations raise doubts as to whether CEMS are clearly more reliable or appropriate than opacity monitors.

CS3A-007 (3) I. Introduction and Background on Safety-Kleen Corp. Safety-Kleen Corp. ("Safety-Kleen) is the largest recycler of industrial and automotive hazardous waste fluids in the United States. We operate 162 branch locations across the United States, as well as 10 recycling centers for consolidating and recycling collected wastes. In addition, our company and operates five fuel blending facilities at cement kilns where we test and blend collected wastes prior to their use as a fuel in cement kilns. Safety-Kleen also owns and operates two used oil re-refining plants. Combustion devices, particularly cement kilns, play a key role in Safety-Kleen's waste management services. Safety-Kleen relies on both kilns and incinerators to safely dispose of wastes that cannot be recycled. Most of the wastes that are not amenable to recycling are sent to cement kilns. The valuable energy recovery benefits from managing wastes in cement kilns results in lower costs for this management choice. Safety-Kleen also relies on incinerators to manage a small percentage of waste, primarily wastes that cannot be sent to cement kilns because of high metal content or low Btu value. Therefore, cement kilns, and to a lesser extent commercial incinerators, are vital components of our business. Our ability to provide affordable and waste management services are dependent on our ability to have access to safe management options for those wastes that cannot be reclaimed and reused. Because these devices are so important to Safety-Kleen, we are directly affected by new regulations affecting cement kilns and incinerators. Safety-Kleen provided extensive comments on EPA's proposed revised standards hazardous waste combustors (61 FR 17358, April 19, 1996) Safety-Kleen is a member of the Cement Kiln Recycling Coalition (CKRC) and supports the more detailed comments CKRC submitted regarding the March 21 notice of data availability (NODA).

CS3A-008 (3)(a) E. I. du Pont de Nemours and Company, Inc. (DuPont) appreciates the opportunity to submit the following comments on EPA's March 21, 1997 Notice of Data Availability for Hazardous Waste Combustors; Continuous Monitoring Systems. The monitoring systems under consideration in association with this notice will have significant impact on DuPont facilities combusting hazardous wastes. DuPont owns and operates a number of hazardous waste burning incinerators, boilers, and furnaces in the U.S. as part of our commitment to safely manage the hazardous wastes that we generate. DuPont has hosted the particulate matter (PM) continuous emissions monitor (CEM) demonstration project at our Experiment al Station site in Wilmington, DE. Once "Status Report IV: Particulate Matter CEMS Demonstration", data February 12, 1997 (PM CEM demonstration report) became publicly available, DuPont engaged other CMA member companies in detailed discussion of the PM CEM demonstration report and this NODA. While DuPont shares the technical concerns expressed by CMA in CMA written comments to EPA in response to this NODA, we continue to be committed to working with EPA toward proven, cost-effective options for demonstrating compliance with emission standards for hazardous waste incinerators. DuPont has concerns about and recommendations to improve the overall framework being used to pursue the PM CEM demonstration project: * Rather than focusing on a formal notice and comment approach to gathering input from the regulated community, DuPont recommends a collaborative technical program wherein EPA, EER, DuPont, selected CMA representatives, and selected CRWI representatives work together to devise, implement, and review PM CEM demonstration testing. - DuPont appreciates the Agency's sharing of interim reports on the demonstration project prior to the public notice of the PM CEM demonstration report; per our initial agreement with EPA, DuPont did not share the report with other companies prior to the report

becoming publicly available. Since mistakes of the sort noted in CMA's and CRWI's comments on the NODA could be found during an industrial technical review step (by a team of CMA and CRWI technical representatives) prior to any formal notice and comment, DuPont supports a technical review by such an industry technical team at earlier stages in the demonstration project. - Inclusion of regulated community perspective in setting up and reviewing the remainder of the Experimental Station test program can more quickly identify opportunities for improvement. Such technical collaboration between government and the chemical industry has led to key successes in remediation technology development.

CS3A-009 (3)(a) Holnam Inc. ("Holnam") is one of North Americas largest manufacturers of cement. Headquartered in Dundee, MI, Holnam operates 13 production plants and over 70 distribution terminals and has one of the largest cement production capacity in the United States at over 11 million tons per year. In 1995, we produced over 9.5 million tons of clinker, the key ingredient in making cement, and accounted for almost 12 percent of the nation's cement production. Three of our cement plants rely on hazardous waste derived fuel: Artesia, MS; Clarksville, MO; and Holly Hill, SC. These plants are currently subject to EPA's BIF regulations and would be subject to the proposed MACT standards. These three kilns used 116,897 tons of hazardous waste (approximately 30 million gallons) as a substitute fuel in 1995. Hence, Holnam is significantly affected by any regulatory changes to the use of waste-derived fuel in cement kilns and other combustion devices. Holnam is a member of the Cement Kiln Recycling Coalition (CKRC) and supports the more detailed comments CKRC submitted regarding the continuous emissions monitoring systems (CEMS) Notice of Data Availability (NODA). We offer these comments in addition to those submitted by CKRC.

CS3A-010 (3) The Cement Kiln Recycling Coalition (CKRC) is a Washington, D.C.-based trade association representing all cement companies engaged in the use of hazardous waste-derived fuels, as well as companies involved in the collection, processing, management, and marketing of such fuels for use in cement kilns. CKRC's cement company members are regulated by state implementation plan rules, the existing CAA new source performance standard (NSPS) for portland cement plants codified at 40 CFR part 60, Subpart F, and RCRA rules for burning hazardous waste-derived fuel in boilers and industrial furnaces (BIF rules) codified at 40 CFR part 266, Subpart H. Cement plants are also identified by EPA as a distinct source category for promulgation of maximum achievable control technology (MACT) standards under CAA §112(d). On March 21, 1997, EPA published a Notice of Data Availability on HWC Continuous Emissions Monitoring Systems (CEMS). As stated in our August 19, 1996 comments and demonstrated by member company participation in both preliminary testing efforts and the current demonstration program, CKRC is supportive of efforts to develop CEMS. In addition, CKRC is supportive of the implementation of these systems to assist in keeping the public apprised of facility operations, provided the CEMS are proven reliable and accurate. EPA has taken the first step toward assessing the capabilities of these systems through the Mercury CEMS demonstration at the Holnam, Holly Hill, SC cement plant and the PM CEMS demonstration at the DuPont, Wilmington, DE experimental incinerator. CKRC is concerned that these one-facility tests are not sufficient to demonstrate the applicability of these systems for mandated commercial installation on all types of HWC. CKRC believes the current PM CEMS demonstration should be broadened to include long-term testing on one or more cement kilns. CKRC believes this addition is an important component of the demonstration process as the vast operational, physical, and particulate

characteristic differences between cement kilns and incinerators prevent the direct transfer of an incinerator PM CEMS demonstration to a cement kiln.

CS3A-010 (3)(a) While additional time would have enabled CKRC to better identify all of its concerns arising from the published NODA, our comments are presented as follows: I. EPA failed to conduct the demonstration test in accordance with the prescribed reference methods, performance specifications, and compliance practices that regulated facilities will be required to follow.

CS3A-010 (3) CONCLUSION CKRC urges the Agency to correct the errors and deficiencies in the current NODA prior to its next NODA publication to ensure the public has an opportunity to adequately comment on the demonstration data collected as part of the DuPont PM CEMS demonstration. Also, CKRC encourages the Agency to consider the numerous issues and suggestions raised in these comments regarding both its testing approach and data handling. CKRC agrees with EPA's assessment that PM CEMS are sensitive to a number of things including moisture and particle characteristics. EPA continues that they "do not know the effects of these changes on the outputs of the CEMS." (62 FR 13781) Based on these realities and the fact that the size, shape, chemistry and optical characteristics of particulate from cement kilns and sodium reagent-based wet scrubbers are different, CKRC believes it is necessary for the Agency to perform similar long-term performance tests at a number of different source types before declaring the general suitability of PM CEMS across all combustors. In the case of cement kilns, CKRC believes that the significant flue gas and particle history differences between long wet, long dry and preheater/precalciner type kilns with ESPs and FFs argue for the need to conduct a demonstration program on at least one cement kiln in order to establish that the PM CEMS technology is indeed reliably transferable. CKRC is supportive of the concept of using continuous emissions monitoring as a compliance and performance assurance tool when appropriate, but is very concerned that the current state of development of the monitoring instrumentation still has not reached the level of accuracy and reliability necessary for EPA to mandate the use of these CEMS at cement kiln facilities. Unfortunately, the demonstrations to date have not relieved CKRC's serious reservations regarding the current capabilities of these instruments. Given the sensitivities discussed in these comments, and the uncertainty that these monitors can provide accurate information under the proposed compliance regime (e.g., What does a facility do when the monitor fails calibration but is apparently working correctly; while replacement monitors, perhaps of a different type, are being purchased; and when exceedances are reported against a manual method based standard?) it is crucial that EPA broaden its demonstration program. CKRC believes it would be inappropriate to require the use of CEMS until the completion of a successful long-term PM CEMS demonstration at a cement kiln. CKRC is willing to assist the Agency in identifying facilities interested in conducting such a test. Also, as suggested in our August 1996 Comments, CKRC urges the Agency to modify its overall CEMS implementation approach by making it more practical. EPA's HWC MACT proposal should provide facilities with the option of using CEMS as an alternative to other required compliance procedures. EPA could allow the installation of a CEM for a trial period, which could assist in demonstrating these devices at differing facilities, and base compliance determinations on current operating parameters, not CEMS output. This trial period could enable the facility to determine the CEM's limitations in order to establish practical compliance parameters. However, in order to make this a workable alternative, EPA must ensure that the option provides interested facilities with real incentives (i.e., cost effectiveness, reduced testing) to install these systems.

CS3A-010 (5) B. Consistent Particulate Characteristics From Cement Kilns Indicate That Opacity Is A Viable Tool For Monitoring Emissions On A Cement Kiln On A Site-Specific Basis. As discussed above, the PM from a cement kiln is not predominantly the ash from combustion, but consists mostly of the finely ground particles of limestone, silica, and other raw materials required to produce cement clinker. However, for other hazardous waste combustors, such as hazardous waste incinerators, the particulate is composed entirely of the finely divided particles of ash left from combustion of the hazardous waste. In order for a cement manufacturing plant to meet ASTM standards for a cement product, a consistent raw meal mix is required. Whether the raw meal is ground for introduction into the kiln as a slurry or added as a dry component, process uniformity and consistency is the goal. As a result, combustion gases carrying particulate emissions to the APCD should represent fairly consistent particulate characteristics. This consistency in particulate characteristics allows for a demonstration of a site-specific relationship between particulate and opacity, indicating that opacity is a viable tool for monitoring particulate emissions at a cement kiln. CKRC urges the Agency to explore this relationship by evaluating an opacity monitor concurrent with the PM CEMS during a long-term demonstration test on a cement kiln.

CS3A-010 (5)(b) At Section 1, page 1 of 11, EPA states that the "stability of any opacity/PM correlation is strongly dependent on particle size distribution and composition." This qualifier is also true of the various particulate CEMS being investigated to varying degrees. Enhanced opacity (optical attenuation) and back-scattering devices are both dependent on the same variables; beta-gages are affected by composition. Consequently, if this is the motivating force for the research, the selected devices are unlikely to provide the answer. At Section 1, page 1 of 11, EPA states that opacity monitors become "insensitive(e)..... typically below PM levels of about 45 mg/dscm (at 7% O2)." So, "opacity monitors would not be sufficient because to maintain compliance with 69 mg/dscm, facilities would generally need to operate near 35 mg/dscm." CKRC believes that this limitation is irrelevant. If the problem is to make sure that a facility is complying with an emissions limitation that is above the sensitivity of the instrument, there is no need to have sensitivity much below that level. In other words, an opacity meter - or a PM CEMS should a facility choose to use it - is capable of demonstrating continuous compliance with the regulatory limit if EPA's assessment of the break-point is correct. At Section 1, page 2 of 11, EPA states that it "desires a quantitative, continuous measure of particulate mass concentrations rather than opacity." The Agency states that light-scattering devices can accomplish this goal. However, CKRC disagrees with this statement. A change in particulate composition that does not affect number count or light scattering properties will produce no change in recorded mass emissions even though the mass has changed due to the difference in particulate material density. At Section 1, page 3 of 11, EPA states that the overall scope of the PM CEMS demonstration included pre-screening measurements for HCl. CKRC has been unable to locate the HCl data the report indicates was taken. It would be relevant to know if the HCl affected any of the devices. In addition, CKRC could only locate one particle size distribution curve for the DuPont facility. EPA should provide the basis for its implicit assumption that this analysis is representative and remained unchanged throughout testing. Inspection of the data in the Appendices indicates that the probe catch was substantially higher during the December testing, leading to the speculation that there was significant carry-over during these tests. Notably, a large number of these manual method tests were invalidated by EPA. Assuming that the contractor did not have an unusual run of bad luck with probe tips touching the port wall, this provides a strong indication that none of the CEMS met stability criteria.

CS3A-011 (2) II. GENERAL REACTIONS CMA supports the goal of demonstrating compliance via accurate, reliable, and cost-effective methods. CMA recognizes that EPA is still in the early phases of evaluating the ability of various monitors to continuously evaluate stack particulate matter (PM) concentration in a hazardous waste Incinerator. In early pilot-scale evaluations such as this, one does not normally expect every aspect of the evaluation to go smoothly or for all results to be successful. Rather, one expects these early evaluations to provide data and experience upon which future tests, refinements and developments can be based. In that regard, CMA believes that the PM pilot study has been successful. While CMA views this study as useful and a necessary part of developing continuous emissions monitors (CEMs), we would be extremely concerned if the Agency chose, based upon limited experience it has gained and the questionable results achieved, now to proceed with a mandate to install these monitors on all hazardous waste combustors. EPA makes the following statement in section 2.11: "Consequently, the apparent acceptability of PM CEMs technologies at this facility (with a deliberate worst-case variety of waste feed streams) offers promise that this acceptability may be extrapolated to many other incinerators in the industry similarly equipped." In public comments, certain Agency personnel seem to draw conclusions which appear to be greatly overstated considering the limited results of the pilot study. CMA is especially puzzled at the statement, also in section 2.11, that "[d]espite this heterogeneity of PM characteristics, most of the CEMs were able to meet the DPS 11 data acceptance criteria with certain outliers deleted." Given the inaccuracies and inconsistencies in the database (discussed below), it is doubtful that EPA can, with any high degree of confidence, make any assessment as to whether or not the monitors meet DPS 11 specifications. Even with 20% of the data deleted (based on RSDS), EPA concludes in section 2.6 that, "[based on the revised CEMs data without the RSD outliers, none of the five PM CEMs produced results able to achieve the DSP 11 initial calibration data acceptance criteria except for the Verewa Tolerance Interval." Results of this pilot study fail to demonstrate that PM CEMs operate acceptably at the one DuPont facility. Any assessment, certainly any "apparent" conclusion, about the extrapolation of these monitors to other combustion units is premature and unfounded. CMA believes that this pilot study has provided valuable experience with PM CEMS. However, we believe that a great deal of work remains before PM CEMs are developed to the point of being ready for commercial use. CMA has, and continues, to suggest that EPA make the use of PM CEMs optional and that it promote the further development of CEMs by providing incentives to the regulated community sufficient to solicit their involvement in such development. EPA should work to develop a simpler, more straight-forward regulatory system for owners and operators who choose to install CEMS. This would not only promote CEM development but would eventually result in benefits to the Agency, regulated community and public.

CS3A-012 (3)(a) The American Cyanamid Company (Cyanamid) hereby submits comments to the Notice of Data Availability (NODA) and Request For Comment on Continuous Emissions Monitoring Systems for Hazardous Waste Combustors published in the March 21, 1997 Federal Register (62 FR 13776). American Cyanamid is a subsidiary of American Home Products Corporation, one of the world's largest research-based pharmaceutical and health care product companies. American Cyanamid manufactures crop protection chemicals for domestic and international use. As an active member of the Chemical Manufacturers Association (CMA), Cyanamid supports and incorporates by reference CMA's comments on this NODA.

CS3A-012 (3)(a) The American Cyanamid Company (Cyanamid) is pleased to submit the following comments to the Notice of Data Availability (NODA) and Request for Comments

Hazardous Waste Combustors: Continuous Emissions Monitoring Systems published in the March 21, 1997 Federal Register (62FR 13775). Cyanamid operates four liquid/fume hazardous waste incinerators at our Hannibal, MO manufacturing plant. The Hannibal Plant manufactures herbicides and insecticides for the worldwide market.

CS3A-012 (3)(d) Based on the enclosed comments, Cyanamid believes that PM CEMs are not yet ready for commercial use as regulatory compliance monitors. The EPA should continue and expand the Testing of these units specifically on incinerators with saturated wet stack emissions. The effectiveness of these units must be adequately demonstrated before these units are required as regulatory compliance monitors. More details on these and other concerns are provided in the attached comments.

American Cyanamid and its parent company, American Home Products Corporation, appreciate the opportunity to comment on the NODA and thank you in advance for giving full consideration to our comments. If you have any questions concerning these comments, please contact either Mr. Michael Fessler (201-683-3272) or myself (201-683-3277).

CS3A-014 (1)(a) Eastman Kodak Company (Kodak) is the primary U.S. manufacturer of photographic films, papers, chemicals, and other imaging products. Along with reuse and recycling, incineration is a part of our waste management strategy. Kodak supports the need for effective regulation of hazardous waste combustion to protect human health and the environment as required by the Resource Conservation and Recover Act (RCRA) and the Clean Air Act (CAA). Because we operate two Hazardous Waste Incinerators (HWIS) that will be affected by this proposed rule, we would like to share our thoughts on the implications of the data in this notice. The goal of using Continuous Emissions Monitoring Systems (CEMS) to provide compliance demonstration is laudable provided the monitors can be shown to be accurate, reliable, and the value of the specific monitoring data justifies the cost of the CEMS. Based on the data in this notice, Kodak believes that particulate matter (PM) CEMS have unacceptably poor accuracy and questionable reliability. We also question the need for mandatory use. Additionally, we are concerned that CEMS performance will be different on different HWCs and the tests at the DuPont facility may not represent the worst case performance. Therefore, we oppose the Proposed mandatory requirement for PM CEMS and propose that the use of the monitors be as a voluntary compliance tool. PM CEMS should only be used for compliance when a specific PM CEMS is shown to be accurate enough when used on a specific process. Should the monitor technology improve and later tests show adequate accuracy and reliability on a range of HWCs, much wider use of PM CEMS could occur. Enclosed are more specific comments on the details in the notice.

CS3A-015 (1) This letter constitutes the comments of Rollins Environmental Services, Inc. on the above referenced notice. Statement of Interest Rollins Environmental Services, Inc. (RES) and its wholly-owned subsidiary companies are a full service company engaged in the treatment and destruction of hazardous and toxic wastes. Our interests are directly affected by the outcome of this regulatory proposal. The comments of RES on this NODA are primarily technical in nature. Downtime: RES has concerns about downtime. Units presently under testing and development do not appear to be well supported in the U.S. This means the availability of parts and service is extremely limited. Therefore, they should not become integral to the permitting and operation of a combustion facility until they are reliable, and readily repairable.

CS6A-003 (1) The goal of using Continuous Emissions Monitoring Systems (CEMS) to provide compliance demonstration is laudable, provided the monitors accurately and reliably measure the emissions of interest. We commend the Agency for making continuing progress in demonstrating the particulate matter (PM) CEMS and for improvements to the proposed compliance demonstration procedure. However, there are a variety of problems with mandatory application of PM CEMS for compliance purposes. Based on the data in this notice, Kodak believes that PM CEMS have questionable accuracy and reliability and have not been demonstrated to be workable for all types of applications. A PM CEMS is an unreliable surrogate for metals emissions, EPA's stated purpose for requiring PM CEMS. This lack of correlation with metals emissions creates major problems with implementation of the site-specific standard. Therefore, Kodak opposes the mandatory requirement for PM CEMS and proposes that the monitors be used as a voluntary compliance tool. PM CEMS should only be used for compliance when a specific PM CEMS is shown to meet PS-11 specifications on a specific process. As the monitor technology improves, much wider adoption of PM CEMS could occur.

CS6A-005 (2)(a) The commercial availability and the maintenance support structure does not exist to support this rule making. The proposed rule does little to demonstrate that CEMS are both commercially available and can meet certain performance standards. On page 67791 of the proposed rule, EPA acknowledges that service agreements/maintenance contracts/spare parts created a situation where an instrument is available 74% of the time. It goes on to state that the market will mature with demand. The rate that markets mature differs by sector, but it does not seem that the demand for an additional 200 instruments (the combined demand of LWAK, cement kilns burning hazardous waste, and the RCRA segment) would be sufficient to drive a rush to create a market niche. If these instruments' installed cost is about $100,000, then the proposed rule would create a $20 million market. Whether this market is of sufficient size to justify creating a service group in America is conjecture. Further, data availability of 74% indicates that the instruments need significant improvement to meet the proposed 95% data availability level. The on-going testing of PM CEMS in a saturated stack is good, but it would seem that EPA would want to evaluate the results of that testing before promulgating this regulation.

CS6A-007 (3) As a member of the Cement Kiln Recycling Coalition (CKRC), Safety-Kleen supports the comments submitted by CKRC describing the various technical concerns associated with the application of particulate matter (PM) continuous emissions monitoring systems (CEMS) to cement kilns. We also support the comments submitted by our cement industry partner, Holnam, Inc. Similar to CKRC's position, Safety-Kleen continues to be concerned about EPA's use of testing from an incinerator as the basis for requiring the use of CEMS for PM monitoring at cement kilns. CKRC's comments on the NODA detail the concerns with transferring the results from an incinerator to a cement kiln as well as concerns regarding the accuracy of the test itself. Safety-Kleen supports CKRC's comments in this area and believes that EPA must conduct adequate testing on a cement kiln before requiring the mandatory, across-the-board use of PM CEMS.

CS6A-008 (1) Also, CWM is concerned whether a PM CEMS exists that can accurately measure PM emissions and achieve the 85% data availability requirements and at the same time provide accurate data at a low PM concentration in a wet stack equipped with fabric filters with demonstrated PM values of 0.0009 gr/dscf corrected to 7% oxygen. (Note the proposed MACT PM standard is 0.015 gr/dscf corrected to 7% oxygen.)

The NODA fails to address the scenario that exists at this facility, as a result, CWM is requesting that PM CEMS not be required until further data is presented that confirms instruments exist in the marketplace that can provide data on a consistent basis (at least greater than 74%) and at the PM concentration levels experienced at this facility.

CS6A-007 (5) Combustion devices, particularly cement kilns, play a key role in Safety-Kleen's waste management services. Safety-Kleen relies on both kilns and incinerators to safely dispose of wastes that cannot be recycled. Most of the wastes that are not amenable to recycling are sent to cement kilns. The valuable energy recovery benefits from managing wastes in cement kilns results in lower costs for this management choice. Safety-Kleen also relies on incinerators to manage a small percentage of waste, primarily wastes that cannot be sent to cement kilns because of high metal content or low Btu value.

CS6A-009 (1) 2. CRWI does not agree with the Agency that PM CEMs are sufficiently developed to be required in this rule. EPA concluded that PM CEMs were sufficiently developed because four of the five units passed parts of PS 11 specifications (correlation coefficient, confidence interval, and tolerance interval). CRWI has concerns with the methods of analyzing the data. EPA chose not to use data from September, October, and November due to problems in development of Method 5i. Omitting these data cannot be justified based on RSD differences because these groups had about the same number of RSD outliers as did other groups, which were retained. In fact, EPA did not consider discarding this data until it was plotted against the CEM readings and the scatter of the data pointed out problems. This appears to be an arbitrary decision based on data scatter. EPA also chose to discard Runs 62-73 for the Durag monitor because the unit did not give consistent answers. However, when these data are included in the calibration curves, the graphs show little differences in shape or scatter as compared to the other light scattering units for this time period. In addition, CRWI does not believe there is a sound technical basis for the two calibration periods that were chosen. Preliminary analysis by CRWI has indicated that if the requirements in PS 11 as drafted are followed, fewer of these instruments will pass the requirements. More details on these analyses are included in the specific comments.

CS6A-011 (1) CKRC is particularly concerned because the Agency itself indicates that there will be more data availability problems for cement kilns. Thus, the 95% requirement is clearly unacceptable and should not be established prior to the acquisition of adequate data from PM CEMS demonstrations on cement kilns.

Also, while the Agency may feel confident that US-based technicians (and presumably repair parts) will become widely available after promulgation of this rule, CKRC is aware that even for facilities built in the U.S. using European technology with contractual obligations to establish U.S. sourcing, this did not occur. For example, three L&C Steinmuller (German) and two Seigers (Belgium) waste-to-energy plants have no U.S. source of supply or service support despite contractual obligations on the part of the suppliers to provide the services. Consequently, CKRC is concerned that the Agency's assumption of improved response time may be unsubstantiated.

CS6A-011 (1)(a) II. In the April 1996 HWC MACT Proposed Rule, EPA proposed to require the use of CEMs for compliance with the HWC Hg and PM standards. (61 FR 17426 and 17435)

However, in order to require CEMS for compliance, the Agency, among other things, must determine that the CEMS…have been demonstrated to meet certain performance specifications." (62 FR 67789) CKRC believes the Agency has not adequately fulfilled this requirement. Thus, it is premature for the Agency to conclude that PM CEMS can be used to monitor compliance at all HWCs (62 FR 67793).

CS6A-020-021 (1) The USEPA has wrongly determined that PM CEMs are commercially available because it used flawed procedures that have not been subject to public comment. First, the EPA demonstration was done on a small incinerator which has completely different combustion gas characteristics and situations than a cement kiln which produces a product. Second, the PM CEMs tested did not pass the flawed criteria established by the EPA to evaluate the PM CEMs (PS-11, Procedure 2, and Method 5i). This is clearly demonstrated in the comments and attachments submitted by the APCA and the Cement Kiln Recycling Coalition (CKRC). It is unfair and unethical to require cement kilns and other HWC's to install PM CEMs when the instrumentation cannot even pass the flawed specifications and procedures used by the EPA to evaluate the performance of these CEMs. Essroc is not criticizing the EPA for the development of the methods and procedures (PS-11, Procedure 2, and Method 5i), but believes that the EPA is wrong to use flawed procedures which have failed to undergo public comment to determine that the tested PM CEMs can accurately measure mass particulate emissions and are commercially available. The process of public comment was created so that both the regulators and the regulated community can have input into the rules, regulations, methods, and procedures. The EPA cannot use these methods and procedures to evaluate the performance of PM CEMs until the methods and procedures go through the public comment period and the flaws corrected. Once corrected, these procedures can be used to evaluate the performance and achievability of PM CEMs tested on each subcategory of HWC.

Furthermore, the EPA must be as rigorous in the evaluation of its new procedures as it is with methods and procedures submitted by the regulated community. I can make this comparison because I was personally involved with the APCA development of FTIR and GFC/IR methods to analyze cement kiln combustion gases for HCl and organic HAPs. The EPA did a rigorous evaluation of the procedures and was very strict in its approval of these procedures. It is clear that this is not the case with the PM CEM procedures. Until these new procedures go through the public comment period and proper peer review, they should not and in fact, cannot be used to demonstrate achievability of PM CEMS.

CS6A-021(1)(b) Essroc concludes that while we would like to support the concept of PM CEMs and appreciate their usefulness, we are not convinced, based on EPA's test results, that such suitable units are reliable or commercially available. Consequently, Essroc is of the opinion that further demonstration testing and methods improvement is required before the EPA can conclude that PM CEMs meeting the performance criteria are sufficiently reliable and commercially available for cement kilns.

CS6A-021 (5) EPA should continue to require the use of Continuous Opacity Monitoring Systems at both HWC and portland cement kilns for compliance assurance purposes .... Essroc believes COMs have been proven effective at cement kilns and, in fact, may be more appropriate devices than light-scattering PM CEMs for demonstrating compliance with PM emissions standards. Numerous facilities have successfully correlated PM emissions with opacity measurements by COMs EPA

should consider abandoning its unsupported attempt to transfer HWI test results to cement kilns and, alternatively, require that cement kilns install COMs with sensitive optical systems and data management systems which accommodate the full range of signals. This would be a less expensive and more effective approach to the Agency's apparent objective of ensuring continuous monitoring of PM emissions in HWC cement kilns.

CS6A-022 (5)(a) Merck agrees that CEMS can be a valuable tool to ensure compliance with emission standards. We suggest, however, that since PM CEMS technology is a relatively new application as compared to other CEMS technology (e.g., opacity, CO, O_2, CO_2 ,SO_2, NO_x, HCl)...

CS6A-022 (5)(d) There is no environmental benefit to the establishment of unachievable CEMS performance specifications, however, the cost in resources and public perception problems can be significant to the regulated industry.

CS6A-030 (2) The proposed rule does little to demonstrate that CEMS are both commercially available and can meet certain performance standards. On page 67791 of the proposed rule, EPA acknowledges that service agreements/maintenance contracts/spare parts created a situation where an instrument was available 74% of the time. It goes on to state that the market will mature with demand. The rate that markets mature differs by sector, but it does not seem that the demand for an additional 200 instruments (the combined demand of lightweight aggregate kilns (LWAKs), cement kilns burning hazardous waste, and the RCRA segment) would be sufficient to drive a rush to create a market niche. If these instruments installed cost is about $100,000, then EPA will create a $20 million market. Whether this market is of sufficient size to justify creating a service group in America is conjecture. Further, data availability of 74% does indicate that the instruments need significant improvement to meet the proposed 95% data availability level proposed. DOE supports EPA's on-going testing of PM CEMS in a saturated stack and believes additional insight and refinement of PM CEMS may result; however, it would seem that EPA would want to fully evaluate the results of that testing before promulgating this regulation.

<u>Summary to Issue 1a</u>

Commenters said EPA should not promulgate a particulate matter CEMS requirement because:

- Particulate matter CEMS are relatively new, unproven, and neither industry nor EPA has considerable experience with particulate matter CEMS;
- EPA lacks the technical or legal basis to require them;
- CEMS should not be required because Continental cement insulates their CKD from select ESP compartments which contain larger particles with reduced alkali salt and metal concentration;
- Particulate matter CEMS cannot be "plugged in" like gaseous CEMS;
- Early studies showed particulate matter CEMS do not indicate good performance;

- The proposed Performance Specification 11 will not result in valuable compliance data since the confidence and tolerance intervals are too broad and correlation stability is unknown;
- Particulate matter CEMS only provide an indirect measure of mass;
- Particulate matter CEMS serve only as a "policing" function;
- Opacity monitors should be required instead, since they are acceptable at particulate matter concentrations greater than 20 mg/m^3;
- Particulate matter does not correlate well to metals emissions;
- Requiring particulate matter CEMS and metals controls are redundant;
- 30% of all facilities (of "all kilns") meet the proposed emissions standards;
- Particulate matter CEMS have not been proven successful in the US against US standards;
- TÜV's correlation data is generally not public information;
- Particulate matter CEMS are not cost effective, costs have not been justified;
- Particulate matter CEMS will not be accurate at low particulate matter concentrations;
- Spare parts and US-based trained technicians were not available for EPA's demonstration tests;
- The March 1997 NODA does not support a particulate matter CEMS requirement;
- None of the CEMS EPA tested were manufactured in the US;
- Beta-gage CEMS had low data availability;
- Much of the early particulate matter CEMS demonstration test data is suspect;
- Particulate matter CEMS do not meet performance specifications;
- Particulate matter CEMS provide no environmental benefit; and
- The process was flawed and unspecified aspects of the demonstration program failed to undergo public comment.

Some commenters supported requiring particulate matter CEMS because:

- They have been used in Europe for 20 years and at least six US vendors exist;
- Particulate matter CEMS are the cornerstone of the particulate matter standard;

- There are a number of different technologies available, costing in the range of $13,000 to $57,000; and

- Opacity monitors can be correlated to mass emissions and used as particulate matter CEMS.

Commenters also provided comments specific to various types of devices (other incinerators, cement kilns, light-weight aggregate kilns) as well as other summary and introductory comments.

Response to Issue 1a

EPA recognizes the various concerns and will take these issues into account when it promulgates a particulate matter requirement. Relative to specific issues addressed by commenters:

- EPA has completed its demonstration of particulate matter CEMS at a facility believed to be a reasonable worst case relative to the acceptance criteria EPA will establish.

- We believe we have extensive experience with particulate matter CEMS and have the legal basis to require them.

- We do not agree that insulating CKD from select ESP compartments has any bearing on whether particulate matter CEMS should or should not be required for all HWCs.

- We agree that particulate matter CEMS cannot be "plugged in" like gaseous CEMS, but do not agree that this is or can be a basis for not requiring them.

- See issue 12c of this section of this volume of the Response to Comments document for a full response regarding EPA tests prior to the demonstration test we performed.

- We agree that particulate matter CEMS do not make a direct measurement of particulate matter concentration in the stack, but believe this issue is not relevant.

- Particulate matter CEMS will serve as only "policing" function if the facility fails to use this information to control emissions, thereby preventing an exceedance from occurring in the first place.

- We agree the opacity monitors should be required at cement kilns. Note, though, that a particulate matter CEMS requirement will be forthcoming, so cement kilns are advised to purchase state-of-the-art opacity monitors (similar to 'extinction monitors" used in Europe) so the transition from opacity to particulate matter CEMS can be done without purchasing new hardware. We do not believe opacity monitors should be required at incinerators, largely because emissions are lower than the sensitivity range of these instruments. We do not believe opacity monitors should be used at LWAKS, largely because no LWAK currently has an opacity monitor installed.

- EPA believes that particulate matter, along with feed controls, is necessary to ensure compliance with metals (and possibly the D/F) standard(s).

- We do not agree that the fact that some percentage of facilities already meets a standard through periodic testing has any bearing on whether they can meet that same manual methods-based standard all the time with a CEMS.

- We will embark on additional testing efforts to obtain data from a kiln and incinerator to determine what particulate matter concentration is continuously achievable using a CEMS.

- As discussed in the preamble to the proposed rule, we agree that TÜV reports are not public information.

- A response to cost issues can be found in issue 8 of this volume of the Response to Comments document.

- Particulate matter CEMS are accurate at low emissions concentrations. Method 5i greatly improves manual method measurements at low particulate matter concentrations, and thereby also improves correlation at low particulate matter concentrations.

- We agree that spare parts and US-based service technicians were an issue during the particulate matter CEMS Demonstration Test.

- A response to issues related to the March 1997 NODA can be found in issue 11i of this section of this volume of the Response to Comments document.

- One particulate matter CEMS tested at during the particulate matter CEMS Demonstration Test was manufactured in Knoxville, Tennessee. All the CEMS were supported by an US-based vendor.

- We agree that beta-gage CEMS had lower data availability than light-scattering CEMS.

- A response to issues related to EPA's preliminary particulate matter CEMS tests can be found in issue 12c of this section of this volume of the Response to Comments document.

- EPA does not understand how a particulate matter CEMS cannot meet performance specifications when the data acceptance criteria are based on the results obtained.

- We believe particulate matter CEMS provide an environmental benefit because they are a measure of particulate matter at all times.

- We are unable to comment on the unsubstantiated charges that the particulate matter CEMS demonstration was flawed. We believe the whole particulate matter CEMS Demonstration Test had considerable public input.

- We agree that particulate matter CEMS have been used in Europe for nearly 30 years and many vendors exist.

- The prices that commenters state for particulate matter CEMS is with the range of purchase

prices EPA believes particulate matter CEMS will cost.

- We agree that "extinction" type opacity monitors can be used as particulate matter CEMS at facilities with reasonable high emissions.

Comments specific to certain devices are addressed in issue 1f of this section of this volume of the Response to Comments document. Comments which are summary or introductory in nature are addressed in the section of this response to comments document dealing with that specific issue.

b. PM CEMS Should Be Optional

Comments

CEM5.001(083) The EPA invited comments on allowing small on-site sources to obtain a waiver from the requirement of installing PM CEMS. We feel that the alternatives to a CEMS that are described in the proposed rule are actually more likely to ensure that you do not exceed prescribed emissions limits that CEMS. It is our opinion that CEMS really only monitor and document the emission exceedance, but do nothing to keep it from happening. Therefore, we support the concept of using operating limits in lieu of requiring CEMS for small on-site sources

CEM5.008(e-f) PM CEM should also be optional, like SVM and LVM; and at this point, PM CEMs are not reliable enough for routine plant applications. EPA and DOE are currently conducting demonstration projects with respect to PM CEMS. We urge EPA to carefully consider the results of these performance demonstrations, when they become available. We urge EPA to consider not only the accuracy of these CEMS, but also the reliability and on-stream time. We request that EPA share with industry the detailed results of their extended demonstration tests. We also urge EPA to set the performance specifications for these CEMs in a phased manner to allow time for operators to debug and break-in these CEMs and to integrate them with their process control logic systems.

CEM5.009(106)(a-b) EPA is currently conducting a demonstration project with respect to PM CEMs (17435/i). ENSCO urges EPA to consider not only the accuracy of these CEMS, but also the reliability and on stream time. We request that EPA share with industry the results of their extended demonstration tests in great detail, including allowing industry to review the actual data logger printouts, the maintenance and servicing records, and the on-stream time data.

At this point, ENSCO must conclude that PM CEMs are not currently satisfactory for routine plant applications. This conclusion will be reconsidered based on the results of the EPA upcoming performance demonstrations. Until these units are fully demonstrated, the use of PM CEMs must be made optional.

CEM5.017(114)(f) 1. PM monitors may not work in all circumstances. EPA should develop alternative compliance methods where certain CEM's will not work. CRWI suggests that EPA allow the use of appropriate operating parameters when CEM's are not a viable option.

CEM5.068(180) Proposed continuous emission monitoring requirements should be replaced with incentives for the use of CEMs. 1. EPA should not require particulate or mercury CEMs for HWIs

in this rule. EPA has proposed to require the use of a continuous emission monitor (CEM) for demonstrating compliance with the emission standard for particulate. DuPont is working with EPA supplying a host HWI for demonstrating particulate CEM technology under realistic U.S. conditions. Discussions with European air pollution control equipment tell us that it took years for such CEMs to be properly customized to European incinerators. We expect it will take several months or longer to demonstrate and prove out particulate CEMs for use by U.S. HWIs. EPA should let this demonstration program run its course before including any requirements for such CEMs in the rule. DuPont proposes that the use of particulate CEMs be optional.

CEM1.087(205) TCC further suggests that sites be given flexibility to opt out of CEMs (such as low ash streams opting out of PM CEM), if a site can prove its waste stream is consistent - and provides little or no constituents of concern to be transformed into emissions. Also, sites with constituents of concern should be able to either select CEMs as an option, or to do periodic confirmatory testing (perhaps at a frequency more often than others with CEMS). We believe the permit writer at the state should be able to make the necessary determinations about the CEMS, AWFCOS, testing frequency, etc. based on the unit, its performance, compliance history, etc.

CS3A-005 (4) III. Potential Solutions Some of Dow's recommendations are integrated into the text above. In order to properly address these recommendations, Dow suggests that EPA delay the mandate for particulate CEMS and make their use voluntary, at least for the time being. EPA could reconsider any CEM decision, based on additional data, during phase H of the rule making. EPA should devise a list of incentives for facilities to voluntarily install this equipment. Some examples are: - Relief from testing for any parameter measured by a CEM (do RATA only). - Relief from all process parameter permit limits that are linked to the pollutant measured by the CEM. - No regulatory oversight on waste analysis if compliance is consistently demonstrated by CEM. - Only a national PM standard limit (no site-specific limit). - Higher emission limit with use of the CEM to include uncertainty of CEM. In doing so, industry and EPA would gain the real life experience necessary to evaluate the true state of the art of this technology. Alternatively, EPA could redirect some of the funding available for the DuPont study to install a number of particulate CEMS at different facilities to broaden the scope of the study and seek answers to the questions raised by the study to date.

CS6A-003 (4) Kodak supports EPA's proposal to make mercury, chlorine/hydrogen chloride and multi-metals CEMS optional, but not mandatory. We believe the same approach should be used with PM CEMS. To encourage maximum applicability, the definition of PM and metals CEMS should not be so narrow that it excludes the use of continuous samplers with later analysis in the laboratory. Continuous samplers are ready for use for both PM and metal emissions and have adequate turn around time to meet the necessary averaging times....The demonstration data indicates these units are not reliable or accurate enough for use in most applications. Allowing their optional use will encourage future development and use.

CS6A-007 (4) If EPA does not propose CEMS as an optional monitoring method, it must allow facilities a sufficient period to test the CEMS and develop appropriate site-specific approaches for operating the system. EPA’s own testing demonstrates the need for such a site-specific approach in establishing appropriate calibration of the system: “...since the instrument response is dependent on PM characteristics, a site-specific calibration is generally required to ensure or adjust instrument

response. The same type of site-specific approach must also be taken when developing requirements for other aspects of implementation and use of CEMS.

CS6A-008 (4) CMA strongly urges EPA to publish the final rule without delay. Rather than requiring CEMS, the final rule should establish a manual standard and also offer incentives for sources to install CEMS voluntarily. CMA would be happy to meet with the Agency to discuss what those incentives could be. EPA should then conduct (or observe) additional PM CEM demonstration projects for another year, and publish that data for comment. As noted earlier, CMA is already supporting one such project. If the projects indicate that PM CEMS are broadly workable, the Agency should then propose a national CEMS-based PM standard. (Our reasons for supporting a national standard are discussed in Part II.A of these comments, below.) This standard could conceivably still become effective within a year of the compliance date.

CS6A-012 (4) MIP members encourage the Agency to either: (1) reconsider its proposal and not finalize the inclusion of PM CEMs in the MACT hazardous waste combustion rule (scheduled to be promulgated in December 1998), until the Agency collect sufficient data and has an adequate record or (2) make the use of PM CEMs optional, allowing the combustion facility owner/operator to decide whether or not it makes sense for them to monitor PM using a CEM. Of course, if a PM CEM is not selected, the combustion facility owner/operator would be required to demonstrate compliance with PM using surrogate operating parameters established during the performance test.

CS6A-022 (5)(e) Therefore, we suggest that PM CEMS be offered as a compliance alternative until the effectiveness of the technology has been adequately evaluated.

<u>Comment Summary to Issue 1b</u>

Commenters requested that EPA consider the use of CEMS as an optional requirement. Other comments contained here include:

- Particulate matter CEMS should be waived for small, on-site incinerators;
- Particulate matter CEMS should be optional since their reliability is suspect;
- Data availability and a phase-in period should be considered;
- Hg and MM CEMS are not commercially available;
- Compliance alternatives should be considered for situations where particulate matter CEMS do not work;
- EPA should wait until the outcome of its demonstration tests before making particulate matter CEMS a requirement;
- Particulate matter CEMS are unwarranted because metals and D/F standards are already too low;
- Comments related to CEMS incentives; and
- Continuous samplers should be allowed.

<u>Response to Issue 1b</u>

Particulate matter CEMS will be optional, until EPA promulgates the requirement to use them:

- Whether particulate matter CEMS are waived for small, on-site sources has yet to be determined.
- We believe particulate matter CEMS have good reliability.
- We agree that data availability and a shakedown period will be necessary prior to a facility using a particulate matter CEMS for compliance.
- Hg and MM CEMS are addressed in sections 2.1 and 3.1, respectively, of this Response to Comments document.
- We agree that a facility should have alternatives in situations where the prescribed compliance regime does not work, but believe most of the problems associated with particulate matter CEMS involve purchasing an appropriate system (given the range of emissions and particulars of the flue gas) and making highly accurate manual method measurements.
- We agree that we should wait until the demonstration test is completed before we should require them.
- Particulate matter CEMS are used to assure compliance with a particulate matter standard, not metals or dioxin standards. A response to why we have particulate matter standards is provided in Volume I of this Response to Comments document.
- CEMS incentives and continuous samplers are dealt with in sections 1.4 and 3.2, respectively, of this volume of the Response to Comments document.

c. *Any Particulate Matter CEMS Requirement Should be Deferred*

Comment

CEM1.027(127)(c) Given that numerous questions remain concerning practical implementation of the proposed PM CEMS requirement, Ciba recommends that EPA either 1) modify its terms for application of CEMS so as to better reflect European CEMS practices as described above, or 2) defer implementation of the CEMS requirement beyond the three-year schedule for implementation of the MACT standards themselves (so that sufficient time is allowed to develop workable performance specifications more consistent with the conventional U.S. enforcement framework).

Response

EPA has deferred the installation and use of particulate matter CEMS until it gathers additional data in order to determine what particulate matter standard can be continuously achieved at MACT sources.

d. *Mobile Incinerator and Short Life Span Exemptions*

Comment

CEM5.023(124) 3. EPA offers no exclusions from PM CEMS for off gas systems equipped with High Efficiency Particulate Air (HEPA) filtration even though HEPAs are recognized as MACT for PM control. DOE facilities routinely use HEPA filters to control radionuclides. These HEPA filters achieve over a 99.97% removal efficiency at .3 microns for particulate. Therefore, DOE believes that the requirement to use CEMS to measure PM to the level proposed in the rule is unnecessary under the DOE approach which achieves much more stringent particulate removal levels than the proposed

MACT rule would require.

CS6A-005 (2) For facilities with very low particulate emissions, a 0-30% test is in the noise band of the instrument. The prospect of purposefully increasing particulate emissions is not good public policy for mixed waste facilities, yet that is the best way to stay out of the noise band of the instrument. EPA should consider exempting facilities from the PM CEMS if they meet the standard. Should EPA choose to make an incentive for facilities to install a CEM, then some operating parameters should be abolished. Regardless, there is still engineering concern that the PM CEMS cannot measure consistently low particulate emissions.

CS6A-016 (2) Our facilities feed streams contain liquid overheads from on-site processes. The latest trial burn for our incinerators verified an efficiency of 99.99% destruction of the hazardous organic content while meeting the standard's specified CO and HC limits. These streams in the incinerators contain only liquid organics with no HAP metals or chlorides as shown from our facility's last trial burn. Facilities with well-defined and consistent non-solid waste streams should only require periodic monitoring of the feed streams pursuant to a site specific waste analysis plan. We believe that if the facility can show, with process knowledge and engineering judgment, that for feeds which contain no metals the PM standard should be 0.06 gr/dscm and allow an exemption to PM monitoring.

CS6A-016 (2) The EPA did not address sites with no APCDs. As stated above, EPA does not address sites with no APCDs. The EPA's comments focus on using PM CEMs to indicate how well the APCD is working. The conclusion indicates that all streams release PM-containing HAPs and require APCD. Our sites maintain the RCRA limits with no APCDs. We also do not have any carbon injection systems that would facilitate absorption of any quantity of D/F or mercury (Hg). A site may use the hierarchy of Pollution Prevention by controlling HAP emissions by not burning these constituents in the first place. These facilities already control these emissions without the use of an APCD and with knowledge of their organic streams. The EPA should not require the use of PM CEMs for these sites.

CS6A-016 (2) BP Chemicals further processes these overhead streams to produce co-products. These streams are also sometimes fed intermittently to the incinerators. In section IV G, the EPA proposed waivers to sites with short life-spans. The regulation should also address other sources that do not continuously burn wastes. A facility may normally separate and purify these certain streams, but due to market conditions and the business environment combined with fuel usage and costs, they may choose or need to divert them to incinerators. A facility may also have a stream that during emergency conditions may need to re-route it to a control device. Such processes may not be able to generate enough data to perform the performance certification described for PM CEMS. For example, EPA proposes basing the PM CEMS operating parameter limit of "CEMS recordings during the nine months after the Compliance Date." Intermittent operators may not burn hazardous waste for nine months; or they may not be able to sustain "normal" or performance test hazardous waste feed rates for nine months. These facilities would not have enough CEMs data to develop a PM CEMs limit which would correlate to the manual method.

CS6A-022 (2) A waiver from the PM CEMS requirement for small and short-life span sources is appropriate since, in both cases, the cost of installation and operation of a PM CEMS is excessive

and impractical.

CS6A-024 (2) Finally, the Illinois EPA supports U.S. EPA's proposal regarding exemptions from the PM CEMS requirement for mobile sources, small on-site incinerators, and short life-span incinerators.

CS6A-025 (2) For mobile HWCs, EPA could allow calibration and OPL limits to be used at different clean-up sites, and not require new calibration and OPL limit development whenever the HWC is moved. It is likely that the mobile unit will be used for similar waste from site-to-site, and a 3 run particulate test with particle sizing can be conducted to verify that the physical nature and quantities of the particulate emissions are the same. In the case of mobile units, EPA is not justified in waiving PM CEM requirements, given that these units are expected to operate for several years, moving from site-to-site.

CS6A-025 (2) The ETC is opposed to waivers from the PM CEM monitoring requirements for small on-site units or for sources with short life spans. Emissions from these units present potential risk to human health and the environment, and there is no basis in the Clean Air Act to exempt sources operating for short durations from MACT compliance. In fact, as EPA found in the proposed MACT rule, the relatively larger number of small sources can contribute greater aggregate emissions and risks than the lower number of other sources. The ETC suggests two alternative approaches for these units:

A waiver for small units is unnecessary because EPA intends to exempt units that burn hazardous waste meeting the "comparable fuel exclusion". Such wastes containing low ash, metals and chlorine content, and high heat content, are not likely to emit significant quantities of PM emissions.

Instead of a total waiver for HWCs operating for short duration, EPA could simplify the PM CEM OPL development requirements. For example, EPA could require that only one period of normal PM CEM data be collected for a shorter period of 6 months. This shorter period of data used to develop the OPL is justified given that the unit will not be operating beyond a set period, such as 3 years.

For mobile HWCs, EPA could allow calibration and OPL limits to be used at different clean-up sites, and not require new calibration and OPL limit development whenever the HWC is moved. It is likely that the mobile unit will be used for similar waste from site-to-site, and a 3 run particulate test with particle sizing can be conducted to verify that the physical nature and quantities of the particulate emissions are the same. In the case of mobile units, EPA is not justified in waiving PM CEM requirements, given that these units are expected to operate for several years, moving from site-to-site.

CS6A-029 (2) EPA has proposed waiving CEMS requirements for small on-site incinerators and various sources with short life spans such as weapons incinerators. Such waivers would be inappropriate and, in the case of any incinerator that is a major source, illegal.

EPA's only explanation for this proposed waiver for small units is that they emit less and are better able to analyze their feedstreams. Neither of these reasons supports a waiver. All units, must be

required to analyze their feedstreams well enough to know exactly what they are burning at any given time, and must be required to make this information public. Feedrate analysis is not sufficient, however, to show compliance with emission standards, so small incinerators' relative ease in feedrate analysis cannot substitute for effective emissions monitoring.

That small units individually emit less than large ones are also irrelevant here. EPA has recognized that small incinerators pose a serious health threat. Given this threat, EPA must, at a minimum, do everything possible to ensure that small incinerators comply with emission standards, and this necessarily requires the use of CEMS.

EPA's explanation for its proposed waiver for HWC with short life spans is that it does not seem practical to mandate that these facilities use PM CEMS if they will be in service for less than or slightly longer than the implementation schedule...11

Finally, to the extent that any of the short life span incinerators are also major sources, EPA must comply with section 114 of the Clean Air Act and require "enhanced monitoring" that will enable such sources to know their compliance status at all times, and to report each deviation from emission standards. To meet this requirement, all sources, including short life span sources will need to use CEMS wherever possible.

CS6A-030 (2) To provide maximum flexibility, EPA should allow the owner/operator of small on-site incinerators and radioactive mixed waste incinerators to have the option to use the waiver (use existing operating parameters) or use the PM CEMS to document compliance with the PM, SVM, and LVM standards. The CEMS calibration requirements as proposed could be prohibitively expensive and not cost beneficial for HEPA filtered radioactive systems in HWCs that burn highly varying waste streams yet emit PM at levels far below the proposed MACT PM standard.

IV.G.2. PM CEMS Waiver for Sources With Short Life-Spans: EPA is considering a waiver of the PM CEMS requirement for HWCs operating under a legally binding agreement [such as a Record of Decision (ROD) or Compliance Order] that ensures the source will stop burning hazardous waste within three years of the Compliance Date.

EPA could likewise grant a waiver from the PM CEMS requirement for facilities with short life-spans that lack the legally binding agreement discussed above. However, EPA is concerned that without a legally binding agreement to cease operations, the Agency lacks certainty that operations will cease by a prescribed date. For this reason, EPA would consider a waiver for other facilities that plan to cease operations within the first year of compliance with the HWC regulations, that is, prior to the need to use PM CEMS as the operating parameter for PM control. Facilities that operate after the first year would need to have PM CEMS installed and calibrated, meet data availability requirements, determine the PM CEMS operating parameter limit, and use the PM CEMS as the primary operating parameter for PM control. (62 FR 67803, col. 1-2)

The Department agrees with the proposed approach EPA is considering, which would allow EPA to waive the PM CEMS requirement for (1) HWCs that under a legally binding agreement will stop burning hazardous waste within three years of the Compliance Date, and (2) HWCs that have short life-spans that lack the legally binding agreement. Further, DOE appreciates the cost/benefit

considerations that have gone into formulating this approach. A closure plan and schedule submitted to and approved by the regulatory agency should also be sufficient documentation of the intent to close a facility in the interim between the compliance date and the three-year limit.

CS6A-030 (2) When the actual PM emissions are much lower than the standard, for example 1/10 to 1/20 of the standard, requiring a facility to perform calibration tests in the much higher vicinity of the standard is unwarranted, particularly when the calibration would result in unnecessarily excessive emissions. Any unnecessary increase in radioactive PM emissions is of particular concern for DOE s radioactive mixed-waste incinerators. Therefore, the wording in Section 6.1.1.2 should be retained. However, EPA should also reconsider whether mixed waste HWCs that use HEPA filters for PM control could be granted a waiver from the PM CEMS requirements if they have PM radioactivity monitors or other regulatory agency-approved operating parameter indicators already in place that can provide an acceptable indicator of HEPA functionality.

CS6A-030 (2) DOE is concerned that EPA has not proposed thresholds or ranges that constitute criterion such as (1) the amount of variability within a HWC feed that it believes would lead to unnecessarily burdensome calibration requirements, and (2) the number of unique calibrations it considers to be unnecessarily burdensome. Depending on the criteria used, the concern cited by EPA for mobile incinerators at Superfund sites could be the same or perhaps even greater for DOE s mixed waste incinerators (or other incinerators) that receive highly variable feed on an hourly or daily basis. This problem is further compounded for such incinerators with oxides of nitrogen (NOx) abatement that use ammonia (NH3) as a reducing agent for NOx, especially when the incinerator is fed in a batch mode with highly variable feed. Specifically, highly variable concentrations of ammonium nitrate (NH4NO3) particulate are formed in the offgas, exacerbating the problematic PM variability due to variable feed and batch mode feeding. The latter problem may be especially significant for DOE's New Waste Calcining Facility (NWCF), where such NOx reduction is being considered.

Variability of the waste stream, however, may not be the best reason to exclude mobile incinerators. Commercial incinerators experience a broad array of differing waste streams. Conversely, the argument that an incinerator exists for cleanup could be broadened to include the DOE and Department of Defense (DoD) facilities. Each exists for a specified duration and for the mission of incinerating waste that is legacy waste. The incinerators have a publicized time- certain life that is tied to the cleanup of specified government sites. DOE requests that EPA consider expanding the mobile incinerator argument to include incinerators that are dedicated to remediation/cleanup of Superfund-like waste.

<u>Summary</u>

Commenters support the exemption for the requirement of PM CEMS at small and mobile incinerators.

Some support the idea of an exemption for facilities with short life-spans. One commenter also said sources that do not burn waste all the time need exemptions too.

Some commenters also wanted the exemption to be extended to mixed waste incinerators that use

HEPA filters, sources with emissions lower than the standard, and sources with low ash in the feed. Commenters also requested guidance for sources that do not use an air pollution control device.

Response

EPA continues to believe there is no sense requiring facilities that operate for short periods of time, or those that operate for short periods at a given site, to install CEMS. This includes mobile incinerators and facilities with short life-spans.

EPA believes facilities with HEPA filters should have a particulate matter CEMS requirement. The type of particulate matter APCD does not appear to be relevant. We also believe all facilities should use CEMS--even if the facility believes their emissions are lower than the standard or believe they have low ash in the feed. (How does one know they are always in compliance unless they install the CEMS and demonstrate this fact?)

EPA will provide guidance on using CEMS, including situations in which a facility has no particulate matter APCD and when a new correlation is required.

e. Soot Blowing–Waste Heat Boilers

Comments

CS6A-005 (1) The request for comment should be expanded beyond incinerators with Waste Heat Boilers. Most APCD systems have a "cleaning phase" design: for a baghouse, the frequency of pulsing for knocking cake off the fabric filter; for WESP and IWS, the wash down of the plates or rods; and for wet scrubbers, the frequency of adding fresh water to replace evaporative losses, etc. Is there reason to believe that soot-blowing is more deleterious than any of the other PM-creating activities listed above? EPA should justify that soot-blowing creates far more particulate emissions than baghouse pulsing, etc.

CS6A-006 (1) Impact of Soot Blowing: In the NODA, EPA requests comments on the problems that soot-blowing may cause in calibrating continuous PM monitors installed on incinerators equipped with waste heat boilers (WHBs). If RMB's knowledge of electric utility boilers is transferable to WHBs, then it would be fair to say that EPA's request for comments on soot-blowing is an oversimplification of a complicated topic. First, boilers utilize different types of blowers depending upon the heat transfer surface to be cleaned. For example, there are wall blowers, blowers in the convective section (i.e, superheat) of the furnace, and blowers in the economizer and air pre-heater. These blowers are physically different, depending on where they are located and the surface to be cleaned. Soot-blowers have different cycle times depending on a host of variables, including where the blower is located, the type of fuel, ash characteristics, etc.

Therefore, soot-blowing will have varied and possibly unquantifiable effects on continuous PM monitor calibrations. The overall effect will depend on the blower being operated at any given time and the characteristics (e.g., size, shape, and color) of the ash deposits being dislodged. The issue of soot-blowing cannot be addressed adequately by simply requiring soot-blowing during PM monitor calibrations.

CS6A-008 (1). EPA requested information on incinerators that are equipped with waste heat boilers (WHBs). A summary of CMA member responses is provided below:

Bayer - One incinerator equipped with a WHB, and unlikely to remove the WHB. Soot-blowing occurs 3 times per day at 10 minutes per event (30 minutes total per day). The soot-blowing frequency changes when the heat drop across the WHB is reduced, representing fouling on the heat exchanger section of the WHB. The soot-blowing frequency increases when this occurs. No data are available concerning how PM emissions change, or how it affects the APCS.

Celanese - Two incinerators equipped with WHBs, no plans to remove. Soot blowing typically occurs four times per day, with a duration of 8 to 12 minutes per event. The frequency or duration increases when there is an increase in pressure drop across the tubes. Soot-blowing increases PM 10-15% when burning clean organic fuels. When burning dirty fuels, the PM varies based on the fuel variation. The facilities aim to burn consistently. If a fuel results in problems with the incinerators equipped with WHBs, it is instead burned in an incinerator without a WHB and equipped with an absorber (wet scrubber).

Dow - Only one incinerator is equipped with a WHB. There are very limited data on soot-blowing; no response to the questions can be made at this time.

Eastman Chemical - Total of 5 incinerators with WHBs. All WHBs are anticipated to be removed. Soot-blowing is only performed at two facilities. One blows soot 6 times per day, 15 minutes per event. The other blows soot 4 times per day, 15 minutes per event.

Lubrizol - One incinerator equipped with a WHB, no plans to remove it. Soot blowing typically occurs once every three hours, 10 minutes per event. The soot blowing frequency is fairly consistent; minimal deviations. There are only negligible differences in PM between soot blowing and other periods due to the robustness of the air pollution control equipment.

CS6A-011 (1). CKRC agrees that the effect of soot blowing on achievable particulate emission rates needs to be considered. The Agency recognizes that some incinerators have waste heat recovery boilers. CKRC points out that the Lafarge Alpena, MI facility also has recovery boilers.

The Agency says that it will include a requirement in PS-11 to perform at least 3 of the calibration runs during soot blowing. CKRC is unable to fully comment on this apparently arbitrary requirement since no basis is provided. CKRC is concerned, however, that this requirement may be needlessly cumbersome. Our experience is that waste heat recovery boilers blow soot intermittently and that in a multi-blow regime the second blow dislodges less material than the first, and so on. Given that sampling times for some sources will be only 1 hour, it makes little sense to require a sampling team to stand-down for 4 to 8 hours to capture the next soot blow. It is also unnecessary to keep resetting process parameters to test other conditions during the waiting time since cement kilns have stabilization response times on the order of several hours.

CKRC believes that the Agency should carefully analyze the soot blowing data in CETRED and determine a prudent number of samplings to include soot blows. The Agency should also consider the cost and need to design PS-11 test programs to capture soot blows under specific conditions or

to simply require that a minimum number of tests include soot blowing.

CS6A-015 (1) On a final note, the EPA has requested comment about its proposal for special considerations for incinerators equipped with waste heat boilers (page 67794). The EPA assumes that incinerators that employ soot blowers to clean the boiler tubes will have increased particulate emissions during periods of soot blowing. We can state with confidence that facilities using advanced PM control devices do not and will not experience elevated PM emissions. The EPA should propose a procedure for a facility to demonstrate that soot blowing does not increase particulate emissions or change the physical properties of the particulate matter. It would then be unnecessary to conduct calibration runs during periods of soot blowing at facilities that have no demonstratable change in particulate emissions or particle size distribution.

CS6A-025 (1) The ETC also agrees with EPA's proposal to require units that utilize soot blowers in downstream boiler equipment to incorporate soot blowing events in a minimum of three calibration runs. Alternatively, this requirement can be waived if a facility can demonstrate that soot blowing events have no significant impact on the quantity of PM emissions or the particle size distribution of PM. We also agree with EPA that routine maintenance cycles should be included in the calibration and OPL development data.

The ETC is opposed to any waivers from PM CEM requirements for incinerators that utilize waste heat boilers (WHBs). The particulate matter collected in WHBs is part of the combustion off-gas, and is the same material that is normally emitted from the stack. The same concerns exist regarding hazardous metal and organic pollutants entrained and associated with this particulate matter. If a unit incorporates soot blowing, then the calibration runs should include soot blowing events, and this particulate should be counted as part of the PM emissions. Many EPA regions and states have required that incinerators equipped with soot blowers include soot blowing events as part of trial burn tests. Some incinerators with WHBs perform soot blowing on a frequent basis (such as hourly). It is important to capture these soot blowing events as part of PM CEM testing and calibration.

EPA should also note that certain metals have a tendency to plate out on boiler tubes. For example, ash coating the boiler tubes tend to be rich in cadmium. Given the toxic properties of this metal, it is especially important to include soot blowing events in PM CEM calibration and measurement requirements.

CS6A-027 (1) 3)Lafarge notifies the Agency that there is a hazardous waste combusting cement kiln that uses a waste heat recovery boiler which has a soot blowing system. On p.67794 of the December NODA, EPA requests comment on hazardous waste incinerators using WHB and the confounding aspects of soot-blowing. Lafarge currently operates hazardous waste combusting cement kilns (2kilns) at its Alpena, MI facility. Each of these kilns uses a HWHB that has a soot blowing process and the facility will not need to move the WHB to comply with any of the MACT limits noticed in the May 1997 NODA. Unfortunately, due to the brevity of this comment period, Lafarge was unable to determine any impacts of this soot blowing on the nature of its PM emissions, with respect to the applicability of a PM CEM. Lafarge encourages the Agency to appropriately consider this facility in any determination on the appropriateness of PM CEMs for facilities with WHBs.

CS6A-030 (1) DOE believes that EPA s proposal that incinerators equipped with WHBs be allowed to conduct soot-blowing episodes should be expanded beyond incinerators equipped with waste heat boilers. Most APCD systems have cleaning phase designs such as: (1) for baghouses, the frequency of pulsing for knocking cake off the fabric filter, (2) for wet electrostatic precipitators (WESP) and ionizing wet scrubbers (IWS), the wash down of the plates or rods, and (3) for wet scrubbers, the frequency of adding fresh water to replace evaporative losses. DOE believes that soot-blowing is no more deleterious than any of the other PM creating activities listed above. DOE requests EPA examine available information (e.g., public comments) highlighting the differences/similarities between the various PM cleaning-phase designs and either: (1) justify that soot blowing creates far more particulate matter emissions or results in far greater changes in PM physical properties than baghouse pulsing, etc.; or (2) promulgate regulations governing APCD cleaning phases that closely reflect those issued for incinerators equipped with WHBs.

Summary

EPA requested comments on soot blowing and waste heat boilers. Overall, commenters said soot blowing is no different that any other APCD cleaning cycle and that soot blowing is highly infrequent (zero to 6 times per day) and of short duration (less than 15 minutes per cleaning cycle.) The facilities that had extensive experience with testing during soot blowing operation said that the impact was minimal, however, the facility has demonstrated superior particulate control.

Response

EPA concurs with this opinion, that soot blowing should have a minimal impact on the ability to correlate PM CEMS to manual methods so long as soot blowing events are a part of the correlation, but will follow tests at boilers and other like sources to gain further insights for future rulemaking.

f. Transferability of Demonstration Test Results to CK's, LWAKS, Wet Stacks, etc.

Comments

CEM5.017(114)(d) 4. As pointed out by ENSR, many PM CEM's have trouble distinguishing between particulate matter and water droplets. This can be a significant concern in saturated stacks.

CEM5.021(122) 2. PM CEM Analyzer not necessary for facilities with low ash in feedstreams. Feedstream analysis and feed rate controls limits the ash that can be formed in many facilities. Additional Particulate CEMs adds capital and operating cost and reduces the reliability of the combustion system with no additional benefit to the environment. Unnecessary CEMs could lead to many unnecessary shutdowns for CEM malfunction which could lead to greater public exposure and risk. A waiver is needed to exempt those facilities from PM CEMs who have low ash and appropriate feed rate controls.

CEM5.051(141)(c) A further assumption is that PM CEMS will work properly on streams with variable amounts of entrained water. This has been a major problem for opacity monitoring historically and it would require considerable field experience in entrained liquid streams to prove that the new instruments do not have the same problem.

By contrast, the assumptions required to assure compliance when using operating parameters, which are less favored under the proposed monitoring hierarchy, are sound technical means of insuring that complete combustion i[s] occurring, which can be confirmed with periodic testing.

CEM5.052(142) Finally, the Agency should find that a PM CEMS is not necessary for facilities that have low ash in waste feed streams. Particularly for on-site, non-commercial operations with consistent day-to-day waste compositions, feed stream analysis for ash and feed rate controls should be allowed as an effective alternative to a CEMS. The CEMS would be an unwarranted cost burden and, as discussed above, would, when it malfunctions, unnecessarily trigger unit shutdowns.

RSCP-183 (1) 3M believes that for CEMs to be used reliably in the field, they must have demonstrated reliability with combustion of various wastes and with wet APC equipment

CS3A-003 (3)(c) For example, EPA states that it has not been able to conduct any tests in the presence of entrained water droplets. RMB believes that this is a very important observation for several reasons. Of course, it provides strong evidence that the Dupont incinerator is not a worst-case facility. More importantly, the absence of water droplets makes it impossible to evaluate just how the various instruments would respond to such conditions. The statement that light scattering devices "see" water droplets as particulate matter should be irrefutable. We had hoped that this field demonstration would provide definitive quantification to the degree of interference a facility can expect from entrained moisture. We suspect the impact of entrained water droplets on the performance of beta-gauge instruments is less well known than for instruments that utilize light scattering. Even if it can be postulated that entrained water droplets have little effect on a beta-gauge instrument's ability to measure, clearly the presence of water droplets can be problematic for the extractive sampling probe as well as for the paper filter substrate. Given the number of hazardous waste incinerators that are equipped with wet air pollution control devices, we do not believe a field demonstration of continuous PM monitors can be complete without evaluating the impact of entrained water droplets on the performance of the instruments. Another problem observed by EPA is the inability of the Dupont incinerator to emit particulate matter at or above its permitted limit of 0.08 gr/dscf. RMB understands this causes some difficulty, given that two of the statistical criteria (confidence interval and tolerance interval) in proposed PS 11 are to be evaluated at the emission limit. However, the fact that the Dupont incinerator stack is dry and relatively clean makes it neither a "worst-case facility" nor a particularly challenging location to evaluate continuous emission monitors.

CS3A-004 (3) II. Even if the CEM's worked at the DuPont facility, can the test results be transferred to other hazardous waste combustors? Hazardous waste combustors vary greatly in their configuration. Below is a listing of the air pollution control systems currently in use at the 158 hazardous waste incinerators operating in the United States today. Evident from this listing is that over 65 percent of facilities operate some sort of wet scrubbing system. Some of these are equipped with flue gas reheat systems. The remainder of plants either have no pollution control system or employ a dry system. Wet APC 48.1% (76 systems) Dry APC 4.4% (7 systems) Dry-Wet APC 5.0% (8 systems) No APC 14.6% (23 systems) Waste heat boiler with wet APC 14.6% (23 systems) Waste heat boiler with dry APC 4.4% (7 systems) Waste heat boiler with dry-wet APC 3.2% (5 systems) Waste heat boiler with no APC 5.7% (9 systems) Both the configuration of the air pollution control train and the method of operating the combustion process will impact PM

characteristics in the stack. Since CEM's (especially units based on light scattering technology) may be influenced by these characteristics, the ability to calibrate a CEM may vary between different units. The criteria that influence transferability are: * The presence of free water droplets; * Particulate emission concentrations; * Particulate characteristics such as size, shape, and refractive index; * Stack operating conditions such as temperature and moisture content; * Impact of weather conditions, (outside temperature, humidity); * Different combustion systems have been shown to produce different particulate qualities (e.g., slagging vs. non-slagging kilns); * Ratio between filter weight and probe rinse from a MM5 train: some facilities find the majority of the particulate matter on the filter while other find up to 100 percent in the probe rinse; and * Characteristics of the air pollution control train such as hysteresis effects, delayed releases, etc. Given these variations and given that the DuPont facility does not address all possible situations, one should not expect the results from the DuPont site to be applicable at another facility. Some of the problems listed above can be quite difficult to analyze but are very well understood by individual facility operators. CRWI recommends that CEM's be voluntarily installed at a broader variety of plants and be operated by the experts of the individual installation before final determination of suitability is made. From the listing above, it is apparent that at least three categories of plants should be considered: saturated stacks; wet systems with stack reheat systems; and dry systems.

CS3A-005 (3) II. Even if the CEMS worked at the DuPont facility, can the test results be transferred to other hazardous waste combustors? Transferability Hazardous waste combustors vary greatly in their configuration. Particularly the air pollution control train from one facility to the next shows distinct differences. This fact impacts the conditions encountered in the stack to a great extent. Since this is what the CEM sees, the success of an installation may vary. The important criteria are: * The presence of free water droplets * Particulate emission concentrations * Particulate characteristics such as size, shape and refractive index * Stack operating conditions such as temperature, moisture content (relative humidity) * Impact of weather conditions, (outside temperature, humidity) * Different combustion systems have been shown to produce different particulate qualities (for example, slagging versus non-slagging kilns) * Halogen feed rates and emission rates * Difference in feeds of various waste streams * Ratio between filter weight and probe rinse from a manual method 5 train: some facilities find the majority of the particulate matter on the filter while other find up to 100 percent in the probe rinse. * Characteristics of the air pollution control train such as hysteresis effects, delayed releases, etc. Given these variations, one must expect that what was found to be true at the DuPont site may not be repeated at another facility. Some of the problems listed above can be quite difficult to analyze but are very well understood by individual facility operators. Dow recommends that CEMS be installed at a broader variety of plants and be operated by the experts of the individual installation before final determination of suitability is made. Dow notes that EPA suggests that at least nine runs are needed for calibration. Similarly, at least nine different facilities may be needed to demonstrate general applicability of the CEMS which are to be required. Below is a listing of the air pollution control systems currently in use at the 158 hazardous waste incinerators operating in the United States today. Evident from this listing is that over 65 percent of facilities operate some sort of wet scrubbing system. A few of these are equipped with flue gas reheat systems. The remainder of plants either have no pollution control system of employ a dry system. From this listing at least three categories of plants should be looked at: saturated stacks, wet systems with stack reheat systems, and dry systems. Wet APC 48.1% (76 systems) Dry APC 4.4% (7 systems) Dry-Wet APC 5.0% (8 systems) No APC 14.6% (23 systems) Waste heat boiler with wet APC 14.6% (23 systems) Waste heat boiler with dry APC 4.4% (7

systems) Waste heat boiler with dry-wet APC 3.2% (5 systems) Waste heat boiler with no APC 5.7% (9 systems) Total 100.0% (158 systems) Perhaps, at least one facility in each category needs to be demonstrated, or shown to be equivalent to a demonstrated category, before CEMS are required for that category.

CS3A-006 (3) II. EPA Continues to Ignore Fundamental Differences Between Cement Manufacturing and Hazardous Waste Incineration. Continental provided extensive comment on the April 19, EPA proposal regarding the various differences in design, operation and pollution control between cement kilns and hazardous waste incineration. Here again, EPA has proposed to use data collected under conditions which either do not exist or cannot exist at a cement manufacturing facility. In particular, Continental objects to EPA imposing a de facto 35 milligram PM per dscf of dry feed in order to maintain the 69 milligram standard in the proposal. This is patently impractical for a cement manufacturing process and would essentially eliminate fuel replacement. EPA's use of an incinerator to demonstrate the effectiveness -of PM CEMS at a cement kiln ignores the significant differences in particle size distribution. EPA must test PM CEMS under comparable operating scenarios. Further support for this maxim is found when one compares the stack moisture differences between kilns and incinerators. PM CEMS will not distinguish water droplets in cement kiln stacks from true PM, thus skewing cement kiln data such that kilns would be unfairly penalized if incinerator test data is used. EPA's proposal to impose dioxin/furan controls would further exacerbate this phenomenon. Measuring exit gas temperature at the inlet to the air pollution control device will cause additional water condensation, thus artificially driving up PM CEMS readings at cement kilns. Finally, the DuPont incinerator is a significantly smaller device than a cement kiln in two important ways. First, the gas flow rates at the end of the demonstration were 15,000 dry standard cubic feet per minute. Cement kilns are traditionally much larger devices running between 125,000 to 400,000 dscf per minute. This comparison places the DuPont incinerator in the category of an R&D or pilot plant. Data from such an operation cannot reasonably be correlated to a much larger device with significant certainty, much less across industrial categories. Second, the DuPont stack is only 4 feet in diameter while cement kilns are traditionally in the range of 11+ feet in diameter. Here again, the differences make data comparison difficult or impossible. EPA has failed in both instances to explain why, in either case, the data may fairly be used to set standards for cement kilns.

CS3A-008 (3)(b) * Rather than testing PM CEMs on a single hazardous waste incinerator, DuPont supports demonstrating testing on a sufficiently large number of hazardous waste incinerators to adequately reflect the diversity of emission rates and stack PM characteristics from incinerators in the U.S. For example, extended demonstration testing of incinerators with saturated stacks (following wet scrubbing systems without reheat) is necessary to supplement the demonstration work at the Experimental associated with prior testing at the Rollins facility. DuPont and CMA have gathered information on key variables expected to affect PM CEM performance of hazardous waste incinerators. These data can be used to subdivide incinerators into various classes, and a suitable incinerator could represent each class. We would like to meet with EPA to present these data and discuss additional PM CEM demonstration beyond the test program at the Experimental Station. A few CMA member companies have expressed interest in hosting a PM CEM demonstration on a hazardous waste incinerator with a wet stack.

CS3A-010 (1)(c) At Page 13780, column 1d, EPA states its inability to test with entrained water

droplets at the DuPont facility. Based on previous tests, EPA has qualitatively concluded that entrained water droplets are recorded as PM by in-situ light-scattering devices. EPA was hoping to test the light -scattering devices at the DuPont facility in an effort to quantify the effects of entrained water droplets, but efforts to formulate water droplets were unsuccessful. CKRC suggests this may be an important phenomenon to test.

CS3A-010 (3)(b) II. Vast physical and operational differences between cement kilns and incinerators make it technically inappropriate to transfer a HWI CEMS demonstration to a cement kiln.

6. Specifically, aerosol chemistry and particle size distribution from the DuPont incinerator and cement kilns are vastly different that PM CEMS must be successfully tested at a cement kiln to demonstrate applicability.

CS3A-010 (3) II. VAST PHYSICAL AND OPERATIONAL DIFFERENCES BETWEEN CEMENT KILNS AND INCINERATORS MAKE IT TECHNICALLY INAPPROPRIATE TO TRANSFER A HWI CEMS DEMONSTRATION TO A CEMENT KILN. The NODA states that "EPA chose to perform the PM CEMS tests at an incinerator because, under a normal range of operating conditions, incinerators present a worst case exhaust stream...consist[ing] of high moisture (i.e., 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). "(62 FR 13778) While EPA cites various reasons it believes the DuPont facility is a representative worst-case[FN2] incinerator, this HWI is not representative of a cement kiln. As CKRC explained in its August 1996 HWC MACT comments (pp.538-548), a cement kiln is a unique system, and therefore, likely to respond to a PM CEM differently than an incinerator. CKRC believes these inherent differences prevent legitimate transfer of the results of a PM CEM incinerator demonstration to a cement kiln. [FN2] Even if this in fact is a "worst-case incinerator," that does not mean it is representative of all HWC Table 2. Differences Between Cement Kilns and Hazardous Waste Incinerators and the Potential Impact of These Differences on PM CEMS. [Table not reproduced here.] Table 2 illustrates some major differences between cement kiln and HWI devices and-their processes. Several of these differences including stack diameter, stack temperature, and gas chemistry are likely to directly impact the ability to successfully operate a PM CEMS at a particular facility.

One major difference between a cement kiln and an incinerator is the size of the stack. Because cement kilns have a gas volume average of 120,000 - 130,000 dscftn, which is about 4 to 5 times larger than that of a typical incinerator, cement kiln stack diameters are necessarily 2-3 times greater than those on an incinerator. Many PM CEMS use light scatter techniques. The larger cement kiln stacks may result in less of the larger flow being penetrated by these back scattering devices -- as opposed to an opacity (transmission) device. An even smaller percentage is sampled by a beta gauge. Larger stacks also make it more difficult to actually align, or cause the need for more frequent alignment, of light-scattering devices. In addition, extreme cement kiln stack temperatures (>3500F) may interfere with the operation of extractive devices and the electronics of in-situ devices. Also important is the gas chemistry. While the DuPont incinerator is considered a worst-case example with only 20% moisture in the gas stream, a wet process cement kiln's gas stream has a moisture content of approximately 34%.[FN3] As EPA learned from the Lafarge, Fredonia test, this much moisture leads to beta gauge sampling system plugging and could plug the

monitor itself. For optical systems, the aerosol surface characteristic can change and the transition of the gas can be reduced, leading to false instrument readings. [FN3] Facilities employing water sprays to control D/F are likely to have a higher moisture percentage. Carbon dioxide emissions from a cement kiln are significantly higher than from an incinerator. The cement process requires the decarbonation of the large mass of limestone fed to the kiln (CACO3, CaO+CO2). This means that the exhaust gas from a cement kiln will contain approximately 22% CO,, compared to 15% in an incinerator's stack gas. This different exhaust gas chemical composition will mean that the absorptive properties of the gas will also be different. This may facilitate the need for a change in the light source for light-scattering PM CEMS installed for cement kilns. Since the NODA does not detail the wavelengths for these devices, we cannot determine the precise effect of this change in gas chemistry on the light sources for the CEMS. Thus, even if EPA concludes that the DuPont tests show particulate matter CEMS can be reliably used on hazardous waste incinerators, the Agency cannot automatically infer that CEMS are currently feasible for cement kilns. As discussed above, cement kilns differ significantly from incinerators. EPA itself recognized in its April 19, 1996 proposal that hazardous waste incinerators and waste-burning cement kilns are very different types of sources, and thus belong in separate MACT source categories under section 112(c). Unless CEMS tests are conducted at cement kilns, it would be arbitrary and capricious to conclude that the distinct operating conditions at cement plants will allow for the dependable operation of CEMS. As the legislative history of CAA section 112 provides, MACT standards "should be defined predominantly by the technology used in each source category and should not broadly specify for technology transfer between source categories." A Legislative History of the Clean Air Act Amendments of 1990, S. Prt. No. 38, 103d Cong., lst Sess., vol. IV, p. 4866, Congressional Research Service (1993) (statement of Senator Chafee). A. Specifically, Differences in Cement Kiln Aerosol Chemistry and PM Characteristics Are Sufficiently Different that PM CEMS Must Be Successfully Tested At A Cement Kiln Prior to Requiring These Systems for Compliance Monitoring. EPA (See Draft Status Report section 1, page 8 of 11) correctly states that the light scattering CEMS response "is proportional to PM concentration for a given set of PM characteristics (composition, density, size distribution, index of refraction)." Thus, it is a critical fact that the particle size distribution for cement kilns is markedly different than that exhibited by the DuPont Incinerator and the aerosol chemistry, hence the index of refraction, is also different. Figure 1 is a log-log plot showing the particulate fraction from the DuPont Facility[FN4] smaller than a given cut size compared to that found at several cement kilns. Three of the four cement facilities which have measured particle size distributions down-stream of their particulate control device have a significantly coarser particulate. Only 10 percent of the DuPont aerosol is larger than 1 µm whereas between 40 and 90 percent of that emitted from cement kilns is larger than 1µm. [FN4] Found in Volume II, Draft PM CEMS Status Report. Also, the DuPont aerosol is reported to be predominantly NaCl2 with only minor amounts of calcium, silica, alumina, and iron components -- which are the major constituents of the particulate from cement kiln stacks. The crystalline form of NaCl is highly reflective face centered cubic, and very different from the crystalline composition of the CACO3 SiO2 etc. found in the PM from a cement kiln stack. Therefore, one would anticipate the optical nature of the PM from the DuPont facility to be very different than the PM from a cement plant. Thus, while particulate CEMS eventually may be successfully demonstrated at a hazardous waste incinerator with a sodium based wet scrubber, the facility's aerosol chemistry and size distribution was sufficiently different that the results are not directly transferable to cement kilns. The DuPont results do not demonstrate that the technique will be equally applicable to sources that have different aerosol characteristics. As discussed later in these comments, the only PM CEMS demonstration

test conducted by EPA on a cement kiln (Lafarge's Fredonia, KS Facility) showed that the systems are not capable of providing sustained compliance monitoring at a Wet process cement kiln in accordance with the proposed specifications. Thus, it is not known that any particulate CEMS is reliable, repeatable or even accurate at cement kilns. CKRC objects to any forced application of these devices as compliance monitors prior to a successful long-term demonstration on a cement kiln.

Such an action could inappropriately put these facilities in jeopardy of false non-compliance due to instrument problems rather than poor performance. Such "false hits" inappropriately could result in significant fines and/or other legal actions. Figure 1. Comparison of the DuPont Particle Size Distribution to Typical Distributions Measured at Cement Kilns. [Not reproduced here.]

CS3A-011 (3) B. EPA HAS NOT DEMONSTRATED THAT PM CEMS WILL WORK ON OTHER TYPES OF HWCS EPA has not provided information to demonstrate that PM CEMs will work on other unit types. Because hazardous waste combustion units and their air pollution control devices differ, CEMs may well operate differently at different units. Among the most important of these differences is whether a wet or dry scrubbing system is used. The dry system used at the DuPont facility is much less prevalent than wet systems. EPA should also demonstrate the reliability and accuracy of CEMs for other types of systems.

CS3A-012 (3)(b) Cyanamid is very concerned that the Agency is drawing the apparent conclusion that this study demonstrated that Particulate Matter Continuous Emission Monitors (PM CEMS) are applicable to other incinerators however, the PM CEMS were never tested in a saturated wet gas stream. Many incinerators, including Cyanamid's four incinerator units, have saturated wet gas streams. The study did not show that the CEMS tested would work in a saturated wet gas stream.

CS3A-012 (3)(b) Each of the four incinerator units utilize a rapid quench system (preferred for Dioxin/Furan control) which generates a saturated wet exhaust gas. This gas is then treated in a wet air pollution control train for acid gas and Particulate Matter (PM) control. The final exhaust stack is a saturated wet gas. 1. The operability of the PM CEMS was not proven in a saturated wet stack gas. The DuPont study did not include performance testing of the PM CEMS in a wet stack gas.

CS3A-012 (3)(d) A wet gas stream would significantly compound operational and performance problems of these CEMS. In addition, it is questionable whether these CEMS (especially the light scattering units) could be used on wet stack gas. It should be noted that a "wet" cement kiln stack gas is different than a "wet" incinerator stack gas. "Wet" cement kilns refers to the cement manufacturing process. "Wet" incinerator stack gas specifically refers to the moisture content of the stack gas. In order to determine the applicability of these CEMS to wet incinerator stack gases, they must be tested on an incinerator which produces a saturated wet stack gas. Recommendation - Conduct further testing of the PM CEMS on an incinerator," with a saturated wet stack gas.

CS3A-012 (3) 3. Additional testing of PM CEMS is required before they can be considered ready to use in regulatory compliance. The PM CEMS should be tested and demonstrated more fully before they can be considered for use in regulatory compliance to meet DPS-11. Recommendation - At a minimum, the PM CEMS must:

* Be tested in a wet incinerator stack gas;

* Be fully tested over the complete range of possible PM loadings;
* Meet the specifications of DPS-11 without significant data outlier screening and;
* Be further tested to determine realistic on-line/off-line operational percentages.

CS3A-014 (3) PM CEMS accuracy must be determined for the range of process operating conditions, including stacks with entrained water droplets. Accuracy under conditions at other HWCs may be worse than accuracy at DuPont's incinerator. This is particularly likely for stacks with entrained water droplets which may show up as PM. Optical monitors will respond to water droplets which occur in many systems with wet air pollution control systems. There is a significant quantity of entrained water droplets in Kodak's hazardous waste rotary kiln incinerator, therefore none of the optical monitors would work on this facility. The optically based CEMS respond to particle diameter, rather than mass. Therefore the readings will vary according to particle diameter. There is no data to indicate that DuPont's facility is representative of the particle sizes that are present in other HWCs

CS3A-015 (3)(a) Entrained Water Droplets and light-scattering PM CEMs: EPA's testing at the Rollins facility in Bridgeport, NJ showed that entrained water droplets are mistaken as particulate by light-scattering PM CEMs. While RES has no further data on this issue, we suggest the Agency try an extractive approach. If a facility has water droplets in the stack that significantly increase the PM indication from light-scattering CEMS, an extractive approach may be required. A representative sample can be extracted and heated to vaporize all the water and then viewed in a chamber that simulates the stack but without the confusing effect of the water droplets. Feed Variation and PM Levels: The initial test plan cited the DuPont incinerator as an ideal test facility because the "wide variety of feedstock has a high potential to produce highly variable particulate". The key point to this is the calibration methodology outlined in MACT, where feed variability could induce a tremendous workload in generating calibration curves correlated to feedstock. RES contends that feed variation is not so dramatic changing PM level or chemistry, and that this calibration methodology can be significantly simplified.

CS6A-008 (3) The limited duration DuPont Experimental Station demonstration project used as the basis of the NODA demonstrated that PM CEMS are feasible for the particular dry-stack incinerator tested. However, the Agency has not demonstrated that PM CEMS are feasible for other dry-stack sources or for wet-stack sources.

1. Wet Stacks

   CMA does not believe the available data supports the ability of PM CEMS to measure PM on wet stacks. The only information the Agency has on PM CEM operation in wet stacks is from vendor representations on European installations. Experiences with hot total hydrocarbon CEMS show that these units are extremely difficult or impossible to operate on salt laden, wet stack gases. It is highly probable that similar problems will be experienced with PM CEMs on wet stacks. The Agency should demonstrate the viability and reliability of these units on wet stacks before requiring them on such sources. At a minimum, the final rule should provide that if significant operational problems are encountered with the PM CEMs during the 12-month PM CEMS implementation period, their use on wet stacks will not be required.

   CMA, in conjunction with Eli Lilly and the Coalition for Responsible Waste Incineration

(CRWI), is currently beginning a demonstration test at Eli Lilly's Clinton, Indiana incinerator in order to assess PM CEMS performance on sources with wet stacks. This demonstration project is being pursued partly because EPA did not demonstrate the use of PM CEMs on a truly wet stack gas. The participating organizations will submit data from this study when it becomes available in the second and third quarter of 1998. We encourage the Agency to use these data in its determination of downtime and reliability of PM CEMs on moisture-laden incinerator stack gas.

2. Cement Kilns and Light Weight Aggregate Kilns

The Agency also has not yet demonstrated that PM CEMS will work on cement kilns and lightweight aggregate kilns, two additional source types to be included in the final rulemaking. We understand through discussions with the cement industry representatives that cement kilns, in particular, may present operating conditions that may prove difficult for CEMS.

3. Low PM Emitters

The proposed requirements outlined in the NODA are based primarily on the demonstration testing of a single source that is recognized not to meet the MACT PM standard. This raises the question of whether the PM CEMS will prove feasible at the lower emission limit proposed as MACT by the Agency. We believe there is still insufficient data to conclude that PM CEMS will work on very low PM emitting stacks. This is particularly important since some facilities could have extremely low PM CEMS limits due to the site-specific standard setting process. We urge EPA to proceed with demonstration testing of a variety of source types operating at or below the MACT standards, and reevaluate the technical feasibility of requiring PM CEMS on all units.

Although CMA was encouraged by EPA's acknowledgment in the January 8, 1998 meeting that it would reassess requiring CEMS on all source types if they later proved to be technically infeasible, we believe it would be more prudent to have the results of demonstration projects in hand prior to finalizing CEMS requirements. Such additional testing would provide valuable information to be used in assessing the technical feasibility of requiring PM CEMS on all hazardous waste combustors operating at MACT levels.

CS6A-009 (3) CRWI has concerns about the availability and applicability of these instruments to wet stacks. In the NODA, EPA states that in-situ light scattering instruments are likely to have operational difficulty and, therefore, are not a practical choice for wet stacks. When the PS 11 criteria and the minimum on-line time criteria (as proposed) are applied to the three remaining instruments, only one is acceptable. In an effort to address this question, Eli Lilly and Company, the Chemical Manufacturers Association and CRWI are funding a project where two, possibly three extractive CEMs are being tested at a Lilly incinerator with a wet stack. The work plan for this project has been shared with Agency staff and their recommendations for improving the project have been incorporated. As soon as data is available from this project, the group will share the results with all interested parties. CRWI urges the Agency to incorporate the findings from this project into any final decisions made during the rule-making process.

Given these concerns, CRWI strongly suggests that EPA not require PM CEMs in the final rule. Even if the final analysis of these tests show that the units work at two incinerators, currently available data does not justify extrapolating this requirement to all incinerators. Data from earlier tests at other incinerators was not sufficiently conclusive to be the basis for regulatory decisions. Given the lack of experience necessary to judge which instrument will perform best on different stacks, CRWI suggests that the final rule allow each facility owner/operator to decide if a PM CEM makes practical sense for their operating conditions.

CS6A-011 (1)(b) Thus, EPA's claim that the PM CEMS demonstrated at Dupont are commercially available and reliable based upon their calibration characteristics vs. M5i (62 FR 67791) is not an appropriate assumption to transfer to cement kilns.

CS6A-011 (3) A. CKRC does not agree that the Dupont test represented "reasonable worst-case conditions" for HWC's. For most parameters, cement kilns have stack and process conditions that are far different than the Dupont test conditions...

CS6A-011 (3) EPA states that, "in-situ light-scattering PM CEMS will pass performance specifications at cement kilns if an informed decision is made..." (62 FR 67793, emphasis added). CKRC points out that its members' ability to make "informed" decisions must rest upon a body of as yet nonexistent data from testing of PM CEMS on a representative range of cement kilns. EPA is correct in recognizing that site-specific decisions about PM CEMS must be supported by facts. However, because the Agency has failed to conduct proper demonstration testing on cement kilns, no such informed decision can be made by cement kiln operators. EPA's limited and purportedly "worst-case" testing on an incinerator is, as described above, both flawed in its own right and wholly without utility for HWC cement kilns.

Thus, even if EPA concludes that the Dupont tests show PM CEMS can be reliably used on incinerators, the Agency cannot automatically deduce that CEMS are currently transferable to cement kilns. As discussed above, cement kilns differ significantly from incinerators. EPA itself recognized in its April 19, 1996 proposal that hazardous waste incinerators and waste-burning cement kilns are very different types of sources, and thus belong in separate MACT source categories under section 112(c). Unless proper PM CEMS tests are conducted at cement kilns, it would be arbitrary and capricious to conclude that the distinct operating conditions at cement plants will allow for the dependable operation of PM CEMS. As the legislative history of CAA section 112 provides, MACT standards "should be defined predominantly by the technology used in each source category and should not broadly specify for technology transfer between source categories." A Legislative History of the Clean Air Act Amendments of 1990, S. Prt. No. 38, 103d Cong., 1st Sess., vol. IV, p. 4866, Congressional Research Service (1993) (statement of Senator Chafee).

CS6A-011 (5) EPA cannot support its conclusion that the historical use of continuous opacity monitors (COMS) at cement kilns is sufficient to enable transfer of the Dupont results for light-scattering PM CEMS to cement kilns.

CKRC agrees that COMS have been proven effective at many cement kilns and available data indicates that properly-equipped COMS may be able to satisfy EPA's stated objectives for PM CEMS (i.e., monitoring mass emissions of PM and indication of APCD efficiency). In light of this,

EPA should consider abandoning its unsupported attempt to transfer HWI PM CEMS test results to cement kilns and, alternatively, allow cement kilns the option of installing COMS with sensitive optical systems and data management systems which accommodate the full signal range. This would be a less expensive and more effective approach to ensure continuous monitoring of PM emissions and APCD efficiency in HWC cement kilns...

CKRC agrees that COMS have already been proven capable of this function on cement kilns. EPA has further supported this fact by its statement that "...opacity CEMS as they are currently used can be used to ensure PM APCD efficiency..." (61 FR 17436). This is a same use that the Agency is now proposing for PM CEMS under the guise of site-specific Operating Parameter Limits (OPLs) (62 FR 67796). Thus, CKRC sees no reason to use unproven PM CEMS technology when a widely used, well understood, and effective tool for determining APCD performance on cement kilns already exists.

CS6A-012 (3) Also, no data or information are included in the record which demonstrate that these monitoring devices would operate properly on incinerators with wet stacks. The only support provided in the record (as best we can find) for this conclusion is a statement in the NODA which states, "Beta-gauge and certain other light-scattering PM CEMs, however, are designed with extractive reheat systems which heat up the extracted gas to above the water condensation temperature." This is hardly a sound technical basis on which to support this requirement, particularly when combustion facility owners/operators will be held accountable for the operation of their units and could face citizen suits, fines, and other sanctions.

Because of the MIP members' concern with the lack of technical support and experience in operating such units, particularly as it relates to incinerators with wet stacks, Eli Lilly and Company, the Chemical Manufacturers Association (CMA), and CRWI are funding a demonstration project where two types of extractive CEMs are being testing at an Eli Lilly incinerator with a wet stack. (The work plan for this project has been shared with Office of Solid Waste (OSW) staff and their recommendations have been incorporated.) As soon as the data becomes available, which is expected to be in June of 1998, the group is planning to share the results with EPA and its contractors. Therefore, the MIP members request that EPA hold off any final decision on whether to require PM CEMs in the hazardous waste combustion rulemaking until the Eli Lilly demonstration results and any other appropriate data or information are provided to EPA and can be incorporated into the rulemaking record.

CS6A-019-03 Transferability of Particulate Matter CEMS Technology to Lightweight Aggregate Kilns: As outlined in the CKRC comments, significant operational differences exist between hazardous waste incinerators and cement kilns and lightweight aggregate kilns (LWAKs). Solite concurs with comments submitted by CKRC and believes that EPA lacks sufficient data to support its assertion that the DuPont test program "...adequately shows that PM CEMS will meet PS11 at most hazardous waste incinerators, cement kilns, and lightweight aggregate kilns" (62 Federal Register, 67793, December 30, 1997). EPA states on page 67801 of the NODA that "The Agency is undertaking an additional PM CEMS testing program to identify CEMS-based emissions levels that are achievable by hazardous waste combustors ... using MACT control." Solite believes the agency should wait until the completion of this testing program prior to requiring particulate matter CEMS on untested industries such as Cement Kilns and LWAKs.

CS6A-020 (3) EPA should consider the results of additional long term tests of PM CEMS that may demonstrate the effectiveness of the technology at cement kilns before requiring HW burning kilns to install PM CEMs as an enforcement monitoring tool. The tests should be six (6) to twelve (12) months or longer, if necessary, and should establish two (2) consecutive quarters of data meeting the data availability requirement while passing quarterly audits.

CS6A-021 (3) A. Essroc believes that the basis for mandating the installation of PM CEMs for compliance purposes on all HWCs is unfounded. Data analysis errors made in evaluating the DuPont test raises serious questions about whether the DuPont test successfully demonstrated that PM CEMs are reliable and commercially available. However, even if the DuPont demonstration is considered successful, significant physical and operational differences that exist between cement kilns and incinerators preclude any transfer of the incinerator results to cement kilns.

CS6A-021 (3) Notwithstanding our previous comments describing the limitations in the applicability of the performance test criteria, the numerous and extensive physical and operational differences between incinerators and cement kilns negates the transferability of any HWI test results to cement kilns.

A review of the DuPont testing criteria clearly shows that the PM CEMs testing was decidedly not conducted under "reasonable worst-case conditions" for all HWCs. For most parameters, cement kilns have stack and process conditions that are far more rigorous than the DuPont test conditions. For example, wet process cement kilns' exhaust gas stream average 34% moisture vs. 20% for the DuPont incinerator. Cement kilns' stack gas flow rates are several times higher than the typical hazardous waste incinerator (HWI) and those gases are much hotter and more heavily laden with particulate matter due to the kilns' process conditions. Particle size distribution is very different in cement kilns vs. HWIs, as is the basic chemistry and physical properties of the particulate matter itself. Simply stated, the DuPont test results are not transferable to cement kilns.

Essroc concludes that while we would like to support the concept of PM CEMs and appreciate their usefulness, we are not convinced, based on EPA's test results, that such suitable units are reliable or commercially available. Consequently, Essroc is of the opinion that further demonstration testing and methods improvement is required before the EPA can conclude that PM CEMs meeting the performance criteria are sufficiently reliable and commercially available for cement kilns.

CS6A-022 (5)(b) ...and it’s reliability has been inconsistent in certain stack gas environments (e.g., wet stacks)...

CS6A-025 (3) The ETC agrees with EPA’s discussion in this section of the NODA, and supports EPA in requiring use of PM CEMS for all hazardous waste combustion sources. We agree that cement kilns can use a heated air purge system to clean dust away from the optics of PM CEMS, as shown in the La Farge tests. The La Farge data clearly demonstrate that the heated air purge technique will result in acceptable PM CEM operability, and EPA should not allow a variance because of concerns about “dusty environments”. The ETC also agrees that incinerators with wet stacks can utilize extractive reheat systems to obtain acceptable PM CEM operability. Many incinerators currently use such systems for CO CEMS and opacity monitors. Beta gauges also provide another option for units with wet stacks. For these reasons, we urge EPA not to allow

variances or waivers for any types of hazardous waste combustion facilities.

CS6A-026 (3) Ash Grove is concerned that EPA has crafted the proposed method, procedures and specifications to fit the single incinerator test during its test demonstration, without consideration for the different characteristics of cement kilns. Ash Grove opposes the requirement for use of PM CEMS for compliance until the proposed performance specifications, methods and procedures have been demonstrated to be achievable on cement kilns.

CS6A-027 (3) Lafarge disagrees with the Agency's conclusion, based on the DuPont test, that PM CEMs will function on cement kilns to levels necessary for compliance demonstrations contemplated in the NODA. Further, Lafarge disagrees with the Agency's inappropriate use of the PM CEM experience gained at our Fredonia site, which should only be characterized as a rudimentary investigation of PM CEMs. The Agency has overstated the value of the information gained during this experiment, an experiment which did not have an adequate test protocol. The Agency also failed to ensure that the units met any predetermined performance specification -- let alone the performance specification currently under consideration. Finally, the Agency has yet to consider or respond to our comments on the test report that was produced at the Fredonia site. These comments have already been submitted to the Agency within Lafarge's comments to the April 19, 1996 NPRM. To address the issue of applicability of PM CEMs on cement kilns, Lafarge believes the Agency must demonstrate the viability of this technology on *cement kilns*, and is willing to offer its Fredonia facility as host site for a scientifically valid, demonstration program.

CS6A-027 (3) 4) Lafarge strongly supports a scientific evaluation of the viability of PM CEMs at a cement kiln and has volunteered to provide a host site.

Lafarge believes that it is critical that the Agency expeditiously initiate a demonstration program using industry-EPA agreed to protocols and procedures. Further, Lafarge believes that it is inappropriate to finalize an implementation scheme or other compliance related parameters (i.e., data availability requirements and data averaging times) until after the completion of such a program.

<u>Summary</u>

Commenters have expressed significant concerns that the EPA has not demonstrated that particulate matter CEMS are workable at a significantly wide range of stack conditions such as: high moisture, low particulate, and cement kilns. They recommend testing at a wide range of HWCs and referenced the inadequacies of previous tests. There are also concerns that the DuPont site did not necessarily represent a worst-case facility and alleged the tests were flawed.

Comments specific to the use of particulate matter CEMS at cement kilns include:

- Particulate matter CEMS have not been demonstrated at a cement kiln;

- It is unlawful or contrary to the legislative history to transfer the knowledge gained at the DuPont facility to cement kilns;

- Technical and operational differences, including those specifically listed below, show that

particulate matter CEMS will not work at cement kilns:

-- Previous experiences with heated FID hydrocarbon CEMS shows that sampling lines will plug or become obstructed at wet process cement kilns;
-- That this problem (plugging/obstruction) can be adequately solved by using a heated air purge;
-- Cement kiln flue gas contains aerosols that condense at lower temperature, such as the temperature at which Method 5 obtains its measurement;
-- Flue gas flowrates are significantly higher at cement kilns;
-- Stack diameters are significantly larger at cement kilns; and
-- Aerosol chemistry and a different chemical make-up of the particulate, particle size distribution and the presence of larger particles, and the particle's index of refractory are vastly different at cement kilns.

- A "wet" cement kiln is different than a "wet" incinerator in that a "wet" cement kiln refers to the process type while "wet" incinerator refers to the presence of entrained water droplets in the stack; and

- EPA cannot relate the performance of COMS to light-scattering particulate matter CEMS.

Comments specific to the use of particulate matter CEMS at other incinerators include:

- Particulate matter CEMS have not been tested at incinerators with wet stacks;

- EPA must allow an exemption from the particulate matter CEMS requirement for facilities with "low ash" in the feed; and

- EPA has not shown that particulate matter CEMS will work at sources with low particulate matter emissions.

Comments specific to the use of particulate matter CEMS at LWAKs state that particulate matter CEMS have not been demonstrated at an LWAK;

Commenters also said there were specific criteria EPA should use to determine whether particulate matter CEMS can be transferred from one technology to another. These criteria include:

- The presence of free water droplets;
- Particulate emission concentrations;
- Particulate characteristics such as size, shape, and refractive index;
- Stack operating conditions such as temperature and moisture content;
- Impact of weather conditions, (outside temperature, humidity);
- Different combustion systems have been shown to produce different particulate qualities (e.g., slagging vs. non-slagging kilns);
- Halogen feed rates and emission rates;
- Differences in feeds of various waste streams;
- Ratio between filter weight and probe rinse from a MM5 train: some facilities find the majority

of the particulate matter on the filter while other find up to 100 percent in the probe rinse; and

- Characteristics of the air pollution control train such as hysteresis effects, delayed releases, etc.

Response

EPA is confident that the DuPont site was a "reasonable worst case facility" for CEMS performance relative to the acceptance criteria. For more information, please see the Particulate Matter CEMS Demonstration Test Report discussed in the Technical Support Document Volume IV Chapter 12 and issue 13b of this section of this Response to Comments document. We do not understand the commenters allegations that the DuPont tests were flawed.

EPA believes a long term program to test particulate matter CEMS at a wide range of facilities is unnecessary and would only delay implementing the requirement. We also note that others (Eli Lilly, EPRI, DOE's Oak Ridge incinerator, etc.) are conducting such tests on their own. These tests will go a long way to fulfilling commenters wishes. For comments dealing specifically to the previous tests see issue 13c of this section of this Response to Comments document.

Relative to cement kilns, EPA accepts that a successful demonstration has not been performed at a cement kiln. However, we are currently testing particulate matter CEMS at a Lafarge cement kiln in Fredonia, Kansas. We hope these tests will help resolve commenter's concerns. We agree that the cement kiln industry as a whole has misunderstood the issue relative to the applicability of particulate matter CEMS on "wet" stacks. We also disagree with the assertion that the legislative history forbids EPA to make technology transfer.

Relative to incinerators, we note Eli Lilly and Co.'s successful demonstration of particulate matter CEMS with an extractive reheat system at their Clinton, Indiana, incinerator. This incinerator has entrained water droplets in the flue gas. Many things effect the amount of particulate matter emitted, including the type and configuration of the APCD train, and therefore we cannot accept without more input the assertion that sources with low ash in the feed should not be required to use particulate matter CEMS. We believe the particulate matter CEMS demonstration tests shows that particulate matter CEMS will work at sources with low particulate matter emissions, so long as the facility correlates the CEMS over the full range of emissions, including those that would be experienced during a particulate matter APCD failure.

We agree that a particulate matter CEMS demonstration test has not been performed at an LWAK, but believe the results from the DuPont study show what performance can be achieved at an LWAK. We also agree that a particulate matter CEMS test has not been conducted in the US at a source equipped with a baghouse, but note the extensive experience from overseas correlating particulate matter CEMS for compliance monitoring at a wide variety of industrial applications. These include asbestos, asphalt, and lead plants with baghouses as well as chemical (pigments), cement, fertilizer, glass, herbicide, lime, power (coal, lignite, heating oil, and mixed fuel), rock wool, soda, sugar, steel (electric arc furnaces, blast oxygen furnaces, and sintering) and waste incineration plants with various emission control technologies.

We note the commenters help addressing what technical criteria should be used to show that the DuPont tests are transferrable to other sources. We believe this criteria is met relative to transferring

the DuPont tests to other incinerators, cement kilns, and LWAKs.

2. Particulate Matter CEMS Data Availability

a. General Comments on Particulate Matter CEMS Data Availability

Comments

CEM5.045(129) PARTICULATE MATTER (PM) CALIBRATION PROCEDURES Problem EPA has proposed the use of PM CEMs for all hazardous waste combustion facilities. This requirement is based on the commercial availability of these devices and their demonstration and use for compliance purposes in Germany. An international standard (ISO 10155) describes performance characteristics, test methods, and specifications for these systems and a technical inspection agency (TUV) has been charged by the German government with the environmental testing and certification of CEMS. In evaluating the assessments of these technologies, there are a number of issues which are not clear. Much or all of the information that has been generated during the development of performance specifications is proprietary and many performance issues cannot be adequately evaluated.

An underlying concern is that while the methods used to determine performance specifications in Germany may be appropriate to German regulatory practices, they may not be consistent with EPA enforcement practices and/or the U.S. legal system. Due to the lack of available information, it is not understood how EPA adequately addressed many important issues regarding the use of PM CEMs and the associated costs.

Specific issues of concern include:

...

2. The rules indicate that all waste feeds must be discontinued when the PM CEMs is inoperable. It is understood that similar sources in Germany are not subject to this requirement and we believe that this requirement will substantially limit process operations. EPA should further evaluate the practical use of PM CEMs in operating facilities to better determine operating practices. CEMs uptime requirements should be consistent with actual operating experience.

...

Possible Solutions

...

2. The run time requirements for PM CEMs should be consistent with the established monitor performance and operating experience. Most State permitting agencies have recognized that there is significant downtime associated with the operation of CMS/CEMS. Many State agencies require permitted sources to track CMS/CEMs run time and to submit them monthly or quarterly. Enforcement action is only taken in the event of excessive monitor downtime or if the operator has been negligent in instrument maintenance.

CEM5.063(170K)(e) Part of the reason for the reliability and longevity of operation of PM CEMS in Germany is that the manufacturers design automatic correction capability into their instruments. However, such reliability comes at a price. Every four hours the unit is out of service for six minutes. This exceeds the 20 minute allowance for CEM off-line time in proposed Appendix H. The

consequence of the availability requirements for the CEMs in the proposed rule is that the operator of a cement kiln burning hazardous waste must shut the feed off at least 3 times in every 24-hour day to comply with the regulatory limit. An operator could choose to use less exacting PM CEMS to avoid the potential process upsets such a requirement would impose, however, this is not in anyone's best interest. Since CKRC doubts that PM CEMS are accurate enough to be more than bag failure and gross ESP upset indicators, it is inappropriate to force waste feed cut-off based on known CEMS limitations.

As an alternate to shutting off feed, the operators could install redundant CEMS so that the calibration cycles will not overlap and a monitor will always be on line. Of course, in costing the CEMS requirements of the proposed rule it is very clearly stated that none of the costs allow for duplicate installations. Also, the problem will remain when one of the CEMS is off-line for repairs or maintenance. The data availability issue must be addressed for both PM CEMS and the relationship between CEMS signals and Automatic Waste Fuel Cut-Off [AWFCOs] in general. Just because the materials being burned have been classified as hazardous wastes does not mean that they present an acute hazard when burned, even under short-term upset conditions. A recent paper demonstrates that adverse short-term effects are virtually impossible [10].

The European Union [11] data availability requirement is 90% overall, and 20 out of every 30 minutes. Other US incineration regulations call for 75 percent data availability each hour and 90 percent of the hours in a day for CEMS monitored pollutants [12]. These requirements are deemed suitable in other jurisdictions. EPA must demonstrate that they are not protective and the additional expense in complying with the proposed rule provides some measurable benefit. Furthermore it should be noted that the implied accuracy of the method, when forced to report 10 minute rolling averages, is likely overstated since the European's have defined their minimum PM reporting period to be 30 minutes.

CS3A-004 (1)(b) C. Maintainability CEM's (i.e., carbon monoxide) that are currently in use throughout the hazardous waste combustor industry must demonstrate that they will yield accurate results for a significant percentage of the on-line time of the combustor. Typically anywhere between 85 and 95 percent CEM availability must be demonstrated for compliance. The tests at DuPont were conducted under less than ideal circumstances to evaluate the CEM's real availability. Facilities that operate CEM's typically assign staff to their maintenance on a full time basis. Whenever a system indicates a malfunction, that instrument is subjected to proper maintenance in a matter of hours if not immediately. It is under such conditions that particulate matter CEM's should be tested in order to obtain a true indication of their availability, reliability, and maintainability. EPA indicated that the DuPont test was hampered by the lack of adequate spare parts on site, lack of trained local technicians, and the fact that EPA contractors only visited the site every two weeks. Under these conditions, this demonstration will not yield answers to the questions:

* How long does the instrument run between breakdowns?
* What is the frequency of instrument failure?
* How long does it typically take to repair the instrument?
* What would have gone wrong next after an immediate repair?

Without answers to these questions, it will be difficult (if not impossible) to determine the reliability of these instruments and their ability to provide continuous emissions data. One way to test an instrument under real life conditions is to install it at a facility that will maintain it in conjunction

with its other CEM'S, as if its compliance-record depended on it.

CS3A-014 (1) 6. Reliability must be evaluated under a range of conditions and the required PM uptime must be consistent with these test results. From the test data, it is not clear what their liability of PM CEMS is. EPA's discussion indicates problems with all the monitors. Percent downtime should be determined under various conditions for various incinerators with different levels of PM, acid gases, metals, and water. Uptime requirements in the HWC regulations should be consistent with the capability consistently shown to be achievable in this proposed CEMS testing. The rule requires that the CEMS accurately measures the pollutant being monitored 100% of the time. This is more restrictive than the requirements for other emission sources. §63.6(e)(3) which describes the startup, shutdown and malfunction plan is applicable to MACT monitoring requirements for other emission sources. §60.13(e) for new sources allows for unanticipated downtime of the monitoring instrument for a given parameter and/or a certain amount of instrument operating time which did not meet quality assurance/quality control (QA/QC) requirements specified in the regulation. Process parameter monitoring (e.g., APCE parameters) should be used to measure compliance assurance when the CEMS is not operational. The data availability requirement should be based on actual availability established over some specified period of time while initially using the CEMS. A trial period (like German Suitability Test Period) could be established that uses the CEMS on an experimental basis at the unit. During this trial period the final quality objectives for the CEMS could be established.

CS6A-011 (1) The Agency has stated its intention to require maintenance whenever individual or cumulative drift corrections exceed specific levels. CKRC is concerned that the basis for these triggers is not well established and can result in unnecessary loss of data. CKRC is also concerned that if more stringent triggers are needed, performing maintenance in response to them could put the plant in jeopardy of non-compliance with what appears to be arbitrary data availability requirements. In particular, since there is little experience with PM CEMS on North American CKs, LWAKs or HWIs, no one knows if complying with these maintenance triggers will preclude compliance with monitor availability requirements. Until the internal consistency of the maintenance and availability requirement is demonstrated, compliance by properly operated and maintained sources cannot be reasonably assured. CKRC concurs that less than 100% PM CEMS data availability should be allowed.

As a practical matter, no machine operates without down-time for calibration and repair. In the Dupont test report, for example, page 2-19 explains that a run was considered valid as long as PM CEMS data was available for 80 percent of the M5I sampling period. Similar criteria should be used for commercial installations. The possibility of someone operating the PM CEMS for 80 percent of the year and then operating unmonitored the remaining 20 percent can be addressed by incorporating data availability provisions similar to those found in 40 CFR 60, Subpart Eb. These provisions address the number of hours each day and number of days each year that must be characterized by meaningful data.

The Agency concluded that 95 percent data availability is achievable by most PM CEMS (62 FR 67790). Yet, this conclusion is not supported by the diluent corrected concentrations provided as an attachment to the Dupont Report (EPA’s October 24, 1997 CD-ROM Transmittal). As many as 45 percent of the averaging periods CKRC checked did not meet this criteria for some PM CEMS.

Table 3 summarizes data completeness against the 50% 40 CFR 60, subpart Eb criteria for the ESC monitor. If the problem is a reporting error in the CD-ROM data attachment, CKRC encourages the Agency to publish corrected results and request additional comment on this topic.

Also of concern is the inconsistency between data availability criteria used for PM CEMS demonstration purposes and the criteria being contemplated for regulatory purposes. The Agency determined PM CEMS were "commercially available" using an 80 percent data availability criteria. However, EPA proposes to require facilities to achieve 95% data availability. CKRC believes this inconsistency precludes a determination that suitable PM CEMS are commercially available.

CKRC is particularly concerned because the Agency itself indicates that there will be more data availability problems for cement kilns. Thus, the 95% requirement is clearly unacceptable and should not be established prior to the acquisition of adequate data from PM CEMS demonstrations on cement kilns...

Also, while the Agency may feel confident that US-based technicians (and presumably repair parts) will become widely available after promulgation of this rule, CKRC is aware that even for facilities built in the U.S. using European technology with contractual obligations to establish U.S. sourcing, this did not occur. For example, three L&C Steinmuller (German) and two Seigers (Belgium) waste-to-energy plants have no U.S. source of supply or service support despite contractual obligations on the part of the suppliers to provide the services. Consequently, CKRC is concerned that the Agency's assumption of improved response time may be unsubstantiated.

CKRC encourages the Agency to carefully consider the implementation of the data availability criterion in 40 CFR 60, Subpart Eb, the recently promulgated standards for municipal waste combustors. (See 40 CFR §60.58b(h)(6) for an example). Subpart Eb language applies to block averages, and the Agency is proposing 1-minute updated rolling averages in this rule. Consequently, the data availability provision must be carefully drafted to avoid practical compliance and enforcement problems and other unintended consequences. If the Agency pursues this suggestion, CKRC requests an opportunity for public comment.

...The agency must specify how long interpolation can be used to accommodate data loss during calibration and preventative maintenance. CKRC suggests that rule language patterned after 40 CFR 68b(h)(7) monitoring data availability requirements be considered.

CS6A-018 (1) CWM operates a hazardous waste incineration facility which monitors its emissions in a truly wet stack. The facility also employs a fabric filter system as part of its APC devices. CWM believes the beta-gage light scattering PM CEMS seems the practical choice for this facility as detailed in this NODA, however, as the Agency notes, the 95% data availability requirement cannot be met. As a result, the EPA is proposing an 85% data availability requirement for the beta-gage technology. CWM is concerned that not enough data is provided in this NODA to confirm this 85% number, when another beta-gage PM CEMS experienced on 74% data availability during the PM CEMS demonstration test program. CWM does not believe the Agency should be establishing standards on the assumption that as the technology matures over time that the 85% data availability can be achieved. Regulatory requirements should be based on what is achievable at the time of promulgation of the regulation. Also, CWM is concerned whether a PM CEMS exists that can

accurately measure PM emissions and achieve the 85% data availability requirements and at the same time provide accurate data at a low PM concentration in a wet stack equipped with fabric filters with demonstrated PM values of 0.0009 gr/dscf corrected to 7% oxygen. (Note the proposed MACT PM standard is 0.015 gr/dscf corrected to 7% oxygen.)

The NODA fails to address the scenario that exists at this facility, as a result, CWM is requesting that PM CEMS not be required until further data is presented that confirms instruments exist in the marketplace that can provide data on a consistent basis (at least greater than 74%) and at the PM concentration levels experienced at this facility.

CS6A-025 (1) With regard to data availability, the ETC agrees that EPA should not require 100% on-stream time for PM CEMS. We find the proposed 95% availability for light scattering devices and 85% for beta gauges to be appropriate in the long term. However, the ETC requests that EPA allow for a lower level of data availability the first two years of use of PM CEMS. With numerous calibration runs and RTA testing required, it would be hard for a facility to meet the 95% / 85% data availability requirement. Instead, EPA should allow for a 60% data availability for the first year, 75% the second year, and 95% the third year (with corresponding 10% less for BETA gauges). This will allow sufficient opportunity for the regulated community to become skilled in the use of these devices, and will also allow sufficient time for calibration and RTA testing to establish a reliable correlation between true manually measured PM emission levels and PM CEM readings.

In general, the ETC agrees with EPA's proposed compliance schedule and supports the one year phase-in period, as well as the COC and Pre-COC requirements. The only modification that the ETC recommends is that the data availability or on-stream time be phased to allow operators to become skilled in the use of PM CEMS. As stated above the ETC suggests 60% availability after Year 1, 75% after Year 2, and 95% in all subsequent years (Beta gauges 10% less). This would allow time for operators to evaluate more thoroughly the specific PM CEM performance factors at their site, and to better understand the variability and correlation of these readings with APC performance parameters and various waste feeds. This would also provide opportunity for training and development of preventive maintenance procedures for the use of these new CEM devices. Allowing such a phased approach to data availability would also mitigate many of the concerns of the regulated community towards the use of PM CEMS, and would allow for a learning curve to become accustomed to operation of these devices.

With this one refinement above, the ETC is in agreement with everything in this section and in Table 3 regarding compliance schedule.

CS6A-030 (1) Further, data availability of 74% does indicate that the instruments need significant improvement to meet the proposed 95% data availability level proposed. DOE supports EPA's on-going testing of PM CEMS in a saturated stack and believes additional insight and refinement of PM CEMS may result; however, it would seem that EPA would want to fully evaluate the results of that testing before promulgating this regulation.

<u>Summary</u>

Most commenters agreed with the proposed data availability requirements. Several commenters

questioned why the difference in data availability for different monitoring technologies was acceptable. Several commenters felt it would be advisable to have an availability requirement lower for the first few years and eventually increasing to the levels proposed by EPA. Commenters cautioned that vendor support may not be available at the levels required to ensure responsiveness to monitor problems during the early years of operation.

Other issues dealt with the impacts of instrument calibration, flagged data, etc., on data availability.

Response

Availability was based on the levels achieved during the DuPont program. We believe different technologies should have different data availability if one instrument's availability is different than another's, but still indicative of good performance. EPA believes data availability in the early years can be adequately addressed during a "shakedown" period in which the CEMs is installed, but not used for compliance.

We agree that issues such as instrument calibration and flagged data can impact data availability. As a result, EPA's current thinking is to allow data averaging along the lines required in Part 60. Here, available good data is averaged during what occurs in (at most) a 15-minute block. If at least 2 good 15-minute blocks exist (that is, at least half), then all the good blocks within an hour then constitute the block hour, which itself is used for determining a rolling average for compliance determination. If fewer than half the blocks are good, then the block would not be used for emissions averaging and would count against data availability. Averaging and its effect on data availability is explained in Part 5, section VII.C.5.b.ii.1 of the preamble to the final rule.

b. Clarify Procedures For Flagged Data Treatment During Zero/Span Drift Checks

Comment

CS6A-011 (2) The agency must specify how long interpolation can be used to accommodate data loss during calibration and preventive maintenance. CKRC suggests that rule language patterned after 40 CFR 68b(h)(7) monitoring data availability requirements be considered.

Summary

EPA assumes the commenter is questioning flagged data.

Response

PS-11 will require data flag capability by the PM CEMS and associated data logger. EPA will clarify the handling of flagged data when it reproposes the PM CEMS requirement.

c. Averaging Periods Shorter than Correlation Test Runs

Comments

CEM5.053(143) and CEM5.057(147) As proposed, the implementation of the PM CEM requirement is predicated on establishing a correlation between "real" emissions as measured by EPA Method 5 and an electronic output from the instrument. Without this correlation, the setting of ten minutes, one and two hourly rolling averages is at best highly questionable.

CEM5.063(170K)(c) Inappropriate limits are being proposed for the ten minute rolling average particulate limit using an instrument calibrated using 2- to 4-hour data. The problem could be partially ameliorated if EPA modifies the proposed compliance procedure to account for averaging (sampling) time effects on data variability. Unfortunately, the standard deviation used in the calibration equation increases by roughly 5 times [4] to compensate for averaging time affect. The error standard deviation will be about 100% for the 10 minute readings. If these are treated as 10 minute rolling rather than block averages, the error increases to about 300%. Short-term limits must be significantly higher than the data-derived emissions limitation based on longer-term test results. [Footnote 4: The standard deviation scales as the square root of the ratio of averaging times. For example, if data is collected using 4-hour (240 minute) samples, but the 10-minute standard deviation is desired, then the data-derived standard deviation must be multiplied by sqrt(240/10) or 4.9 - say 5 -- to generate tolerance intervals likely to contain the intended 75% of the future 10-minute measurements.]

CEM5.063(170K)(g) Realistically, any operator faced with a time-averaged operating limit has to operate their facility against a shorter and lower standard to avoid violations. In the case of cement kilns where the product is retained in the kiln for more than an hour as it is dried, calcined and finally pyroprocessed into clinker, it is impossible to make short-term adjustments. A reasonable averaging period would probably be on the order of twice- to three-times the average kiln detention time.

Since the objective of using a particulate CEMS is to ensure control of trace emissions, the limit should not be the lowest value measured during a performance test, rather the average for the entire duration of the test. Other EPA regulations limit emissions on the basis of the highest average measured during a compliance test (see 40 CFR 60, Subparts Cb and Eb maximum APCS inlet temperature and operating rate, for example). Consequently, by setting compliance limits on the basis of the lowest measurement during a test, testing must be done under ever more extreme conditions to produce a practical operating envelope for the facility. If averaging times are set to match the average conditions demonstrated during testing, then such a push towards extremes is not needed. EPA must demonstrate that some useful purpose is served by taking a limit setting approach at variance with other already promulgated regulations for the same pollutants.

In the calibration exercise itself, EPA has used correct mathematics for a normally distributed population. However, EPA has correctly concluded elsewhere (namely in the emissions limitation calculating procedure in the preamble and TSD Vol. Appendix C) that these emissions data are lognormally distributed. This means that the calibration must be done using the natural logs of the data and the tolerance limits calculated using the logs re-expressed as untransformed units for use. The tolerance error band will be much larger than expected when properly calculated recognizing the underlying data distribution, perhaps to the point that using particulate CEMS is valueless.

<u>Summary</u>

Commenters questioned the validity of data produced by a CEMS when the manual method tests used to develop the correlation are much longer. In other words, one will observe more variability when observations are made every 15 second relative to what one would see over the same period of time if block averages were used.

Response

We agree. See the preamble to today's rule, Part 5, section VII.C.5.b.ii.1.

3. PM CEMS Tests (General)

a. Demonstration Test Comments

Comment

CEM5.041(128)(f) Finally, CMA notes that EPA is planning to conduct field tests of PM CEMS for hazardous waste combustors. As discussed above, however, those tests were only in the planning stages at the time that the proposed combustion rule was issued by EPA (61 Fed. Reg. 7232), and the results of those tests will not be available prior to the August 19, 1996 deadline for submitting comments on the proposed rule. Moreover, even if those tests are concluded prior to the projected December 1996 deadline for issuance of the final rule, the Agency cannot rely on the test results to justify imposition of PM CEMS without first providing notice and an opportunity to comment on that information. Accordingly, EPA cannot go forward with the proposed PM CEMS requirements at this time. See Citizens for Clean Air v. EPA, 959 F.2d at 846-48. Instead, EPA should allow hazardous waste combustion facilities to continue to use other proven alternative compliance methods.

CEM5.051(141)(g) Finally, Lilly notes that EPA is planning to conduct field tests of PM CEMS for hazardous waste combustors. As discussed above, however, those tests were only in the planning stages at the time that the proposed combustion rule was issued by EPA. 61 Fed. Reg. at 7232, and the results of those test--, will not be available prior to the August 19, 1996 deadline for submitting comments on the proposed rule. Moreover, even if those tests are concluded prior to the projected December 1996 deadline for issuance of the final rule, the Agency cannot rely on the test results to justify imposition of PM CEMS without first providing notice and an opportunity to comment on that information. Accordingly, EPA cannot go forward with the proposed PM CEMS requirements at this time. See Citizens for Clean Air v. EPA, 959 F.2d at 846-48. EPA should allow hazardous waste combustion facilities to continue to use other proven alternative compliance methods.

CEM5.055(144)(b) Demonstration test conditions should include a wet stack to evaluate potential interference, heavy particulate to evaluate system contamination, low particulate to evaluate precision, and a rotary kiln to evaluate varying types and sizes of particulate.

CEM5.076(205)(b) TCC member companies would like to further discuss this issue with EPA and potentially offer some of our sites for such testing.

CS3A-004 (4)(c) Alternately, EPA could redirect some of the funding available for the DuPont study to install a number of particulate CEM's at different facilities to broaden the scope of the study and seek answers to the questions raised by the study to date. CRWI would welcome the opportunity to assist in devising a test protocol and, through its academic membership, provide scientific input. Also, CRWI could recommend some of its member facilities for such a test. One goal of -such a broader test should be to establish the linearity of specific CEM models over a given range of particulate concentrations. Once this has been verified, routine calibration of these models at any site can be accomplished by a simple Relative Accuracy Test Audit. Ultimately, certification of linearity or the RCA (Relative Calibration Audit) for a given model should be provided by EPA or its contractor, similar to the TUV in Germany. The specific recommendations for further testing are:

* CRWI recommends that Method-5 be adequately modified and field tested in order to qualify as the reference method. This should include the question of data from paired runs and repeatability. * EPA should address the problem of statistical evaluation of compliance data: how to deal with outliers, the broad confidence interval and the poor correlation. * EPA should properly assess the maintainability and reliability of the CEM systems in a real life setting. Attached are specific comments that CRWI hopes will help EPA clear up the data inconsistencies and improve this and subsequent CEM demonstration projects. If there are questions or a need for additional information, please contact me.

CS3A-007 (1) II. The NODA does not provide sufficient information to support the mandatory use of PM CEMs in the final rule. The information provided in the March 21, 1997 NODA does little to support the conclusion that CEMS monitoring for PM and mercury should be required in EPA's final rule. Both PM and mercury CEMS are untested monitoring methods for cement kilns in the United States under long-term operating conditions. To test their reliability and accuracy, EPA justifiably initiated a demonstration project for PM and mercury CEMS (61 FR 7232, February 27, 1996). Well before any preliminary results would be available from the demonstration project, EPA included the use of this monitoring method as part of it s proposed rulemaking (61 FR 17358, April 19, 1996).

CS3A-008 (7) During further PM CEM demonstration testing on the Experimental Station incinerator, DuPont recommends that EPA revise its test program: DuPont recommends that EPA supplement the revised (short time period) Method 5 sample collection with one to four hour sample collection periods via the traditional EPA Method 5 train used in compliance tests to improve the accuracy and precision of the manual stack test method for particulate matter at low particulate levels. Collecting manual method PM samples over such longer time periods would also ensure that a sufficient number of Beta gauge-based CEM results could be related to manual method results. DuPont recommends that the EPA focus further testing on the stack with emphasis on comparing manual stack method results to CEM results at the as found stack PM concentration, rather than having the incinerator try to change and hold different levels of stack PM emissions via changes to the waste feeds. DuPont suggests that the collaborative technical team described above could devise an approach simpler than trying to do the calibration runs essentially in "trial burn mode". Following the current demonstration testing on the Experimental Station incinerator stack and during subsequent PM CEM demonstration testing on other incinerators as described above, DuPont recommends that EPA and its contractor(s) conduct the demonstration as if the PM CEM were in compliance mode for a period of a few weeks to more fully determine likely up time for PM CEMs.

CS3A-011 (7) VI. SUGGESTIONS ON HOW TO PROCEED WITH CEM WORK EPA has asked for suggestions on how to proceed on CEM work beyond the pilot studies presented in the NODA. As stated at the outset, CMA supports the goal of demonstrating compliance via accurate, reliable, and cost-effective methods. We believe there are three key elements that are necessary for CEMs to meet these criteria: * testing CEMs under the requirements faced in a compliance setting; * demonstrating CEMs on other unit types; and * improving Method 5 calibration.

CS3A-015 (1) Need for "Alpha" Sites: RES supports the idea of "Alpha" test sites for both instruments. EPA should solicit 3-4 sites to install and operate each CEM for two years of testing (under prespecified conditions RES will gladly make its Bridgeport, NJ facility available as an Alpha

test site). Calibration, endurance, testing, time frames for data averaging, and many other detailed operating issues could be established if this testing proves the CEM successful. Since the quality of the data generated by the CEMs during this testing may be suspect, RES highly recommends that enforcement decisions not be based on it.

Summary

Comments concerning the proposal dealt with identifying EPA's (then) proposed demonstration tests of Hg and particulate matter CEMS. They pointed out that EPA needed to provide the public an opportunity to comment of these tests. They also mentioned the need to test at a wet stack, a facility with heavy particulate matter, a facility with low particulate matter, and a rotary kiln to evaluate varying types and sizes of particulate matter.

Comments concerning the March 1997 NODA focused on commenter's inability to comment on the particulate matter CEMS requirement due to deficiencies in the report. Other comments focused on how the EPA should proceed.

Response

EPA completed its demonstration tests of Hg and particulate matter CEMS and provided the public the opportunity to comment on our final analysis in the December 1997 NODA. Input provided by commenters was taken into account during the demonstration tests. We believe the host site provided ample opportunity for changes in particulate matter physical properties, such a particle size density, both low and high emissions.

We agree that the March 1997 NODA did not provide commenters with sufficient information to comment on the proposed Hg and particulate matter CEMS requirement. The purpose of this NODA was to obtain early input on how EPA should proceed with these tests. We worked closely with the host site on testing issues, including those mentioned in their comments. More particulate matter CEMS tests are either completed, being performed, or are anticipated. We will follow these tests and include insights gained from these experiences in future rulemakings.

b. Tests Conducted for CEMS Evaluations by Facilities

Comment

CEM7.002(114) 2.6. CEM Test Frequency and Type of Test

Concerns
If hazardous waste incinerators are to proceed with a strategy to utilize CEM's for demonstration of compliance with MACT Standards, a combination of calibration audits and test audits will be required as part of the quality assurance and quality control programs. CRWI is concerned with application of the procedures for the Response Calibration Audit and Absolute Calibration Audit for the PM monitor. This is addressed in section 2.5 of our comments. CRWI is also concerned that proposed QA/QC requirements for PM CEM's are more stringent than the "German Approach," EPA's basis for suggesting these monitors are commercially available.

Potential Solutions
With the exception of the PM QA/QC, CRWI supports the EPA's suggested frequency of testing and type of testing proposed in the MACT Rule for CMS and CEM's instruments as listed in Table 2.2. With respect to QA/QC for PM CEM'S, we suggest an approach more similar to that used by the Germans in certification of instrumentation. In this approach, a frequency of PM CEM calibration at 3 - 5 years has been established. It is suggested the EPA consider decreasing the QA frequency if there is repeated assurance that calibration of the PM CEM is not changing based upon the 18 month tests (good actor incentive). It is also suggested that a certification of CEM's be considered that incorporates a combination of laboratory and on-site certification similar to the German TUV Certification Process as discussed in Section 2.2 of these comments. TABLE 2.2 [See original comment, page 48]

CEM7.006(183) CEM Test Frequency and Type of Test If hazardous waste incinerators are to proceed with a strategy to utilize CEM's for demonstration of compliance with MACT Standards, a combination of calibration audits and test audits will be required as part of the quality assurance and quality control programs. 3M is concerned with application of the procedures for the Response Calibration Audit and Absolute Calibration Audit for the PM monitor. 3M is also concerned that proposed QA/QC requirements for PM CEM's are more stringent than the German Approach that was EPA's basis for suggesting these monitors are commercially available.

With the exception of the PM QA/QC, 3M supports the EPA's suggested frequency of testing and type of testing proposed in the MACT Rule for CMS and CEM's. A frequency of PM CEM calibration at 3 - 5 years has been established. It is suggested the EPA consider decreasing the QA frequency if there is repeated assurance that calibration of the PM CEM is not changing based upon the 18 month tests.

Summary

Commenters supported the proposed test frequency, but said RCAs should be conducted every 3-5 years, not every 18 months as EPA proposed.

Response

We agree that every 3 to 5 years may be a suitable timeframe for performing RCAs of particulate matter CEMS.

4. Performance Specification 11

a. Changes to Acceptance Criteria

Comments concerning Proposal

CEM5.032(125A) RMB does not believe that EPA's proposed Appendix to Subpart EEE - Quality Assurance Procedures for Continuous Emissions Monitors Used for Hazardous Waste Combustors is a realistic approach to calibration stability. Proposed Section 5.2.2 to the Appendix defines a procedure for conducting an absolute calibration audit (ACA) for continuous PM monitors. The centerpiece of the quarterly ACA are "NIST traceable calibration standards." The problem is that there are no such standards for the technological principles (i.e., light scattering and beta transmissivity) most likely to be employed as continuous PM monitors. It is difficult to understand how EPA can propose, in the Federal Register, a requirement that simply cannot be implemented.

CEM8.002(130) These [Editor: PM CEMS] performance specifications should be set consistent with the results of EPA's long term demonstration studies performed in 1996 and 1997.

CEM8.003(218) Insitec manufactures and sells a continuous particle monitoring instrument called TESS. This instrument works as a point CEMS. All the comments below refer to the proposed Performance Specification #11 entitle "Specifications and test procedures for particulate matter continuous monitoring systems in stationary sources".
Comments:

- The proposed text fails to mention the error bounds associated with the "representative" reference method, implying that such a method is "perfect and absolute" simply because it is used as a reference for other methods (see section 2.9). Whatever the reference method used, this is obviously not true. Therefore, in the same way that error bounds are recognized for the CEMS, error bounds should also be acknowledged (and accounted for) for the reference method itself.
- Section 1.1, 3rd paragraph. The sentence "This specification is not designed to evaluate the installed CEMS' performance over an extended period of time" is confusing. It seems to imply that CEMS cannot be used over extended periods of time (although they obviously can) and as such tends to leave the reader pondering as to why he should use CEMS in the first place.
- Section 3.1.4. It is unclear whether the requirements in this section apply equally to on-line/in-situ monitors and to extractive monitors. Or is it implied that only extractive monitors are acceptable downstream of a wet air pollution control system such that the flue gases are saturated with water?
- Section 7.2. This section does not clearly establish how to correlate RM data (for which samples have been collected at different locations) with CEMS data in the case of point CEMS: is it required to conduct multiple spatial measurements with the point CEMS oriented in different positions? Does correlation happen based on data averaged over space as well as over time?

CEM5.026(125)(e) UARG is also concerned about the inaccuracy of the calibration results, compared to results that would be obtained if Method 5 were used. Because of the large tolerance interval allowed in PS 11 to achieve a successful calibration (±35%), one could have no confidence

that the result obtained from the PM CEMS calibration line (or curve) is even reasonably close to the result that would be obtained if a concurrent Method 5 compliance test was performed. The probability of deciding that a source is in violation pursuant to the calibration line (or curve), when a Method 5 test would find compliance, is simply too high, and makes unacceptable the use of PM CEMS data for compliance determinations. [Footnote 7: Tightening the statistical criteria significantly would alleviate this problem. However, the information from EPA's field studies reveals that none of the tested PM CEMS would have passed any tighter statistical criteria. Indeed, UARG suspects that EPA loosened the statistical criteria in the ISO specification (referred to in the preamble at 61 Fed. Reg. at 17437, col. 2) because the tested PM CEMS could not even pass those criteria. UARG believes that even the ISO criteria are not tight enough to be able to use a PM CEMS as a compliance method.]

CEM5.027(125) The statistical tests (e.g., a tolerance interval that requires, with 95 % confidence, that 75 % of all values are within ± 35 % of the emission limit value) for establishing the calibration of the PM CEMS to Method 5 are too loose. A calibration line (or curve) that passes the statistical criteria could generate data that are significantly different than data that would be obtained from a concurrent Method 5 test. Using a hypothetical 0.1 lb/mmBtu PM emission limit, an emission value could be as low as 0.087 (or lower) using Method 5, and still be monitored by the PM CEMS as in violation of the 0. 1 lb/mmBtu standard. See RMB. Memo at p. 4.

CEM5.034(125A) In addition to historical CEM performance specifications (e.g., zero drift, calibration drift, and response time) proposed PS 11 requires that the monitor be initially calibrated by conducting reference method tests (i.e., EPA Method 5) at each of three (or more) different particulate mass concentrations (e.g., low, mid, and high). PS 11 requires a total of at least 15 comparative measurements. Then, a linear or quadratic calibration relationship is developed by performing a least squares regression on the continuous PM data and the EPA Method 5 data. Proposed PS 11 contains the following requirements for the calibration relationship.

- The correlation coefficient shall be >.0.90.
- The confidence interval (95 %) at the emission limit shall be within ± 20 % of the emission limit.
- The tolerance interval at the emission limit shall have 95 % confidence that 75 % of all possible values are within ± 35 % of the emission limit value.

Hypothetical Calibration Figure 2 (attached) presents an example of a hypothetical continuous PM monitor calibration. Figure 2 shows the least squares regression line (correlation coefficient = 0.95), the upper and lower 95 % confidence intervals, and the upper and lower tolerance intervals. The units for the y- axis have been chosen to be pounds of particulate per million Btu (lb/ 10^6 Btu) heat input - the unit of the particulate emission limits for most fossil-fuel-fired steam generators. For this example, let us further assume that the numerical emission limit for this source is 0.1 lb/10^6 Btu. [Footnote 5: This is a very reasonable assumption insomuch as the particulate emission limit set forth in EPA's new source performance standards (NSPS) for large fossil-fuel-fired steam generators is 0.1 lb/ 10^6 Btu. Also, many state implementation plans (SIPS) contain a 0.1 lb/ 106 Btu limit for large, existing fossil-fuel-fired steam generators.] For this hypothetical calibration, the 95% confidence interval is found to be 0.0107 lb/10^6 Btu, which is 10.7% of the 0.1 lb/10^6 Btu emission limit. The 95% tolerance interval is found to be 0.0331 lb/ 10^6 Btu, which is 3 3.1 % of the 0. 1 lb/10^6 Btu emission limit. Thus, this hypothetical calibration meets the statistical criteria of EPA's

proposed PS 11 (i.e., correlation coefficient > 0. 9, 95 % confidence interval at the emission limit within ± 20 % of the emission limit, and tolerance interval at the emission limit within ± 35 % of the emission limit).

CEM5.035(125A) The Major Problem with the Statistical Criteria. The fundamental question to be posed is how far might individual values deviate from reference method values, yet the continuous PM monitor still comply with proposed PS11. Contrary to the opinion of some, this question is not answered by the width of the confidence interval. The width of the confidence interval simply bounds where the least squares regression line is likely to be drawn. That is, if one were to repeat the experiment 100 times (i.e., conduct 100 PM monitor calibrations in which each calibration consists of at least 15 comparative reference method tests), the least square regression line would fall within the upper and lower confidence limits 95 times. The correct answer to the question is given by the width of the tolerance interval for it is the tolerance interval that places some bounds on how much individual PM monitor readings can deviate from reference method values.

The major problem presented by this hypothetical calibration example is best illustrated by Figure 3 (attached). Figure 3 shows the individual data points as well as the upper and lower tolerance intervals. More importantly, Figure 3 shows that at the assumed emission limit of 0.1 lb/ 10^6 Btu, only 75 percent of the continuous PM monitor readings are likely to fall between 0.087 and 0.17. This range is simply too broad and demonstrates that continuous PM monitoring technology has not matured sufficiently to provide reliable or accurate compliance measurements.

Comments concerning the March 1997 NODA

CS3A-003 (1) [From Appendix A, RMB Consulting and Research Memorandum to UARG, April 18, 1997] SUMMARY AND CONCLUSIONS Perhaps the most obvious statement to make concerning EPA's Federal Register notice is that the Agency must have composed the notice based on how it "hoped" the field demonstration would turn out-- not on what the data actually show. Else, how does one account for statements such as, "[d]espite this heterogeneity of PM characteristics, most of the CEMS were able to meet the DPS 11 data acceptance criteria with certain outliers deleted."[FN14] As discussed above, of the 15 statistical calculations (5 monitors times 3 statistical tests each) that can be conducted with the field data, only four meet the criteria set forth in proposed PS 11, and this is after various "outliers" are removed. [FN14] Status Report IV: Particulate Matter CEMS Demonstration, Volumes 1, 2, and 3, p. 2-36, report prepared by Energy and Environmental Research Corporation for EPA's Office of Solid Waste, dated February 12, 1997. Reliable and accurate continuous PM monitors could be useful for both affected sources and the regulatory community; however, the technology is simply not adequate at this time to require for continuous compliance determinations. This conclusion is not only supported by the fact that EPA has proposed very broad confidence and tolerance intervals as part of its PS I I requirements, but also by the results of EPA's field demonstration. EPA should acknowledge this technology shortfall and move forward with additional research and development - if the Agency wishes to use PM monitors for continuous compliance determinations. The absolute worst course of action that EPA could pursue would be to further weaken the already weak statistical criteria in proposed PS 11. That is, if in response to the results of the field demonstration, the Agency proposes to further enlarge the acceptable widths of the confidence and tolerance intervals, EPA will simply ensure that data from continuous PM monitors are virtually useless. If you have any questions regarding these review comments or require

additional information, please do not hesitate to call me at (919) 510-0376.

CS3A-003 (1) Among other things, UARG is particularly concerned that virtually every PM CEMs that was tested could exhibit a large range of responses when PM, as measured by the Reference Test method (Method 5), is at a given level. This concern is supported by EPA's data, even after the "RSD outliers" are deleted from the data sets. See Figures 2-46 through 2-50 of the PM CEMS Report. For example, for the Verewa monitor (Figure 2-47), at a PM level of about 37 mg/dscm, the monitor response could range from 20 to about 45, approaching one half of the entire monitor response range of about 10 to 70. This variability is unacceptable for a monitor that will be used for compliance purposes. Given these results, UARG is perplexed that the PM CEMS Report concludes, in section 2.11, that "most of the CEMS were able to meet the DPS 11 data acceptance criteria with certain outliers deleted." The data show no such thing. As RMB Consulting points out, none of the PM CEMs passed the proposed PS 11 criteria in the initial calibration tests, and across all monitors and all PS 11 criteria (a possible 15 "tests"), only four of the 15 tests" were passed. See Table 2 of the RMB Memorandum. The Federal Register notice includes what is an equally inaccurate conclusion. Using the data from the initial field test at the LaFarge cement kiln, EPA concludes that the two PM CEMs being tested "barely passed" the International Standards Organization (ISO) performance specification. See Table 1, 62 Fed. Reg. at 13,777. However, the criteria included in this table are those of proposed PS 11,[FN2] not the more stringent criteria of ISO. See Table I of the RMB Memorandum. Neither monitor comes close to passing the ISO performance specification. [FN2] [Although the criteria appear to be the PS 11 criteria, it should be noted that the proposed PS 11 criterion for the confidence interval is 20 percent, not 25 percent as included in the Table.] UARG notes that, based on the Federal Register notice and the PM CEMS Report, EPA's solution to the problems with the PM CEMs might be simply to relax the PS 11 criteria even further from the ISO criteria. See, e.g., 62 Fed. Reg. at 13,77 9, col. 2 ("EPA also believes that the proposed performance specifications will need to be modified based on the data and experiences coming out of this program."); id. at 13782 ("EPA believes the correlation coefficient specification may have to be lower based on the results of this testing."). This is not a solution. Further relaxing the PS 11 criteria will only make PM CEMs less worthy for use as a PM compliance method. The solution is for EPA to abandon any attempt to require the use of PM CEMs as a compliance method in this rulemaking, and not to promulgate PS 11.

CS3A-003 (1) [From Appendix A, RMB Consulting and Research Memorandum to UARG, April 18, 1997] Absolute Calibration Audits In this Federal Register notice, EPA observes that NIST does not have traceable standards for continuous PM monitors". The following is a direct quote from RMB's August 1996 Memo: "RMB does not believe that EPA's proposed Appendix to Subpart EEE - Quality Assurance Procedures for Continuous Emission s Monitors Used for Hazardous Waste Combustors is a realistic approach to calibration stability. Proposed Section 5.2.2 to the Appendix defines a procedure for conducting an absolute calibration audit (ACA) for continuous PM monitors. The centerpiece of the quarterly ACA is "NIST traceable calibration standards." The problem is that there are no such standards for the technological principles (i.e., light scattering and beta transmissivity) most likely to be employed as continuous PM monitors." Clearly, RMB agrees with EPA's observation regarding the lack of NIST traceable standards. RMB is concerned about EPA's statement in the Federal Register notice that a German TUV version of the NIST standards (referred to as linearity test kits), "are sufficient substitutes for the yet to-be developed NIST standards to conduct ACAs [FN12]." EPA went on to solicit comments regarding the advisability of modifying

its ACA approach, given the fact that these linearity test kits are generally not available to affected facilities. [FN11]. 62 Fed. Reg. 13779, Col. 3 (March 21, 1997). [FN12] 62 Fed. Reg. 13779, Col. 3 (March 21, 1997). Before suggesting the acceptance of a German clone of NIST-traceable standards, RMB believes that EPA should acquire some of the linearity test kits and evaluate them in the context of the Agency's ongoing continuous PM field demonstration project. The obvious question to address is, how does the performance of a continuous PM monitor determined from using a German-made linearity test kit compare with the performance determined from the application of EPA Method 5? Certainly EPA should provide an answer to this important question prior to deciding to revise its ACA approach to utilize standards that are not traceable.

CS3A-003 (1) The fundamental problem with EPA's proposed approach to continuous PM monitoring continues to be the fact that commercially available instruments, especially those that are based on the principal of light scattering, do not provide anything close to a direct measure of particulate mass emissions. Of course, by direct measure, we mean that the instrument must measure particulate mass and the volume of flue gas from which that mass of PM was sampled. As EPA observes in its Federal Register notice, the characteristics of the emitted particulate matter exhibit significant variability, and "this variability in the particulate properties causes a varied response from the PM CEMS [FN3]." [FN3] 62 Fed. Reg. 13782, Col. I (March 21, 1997).It is RMB's considered opinion that the results of the continuous PM monitoring demonstration clearly document that the technology and instrumentation are inadequate to achieve EPA's stated purpose (i.e., to assess continuous compliance with particulate emission limitations). As will be discussed in more detail below, EPA cannot overcome this shortfall in technology by simply relaxing Performance Specification II (PS 11). EPA has already considerably weakened the statistical criteria in proposed PS 11 relative to the requirements of the International Standards Organization (ISO). It should also be noted that in Table I in the Federal Register notice, EPA has incorrectly presented the ISO criteria to be identical to proposed PS 11. The following table shows the correct relationship between the ISO statistical criteria and those proposed in PS 11. Perhaps EPA's tabular error was the cause of an even more serious mistake when the Agency concludes, "[s]tatistics resulting from these calibrations barely passed the ISO specification[FN4]." Of course a more correct statement would be that the statistics from the continuous PM monitors evaluated at the LaFarge facility almost passed the criteria contained in proposed PS 11, but completely failed the ISO specification. [FN4] 62 Fed. Reg. 13777, Col. 3 (March 21, 1997).

Table 1. Comparison of Statistical Criteria for Continuous PM Monitors

	Correlation Coefficient	Confidence Interval	Tolerance Interval
PS 11	0.90	±20	±35
ISO 10155	0.95	±10	±25

The confidence and tolerance intervals are expressed as a percentage of the emission limit. As RMB commented in its memorandum on EPA's original proposal[FN5], the statistical criteria in proposed PS 11 are already so lax as to render the data questionable, at best, for compliance assessments. Even so, it appears that all of the continuous PM monitors included in the field demonstration fail one or more of the statistical criteria for the initial calibrations [FN6]. [FN5] Memorandum from Ralph L. Roberson, RMB Consulting & Research, Inc. to the Utility Air Regulatory Group, dated August 15, 1996, hereinafter RMB August 1996 Memo. [FN6] 62 Fed.

Reg., Table 2, 13782 (March 21, 1997).

CS3A-003 (1) [From Appendix A, RMB Consulting and Research Memorandum to UARG, April 18, 1997] EXAMINATION OF PM MONITOR PERFORMANCE WITH EPA'S PROPOSED STATISTICAL CRITERIA RMB's Table 2 summarizes the results presented in Table 2 of the Federal Register notice by presenting only the results for the initial calibration tests. Also, according to EPA's notice, the results in Table 2, "do not include data outliers which have been excluded from the analysis, such as paired data outliers[FN8]." [FN8] 62 Fed. Reg. 13781, Col. 3 (March 21, 1997).

Table 2. Statistical Results for Initial Calibration Tests

Continuous Monitor	Correlation Coefficient	Confidence Interval, %	Tolerance PM Interval, %
ESA	0.55	26	38
Verewa	0.69	27	32
Durag	0.72	22	36
ESC	0.71	22	36
Sigrist	0.64	25	40

Note: Bold denotes those values meeting the requirements of proposed PS 11.

The results presented in Table 2 indicate that the continuous PM monitors are not performing well, even compared to the relaxed statistical requirements of proposed PS 11 relative to ISO 10155. In fact, of the 15 statistical calculations (5 monitors times 3 tests each), only four meet the proposed criteria of PS 11. Hopefully, EPA will not interpret these results as a need to relax further the requirements contained in proposed PS 11. RMB's final comment on the statistics of the continuous PM monitor demonstration deals with the y-intercept of the various linear regressions. Table 3 tabulates the regression equations for the five continuous PM monitors based on the equations presented on Figures 2-46 through 2-50 of Status Report IV [FN9]. All of these individual figures are titled, ".. . Cumulative Data Base without RSD Outliers." [FN9] Status Report IV.- Particulate Matter CEMS Demonstration, Volume 1, draft report prepared for EPA's Office of Solid Waste by Energy and Environmental Research Corporation, dated February 2, 1997 [Docket Item Number RCSP-SO2671.

Table 3. Regression Equation for PM Monitors PM Monitor

Regression Equation

$y = 0.73(x) + 18.9$ ESA $y = 0.79(x) + 18.7$ Verewa $y = 0.85(x) + 11.7$ Durag

$y = 0.79(x) + 17.7$ ESC $y = 1.00(x) + 14.8$ Sigrist

In the regression equations above, y, the dependent variable represents the predicted Method 5 concentration (mg/dscm) based on x, the independent variable, which is the response of the continuous PM monitor. While it may be encouraging that at least four of the five continuous PM monitors have very similar slopes (the coefficients of x), the magnitude of the y-intersect terms is very troubling. The large y-intercept is troubling because it means that even as the response of each continuous PM monitor approaches zero, the regression equations are predicting significant Method 5 concentrations. In fact, for a continuous PM response of zero, these regression equations predict Method 5 concentrations ranging from a low of 11.7 to a high of 18.9 mg/dscm. Of course, if the continuous PM monitor were accurate, one would expect that a monitor response of zero would

result in a predicted PM concentration of near zero.

CS3A-004-011 (1) PS11 specifications. A series of simulations was run to determine how frequently a facility would have false PM CEM's readings (due to instrument uncertainty) that are above the emissions standard even though the actual emissions were only a specified fraction of the standard. The first simulation was based on a monitor that has the same Tolerance Interval (TI) as required by DPS-11, the PM CEM's performance specification proposed by EPA. In addition to correlation and confidence interval requirements, DPS-11 requires that there is a 95% probability that 75% of the data be within 35 % of the reference method (tolerance interval). For this simulation, it was assumed that CEM's readings are normally distributed about a constant actual emissions level. With these assumptions, the standard deviation of the distribution about the mean can be determined from the TI with the formula, s = TI/g (Hahn & Meeker, pp. 58-59), where s is the standard deviation and the g factor is based on the minimum proportion of points that must be within the TI (75 % for PS- 11), the number of points sampled (10 for this simulation since the PS-11 requires 9-1 5 data points for validation of the CEM's), and the probability that this will occur (95%). The g factors were obtained from Table A. 10 in Hahn & Meeker. The simulation was run for 0.03 grains/dscf (69 mg/dscm) and for .024 grains/dscf (55 mg/dscm). When running at a given percentage of the emission limit, the percentage of points above the standard is the same regardless of the magnitude of the standard. Therefore, only the results for 69 mg/dscm are shown in the tables. Table 1 shows the results for the simulation using the DPS-11 specification. If actual emissions in the stack are 62 mg /dscm (90% of the standard), 28% of the data points from the CEM will be above the standard, simply due to random variation. If actual emissions are at 52 mg/dscm (75% of the standard), 7% of the CEMS readings will be above the standard. In fact even with actual emissions at 35 mg/dscm (50% of the standard), 0.14% of the readings will be above the standard , still a level of concern when trying to stay in compliance. In a compliance mode, this simulation would suggest that if a facility is running at 75% of the standard, four one-minute readings per hour would exceed the standard based on random variations within the CEM unit.

Table l. PM CEM's calculations

for % of time PM reading is above the PM standard for monitor meeting DPS 11.

PM Actual Actual Standard % of CEMS Standard
Emissions Emissions Deviation readings > PM (mg/dscm) (% PM Std) (mg/dscm)
(mg/dscm) Hahn, p.298 69 90 62.1 11.69 28 69
75 51.8 11.69 7 69. 50 34.5 11.69
0.14 69 25 17.3 11.69 <.002 69 10 6.9
11.69 <.002

Simulation results in Table 2 show that loosening the specifications would create a larger number of false readings above the emission standard. This simulation was based on a tolerance interval (TI) of 90% probability that 70% of the readings are within 45% of the reference method. With this TI, 19% of the CEM's readings would be above the standard when t he actual emissions are 75% of the standard. At this TI, almost 4% of the readings would be above the limit when the actual emissions are 50% of the emissions limit. This uncertainty is unacceptable for an instrument used for compliance purposes unless this uncertainty is considered in determining the allowable emissions as measured by this instrument.

Table 3 shows the effect of a tighter specification of a Tolerance Interval that requires that there is a 95% chance that more than 90% of the readings are within 25% of the reference method. This would reduce the percentage CEM's readings that are above the standard to 0.21 %, when the actual emissions are 75% of the standard. This is still significant, indicating that it is still not possible to achieve 100% of readings below the standard, even when a unit is well below the standard. This fact must be considered when determining what constitutes compliance.

These results suggest that DPS-11 should not be loosened but should actually be tightened and PM CEM's should not be required for compliance unless a stricter performance standard can be met by the PM CEM'S. Since the proposed PM standard requires compliance on a one hour rolling average, it might be suggested that averaging time could solve the problem of data scatter. However, it is not clear that averaging time would fully address the problem. The data points used for DPS-11 are obtained by averaging CEM results for the length of a Method 5 test, typically an hour. Therefore days or weeks of data would be needed to eliminate false high readings, even if the data fluctuated randomly. However, if the reason for the data scatter is something that occurs for several days or weeks at a time, ave raging over this timeframe will not help. If particle size distributions change slowly over time, or other factors change slowly, averaging will not solve the problem of falsely identified compliance problems. Additionally, the relationship between PM emissions and PM CEM readings may not be reproducible, so it is possible that a unit will give consistently high or low readings. The initial correlations at DuPont were not reproduced by the later tests. Therefore long averaging times do not guarantee that the PM CEM's readings will adequately reproduce the actual emissions. Averaging time will not deal with consistent biases that may cause the test data to differ from the later PM CEM's data. Without knowing why the correlation is not reproducible, it is not possible to determine whether long averaging times will help eliminate false high readings. One potential solution is to allow a facility with a CEM to be in compliance with a standard if the CEM reading is below a value that is the sum of the standard and the tolerance limit. This method is used in other countries for CEM's based compliance. An EXCEL spreadsheet printout that gives more detail on the simulations whose results are in Tables 1-3 and results for a simulation using .024 gr/dscf as the PM, emissions standard is included in Appendix A. Statistical formulas and factors are from "Statistical Intervals," Gerald J. Hahn and William Meeker, John Wiley & Sons, New York, 1991, pp 54, 58, 59, 308, 310.

CS3A-004 (1) Appendix A. Detail calculations for simulation of the effects of changing DPS-11 criteria on the percentage of CEM's reading that would exceed the proposed standard. [DATA NOT REPRODUCED HERE. SEE COMMENT] Spreadsheet assumes the PM CEMS Monitor Meets PS 11 or other Spec and Actual Emissions are only a percentage of the Emission Standard. Assumes Data is Normally distributed. Assumes linear correlation between CEMS reading and actual PM emissions, so SD and TI have the same absolute magnitude at all PM concentrations. All assumptions are consistent with EPA assumptions and approach.

CS3A-010 (1)(a) At Page 13777, column 3, 5th bullet, EPA states that the Lafarge test demonstrated PM CEMS could be used for compliance with a PM standard. However, this test only showed that the PM CEMS were calibrated (and this was done with a number of runs inconsistent with the number of sampling runs proposed under PS-11).

CS3A-010 (1)(c) At Page 13777, Table 1, EPA reports the May 1995 calibration results from the

Lafarge PM CEMS Test. The tolerance limit description in Table 1 and the text is incomplete. This tolerance limit is expected to contain 75 percent of future test results at the 95 percent statistical confidence limit. These are the same bounds found in ISO 10155.

CS3A-010(1)(d) At Page 13779, column 3b, EPA requests comment on the use of German TUV standards to conduct Absolute Calibration Audits (ACAs) when National Institute of Standards and Technology (NIST) traceable standards are unavailable. CKRC supports EPA's consideration of using a TUV standard when a NIST standard is not available. International cooperation and conservation of resources are advantages to using standards already available provided they are suitable. CKRC does recommend that ACAs using the TUV standards be incorporated into the test protocol for validating the PM CEMS so that EPA can establish the relationship between ACAs and calibration results. This will be very important to facilities trying to determine if apparent changes in emissions are the result of a change in equipment performance, feedstock variation or a PM CEMS failure. This has significant compliance implications. At Page 13783, column 3, third full paragraph, EPA requests comment on the potential redundancy between the correlation, confidence limit and tolerance limit tests. CKRC is of the opinion that they are not redundant, but are different measurements.

CS3A-010 (1) 1. The confidence limit test measures the strength of the association between the PM CEMS and Method 5 results. When squared, it provides information on how much of the change in one measure is captured by a change in the other. A 90 percent correlation coefficient says that 81 percent of the change in one variable is accounted for by the other.

2. The confidence limit provides a bound on the PM CEMS response relative to the average particulate concentration at that level.

3. The tolerance limit provides a bound on the PM CEMS response relative to the individual run particulate concentration measurements at that level. While the latter two measures may seem redundant, they are not. Taking more samples narrows the confidence limit, but has little effect on the tolerance limit which is a function of both the confidence limit and the variability of individual test measurements. CKRC recommends that all three measures be retained. Unless a PM CEMS explains a large part of the data is accurate on average and is likely to contain a significant percentage of individual run results, it can be affirmatively misleading regarding the compliance status of a facility. At Page 13778, EPA explains that it modified Method 5 (M5) without conducting a full field validation of the modification and that the Agency intends to require the use of this modification for calibrating PM CEMS. (62 FR 13778) First, because the Agency has yet to publish its analysis of this modification[FN7], it is impossible to effectively comment on the accuracy or validity of any changes made to M5. Second, CKRC believes it is inappropriate and a violation of the Administrative Procedure Act (APS) for the Agency to dictate changes to reference methods and require facilities to comply with them without providing the public with an adequate opportunity to review appropriate information and provide meaningful comment on such modifications.

At Section 1, page 5 of 11, EPA apparently documented daily calibration and zero checks. CKRC could not find these results in the report, thus we cannot provide comment on the suitability of these findings.

CS3A-010 (1) At Section 2, page 3 of 37, EPA discusses the identification of outliers. While 3-sigma (three times the variation normally encountered) is a traditional continuous quality assurance guideline, it is not necessarily an appropriate way to identify outliers in an emissions data set that includes paired data. First, CKRC objects to scrubbing data from the study designed to validate PM CEMS unless identical scrubbing will be allowed in the prescribed reference Method. Perhaps more importantly, unless there is a reason to believe the data is bad, it should not be eliminated. Simply because something is variable, does not indicate that it is incorrect. Elimination of such data results in an understatement of the precision of future PM CEMS measurements. This in turn leads to a potential understatement of the range of results likely to be encountered when the system is operating as it did when calibrated. This problem, the artificial narrowing of the tolerance band in which future measurements are likely to be found, is particularly onerous given EPA's decision to use a confidence region that encompasses only 75 percent of the data. Under EPA's criteria, 12.5 percent of the individual readings are expected to be above the limit when the system is operating exactly as it did when the PM CEMS was calibrated. A more appropriate criteria, given the presence of the PM CEMS would be to use robust regression to calibrate the PM CEMS using each individual Method 5 result. Any outliers identified by this process should be investigated to verify that there is a probable problem (probe touching the port wall, for example) before they are discarded and not considered normal variability. Only confirmed outliers should be excluded from the final calibration done using ordinary least squares regression. By averaging the two simultaneous runs, EPA is suppressing variability and creating a false impression of precision. In addition, averaging the nominal 30 minute simultaneous results together does not create a 60 minute average - 60 minute samples are both temporally and spatially averaged; the process employed by EPA only considers the spatial average. At Section 2, page 3 of 37, EPA discusses the expected occurrence of outliers. CKRC does not understand the basis or validity of EPA's statement that "outliers are expected to occur in up to 10% of the data in any series of individual measurements as a result of a variety of reasons." When working at the 95 percent statistical confidence level found in 40 CFR 60 or at the 99 percent level implicit in the 3-sigma rule, 1 or 5 percent of the results would be expected to be outside the criteria. More importantly, while this may be thought of as a research program, it is leading to regulation and the data used to set the regulation should be held to the same standards as the data that will be used to enforce the regulation. EPA would not allow a facility to reject 10 percent of its data for a compliance determination, thus, EPA should not be allowed to reject 10 percent of the data it has acquired for the purposes of this CEMS demonstration. Despite the foregoing, CKRC believes that EPA's data is noisy and statistical aberrations occur for no obvious reason.

CS3A-011 (1) C. THE TOLERANCE INTERVAL TEST MUST BE RETAINED EPA requests comments on whether it should retain both or either the confidence interval and tolerance interval tests in PS-11. CMA cannot express an opinion at this point on whether the confidence interval test should be retained. The tolerance interval test should definitely be retained, however. A confidence interval provides no information about how often individual data points are within or outside a given range - only a tolerance interval will tell you that. Emissions standards typically are set using tolerance intervals precisely so that the Agency can conclude how often units will be able to perform within a chosen standard. Similarly, EPA should retain the tolerance interval test in this case so that it can assure that CEMS will accurately measure emissions the requisite percent of the time.

CS3A-011 (1) V. EPA'S TOLERANCE INTERVALS ARE TOO NARROW. AS PRESENTED, THEY WILL MAKE IT IMPOSSIBLE TO DEMONSTRATE 100% COMPLIANCE, EVEN IF THAT IS IN FACT BEING ACHIEVED The accuracy of the PM CEMs units is poor and inadequate for use as a compliance monitor. PS-11 standards for correlation, size of the confidence interval, and size of the tolerance interval were not met, even when outliers were removed. Standards were not even approached with outliers in the data set. As discussed below, PS-11 is already a looser standard than most CEMs performance specifications and should actually be tightened. Therefore PS-11 should be met at a minimum, and there should be no relaxation of the standard. PS-11 should not be loosened, but should be more stringent if used for compliance determinations, because too many false high readings will occur with the current specification. The current PS-11 standard could cause a significant variation in PM readings at a given PM emission level. The current relative calibration audit standard allows for a 5% chance that more than 25% of the data is more than 35% greater than or less than the reference method PM level (Tolerance Interval). The attached simulation (Attachment #2) shows that if a monitor exactly meets PS 11, it would still show 7% of the readings above the standard when the actual emissions are 75 % of the standard. In fact, even with actual emissions 50% of the standard, 0.14% of the readings will be above the standard. A better specification would be a Tolerance Interval that requires that there be a 95% chance that more than 90% of the readings are within 25%, of the reference method. As shown by the attached simulation, this would reduce the readings above the standard when the actual emissions are 75% of the standard to 0.21%. This is still significant, indicating that it is still not possible to achieve 100% of readings in compliance even when a unit is well below the standard. The simulation also shows that loosening the standard would create a huge number of false readings above the emission standard. If the tolerance interval (TI) is raised to a 90% probability that 70% of the readings are within 45% of the reference method, then 19% of the readings would be above the standard, when the reference method reads 7517, of the standard. At this TI, almost 4% of the readings would be above the limit-when the actual reading is 50% of the emissions limit. This is totally unacceptable for an instrument that is used for compliance purposes. It might be suggested that averaging time will solve this problem of data scatter. However, it is not clear that averaging time would address the problem. The data points used for PS-11 are obtained by averaging CEMs results for the length of a Method 5 test, typically an hour. Therefore, days or weeks of data would be needed to eliminate false high readings, even if the data fluctuated randomly. However, if the cause for the data scatter is not totally random in time, but is something that occurs for several days or weeks at a time, averaging over this time frame will not help. If particle size distributions change slowly over time, or other factors change slowly, averaging will not solve the problem of falsely identified compliance problems. If averaging times that are shorter than those used for PS-11 are used, the CEMs readings during normal operation would show even more random scatter, and would have a greater standard deviation and TI than determined by the performance test, since the averaging during the performance test already reduces some of the data scatter. Therefore PM compliance demonstration using a CEMs that meets this PS-11 requires a minimum of one-hour PM CEMs averaging time. A longer time could help reduce scatter if it is random over time. Additionally, the relationship between PM emissions and PM CEMS readings may not reproducible, so it is possible that a unit will give consistently high or low readings. The correlations that were determined initially at DuPont were not reproduced by the later tests. Therefore, long averaging times do not guarantee that the PM CEMs readings will adequately reproduce the actual emissions. Moreover, averaging time will not deal with consistent biases that may cause the test data to differ from the later PM CEMs data. Without knowing why the correlation is not reproducible, it is not

possible to determine whether long averaging times will help eliminate false high readings. Therefore PS-11 should not be loosened, but should actually be tightened and PM CEMs should not be required for compliance unless the stricter performance standard can be met by the monitor. The accuracy and precision of the instrument must be considered when determining the definition of compliance. EPA's proposal to shut down a combustion unit when the PM reading is above the standard is not acceptable when using an instrument that does not adequately reproduce the actual PM emissions. Because a significant number of false high readings above the emissions standard will occur due to data scatter, the definition of compliance must be loosened to allow for this percentage of false high readings. Otherwise, hazardous waste combustors (HWCs) will be forced to shut down just because of the scatter in the PM monitor readings.

CS3A-011 (5)(b) Later in the NODA, however, EPA begins speak of these very same "worst-case" conditions as a basis for lowering the proposed performance standard, which as CMA described above (Part VI of these comments) is already too loose and should in fact be tightened. Id. at 13782. We are concerned about this statement. Historically, EPA has attempted to set technology-based limits so that all or virtually all units using the reference technology could meet the limit almost all the time, using the reference test method. The proposed MACT standards will already be difficult to achieve for most units. EPA should not make that task far more challenging by requiring monitoring equipment that is incapable of meeting typically high performance requirements for typical regulated units. PM CEMs should be able to meet a performance standard higher than PS-11 on a worst-case incinerator.

CS3A-014 (1)(b) Also attached is a discussion of a simulation of PM CEMS readings. This simulation determines the range of PM CEMS readings that would occur at a process with a stable level of emissions provided the CEMS met the PS-11 specification. It indicates that for a facility with emissions in compliance with the standard, there would be a significant number of falsely identified exceedances of the emission standard due to monitor inaccuracy. Therefore, we believe PS-11 should be tightened, and only when this tightened standard is consistently met by PM CEMS, should the monitors be used for compliance. We support the continued development and testing of CEMS so they eventually can be used as a surrogate indicator to replace the monitoring for other HAPS. However significant improvements must be made before we can support their required use.

CS3A-014 (1) 1. PS-11 standards for correlation, size of the confidence interval, and size of the tolerance interval were not met even when outliers were removed. Standards were not even approached with outliers in the data set. PS-11 is already a looser standard than most CEMS performance specifications. Therefore, PS-11 should be met at a minimum and there should be no relaxation of the standard as discussed in the next comment. 2. PS-11 should not be loosened, but should be more stringent if used for compliance determinations, because too many false high readings will occur with the current specification. The current PS-11 standard could cause a significant variation in PM readings at a given PM emission level. The current standard allows for a 5% chance that more than 25% of the data is more than 35% greater than or less than the reference method PM level (Tolerance Interval). The enclosed "Particulate Monitor Simulation" shows that if a monitor exactly meets PS-11, it would still show 7% of the readings above the standard when the actual emissions are 75 % of the standard. In fact even with actual emissions 50% of the standard. 0.14% of the readings will be above the standard. A better specification would be a Tolerance Interval that requires that there is a 95% chance that more than 90% of the readings are

within 25% of the reference method. As shown by the attached simulation, this would reduce the readings above the standard when the actual emissions are 75 % of the standard to 0.21%. This is still significant indicating that it is still not possible to achieve 100% of readings in compliance even when a unit is well below the standard. The simulation also shows that loosening the standard would create a huge number of false readings above the emission standard. If the tolerance interval (TI) is-raised to 90% probability that 70% of the readings are within 45% of the reference method, then 19% of the readings would be above the standard. when the reference method reads 75% of the standard. At this TI, almost 4% of the readings would be above the limit when the actual reading is 50% of the emissions limit. This is totally unacceptable for an instrument that is used for compliance purposes. It might be suggested that averaging time will solve this problem of data scatter. However, it is not clear that averaging time would address the problem. The data points used for PS-11 are obtained by averaging CEMS results for the length of a Method 5 test, typically an hour. Therefore, days or weeks of data would be needed to eliminate false high readings, even if the data fluctuated randomly. However, if the cause for the data scatter is not totally random in time. but is something that occurs for several days or weeks at a time, averaging over this time frame will not help. If particle size distributions change slowly over time or other factors change slowly, averaging will not solve the problem of falsely identified compliance problems. If averaging times that are shorter than those used for PS-11 are used, the CEMS readings during normal operation would show even more random scatter and would have a greater standard deviation and TI than determined by the performance test. since the averaging during the performance test already reduces some of the data scatter. Therefore, PM compliance demonstration using a CEMS that meets this PS-11 requires a minimum of one-hour PM CEMS averaging time. A longer time could help reduce scatter if it is random over time. Additionally, the relationship between PM emissions and PM CEMS readings may not be reproducible, so it is possible that a unit will give consistently high or low readings. The correlations that were determined initially at DuPont were not reproduced by the later tests. Therefore, long averaging times do not guarantee that the PM CEMS readings will adequately reproduce the actual emissions. However, averaging time will not deal with consistent biases that may cause the test data to differ from the later PM CEMS data. Without knowing why the correlation is not reproducible, it is not possible to determine whether long averaging times will help eliminate false high readings. Therefore, PS-11 should not be loosened, but should actually be tightened and PM CEMS should not be required for compliance unless the stricter performance standard can be met by the monitor.

CS3A-014 (1) Attachment 2 Particulate Monitor Simulation A series of simulations were run to determine how frequently a facility would have Particulate Matter (PM) Continuous Emissions Monitor System (CEMS) readings that are above the emissions standard even though the actual emissions were only a specified fraction of the standard. The first simulation was based on a monitor that has the same Tolerance Interval (TI) as required by PS-11, the PM CEMS performance specification proposed by EPA. In addition to correlation and confidence interval requirements. PS-11 requires that there is a 95% probability that 75% of the data be within 35 % of the reference method (tolerance interval). For this simulation, it was assumed that CEMS readings will be normally distributed about a constant actual emissions level. With this assumption, the standard deviation of the distribution about the mean can be determined from the TI with the formula s = TI/g (Hahn & Meeker, pp. 58-59). where s is the standard deviation and the factor is based on the minimum proportion of points that must be within the TI (75% for PS-11), the number of points sampled (IO for this simulation since the PS-11 requires 9-15 data points for validation of the

CEMS.) and the probability that this will occur (95% probability for PS-1 1). The g factors were obtained from Table A.10 in Hahn & Meeker. The simulation was run for 03 grains/dscf (69 mg/dscm) and for .024 grains/DSCF (55 mg/DSCM). When running at a given percentage of the emission limit, the percentage of points above the standard are the same regardless of the magnitude of the standard. Therefore, only the results for 69 mg DSCM are shown in the tables. Table I shows the results for the simulation using the PS-11 specification. If actual emissions are 90% of the emissions standard, 28% of the points will be above the standard, a very high percentage. Even if actual emissions are 75% of the standard, 7% of the CEMS readings will be above the standard. In fact even with actual emissions 50% of the standard, 0.14% of the readings will be above the standard, still a level of concern. Table 1 PM CEMS Calculations for % of Time PM Reading is above PM Standard For Monitor Meeting PS-11 PM [TABLE NOT REPRODUCED HERE. SEE COMMENT.] results in Table 2 show that loosening the standard would create a huge number of false readings above the emission standard. This simulation was based on a tolerance interval (TI) of 90% probability that 70% of the readings are within 45% of the reference method. With this TI, 19% of the CEMS readings would be above the standard, when the actual emissions are 75% of the standard. At this TI, almost 4% of the readings would be above the limit when the actual emissions are 50% of the emissions limit. This is totally unacceptable for an instrument that is used for compliance purposes. Table 2 PM CEMS Calculations for % of Time PM Reading is above PM Standard For Monitor Meeting Standard Looser than PS-11 PM [TABLE NOT REPRODUCED HERE. SEE COMMENT.] better specification would be a Tolerance Interval that requires-that there is a 95% chance that more than 90% of the readings are within 25% of the reference method. As shown in Table 3, this would reduce the percentage CEMS readings that are above the standard to 0.21%, when the actual emissions are 75% of the standard. This is still significant, indicating that it is still not possible to achieve 100% of readings below the standard, even when a unit is well below the standard. This fact should be considered when determining what constitutes compliance. Table 3 PM CEMS Calculations for % of Time PM Reading is above PM Standard For Monitor Exceeding PS-11 PM [TABLE NOT REPRODUCED HERE. SEE COMMENT.] Therefore PS-11 should not be loosened, but should actually be tightened and PM CEMS should not be required for compliance unless a stricter performance standard can be met by the PM CEMS. Table 4 gives results for a simulation using .024 gr/DSCF as the PM emissions standard in addition to more detail on the simulations whose results are in Tables 1-3. Table 4- Simulation Data PM CEMS Calculations for % of Time PM Reading is above PM Standard For Monitor Meeting PS-11 [TABLE NOT REPRODUCED HERE. SEE COMMENT.]

<u>Comments concerning the December 1997 NODA</u>

CS6A-008 (1) The discussion of the confidence interval and tolerance interval (page 2-22, second paragraph) states that the statistical calculations "would normally be calculated at the emission limit…" However, on the next page, it is stated that for "future CEMS certifications performed by industry" the statistical calculations can be calculated at the "maxima of the calibration or the regression calculation." If this is indeed as inconsistent as it sounds, it needs to be clarified.

The discussion of the linear regression (page 2-24, last paragraph) states that the linear regression for the two calibrations would agree if, among other things, "the calibration relationship were stable over time." The elapsed time between the two calibration tests is only one month (i.e., the first and second calibration tests ended in March and April, respectively). The one-month period is

inadequate to evaluate the stability of an instrument. Even over this short duration, significant divergence developed on some the instruments precipitating an involved data fitting process in an attempt to reconcile the results from the first and second calibrations.

CS6A-010, -011, -023 (1) PS 11 is largely adapted from ISO 10155 which requires that the correlation coefficient be greater than or equal to 0.95. The "relaxed" confidence and tolerance interval calibration specifications originally included in the proposed PS 11 have now been adjusted to the same levels as the ISO standard. EPA should adjust its approach, technical procedures, and test methods to allow the higher correlation coefficient to be achieved in the U.S. that is met in other countries. The significance of this issue cannot be determined until the emission standard averaging time, enforcement policy, and variability of emissions are determined.

CS6A-010 (1) CMA agrees that the original Confidence Interval (CI) and Tolerance Interval (TI) in PS 11 needs to be tightened. The revised PS 11 is still neither accurate nor highly precise, but is better than originally proposed. The softness of this specification still allows a significant number of false non-compliances if a short averaging period (< 24 hours) is used.

CS6A-011 (1)(b) A. EPA uniformly downgraded the PS11 criteria to assess PM CEMS performance in the Dupont test to levels below the comparable International Standards Organization (ISO) 10155 standard used in Germany (and other European nations). EPA then proposed that PM CEMS which meet the less stringent performance specifications of PS11 be used for determining compliance.

CS6A-014 (1) They raised the following comment, based on their European experience:
To our experience, the minimum specification on correlation coefficient, confidence interval, and tolerance interval are not practical for this application. These values are mainly determined by the incinerator and the calibration point selection and not by the CEMS. So the correlation coefficient is influenced by the range of sample data. The confidence interval depends strongly on the incinerator operating conditions, but can also be optimized, if the mean value of all runs is close to the applied limit value. The tolerance interval finally depends on the sample distribution (and also on the outlier criteria). To underline this statement, find in table 1 data on the same type of instrument (KTN and CTNR are basically the same instrument) on different installations giving significantly different results.

Due to this reason, these statistical values are not relevant in the German regulations for approval of PM CEMS. Although the values given by ISO 10155 are the target, even lower results are accepted, as long as a statistical relation seems to be given ® > 0,7). We again point out at this time, that the results are also significantly influenced by the accuracy of the manual method. In most cases formerly bad results for the correlation coefficient could be significantly improved by improving the manual method.

Table 1: Results for KTN(R) calibration

Test facility	Municipal waste incinerator	Arc furnace of sec. steel mill	Brake lining production facility

Instrument type	CTNR	KTN	KTN
Reference	TUV report no. 936/806015	TUV report no. 936/805001	TUV report no. 936/805001
Number of runs	13	32	34
y-Intercept	-0.158	-1.6	-0.728
Slope	0.1289	0.462	0.284
standard deviation	0.036	0.559	0.257
correlation coefficient	0.954	0.984	0.872
confidence interval at highest value	14%	5%	12%
tolerance interval at highest value	21%	8%	18%

We hope that we could bring up with these topics additional information and recommend to contact German authorities (Bundesministerium fur Umwelt; **http://www.bmu.de)** or approval institutions (TUV Rheinland, Koln; **http://wwwtuev-rheinland.de)** for further information on regulations and requirements. Of course, we are also open for delivering additional information or having more detailed discussions.

CS6A-022 (5)(c) ...as illustrated in EPA's own demonstration tests that it would be appropriate for EPA to require less rigorous performance specifications for PM CEMS than are being proposed in this notice.

CS6A-022 (5)(f) Regardless of whether EPA decides to mandate PM CEMS or make its use a compliance alternative, we request that the performance specification (PS 11) be relaxed to reflect the demonstrated capability of this technology.

CS6A-025 (1) The ETC supports EPA's development of revised ISO specification levels as PS 11 for PM CEMS. However, based on technical information provided in the comments of CRWI to this docket, the ETC is concerned that the specific proposed specifications may not be valid or achievable. The CRWI review of the Dupont demonstration data, as discussed in CRWI's comments, indicates that EPA's own data collected over several months does not achieve proposed conditions in PS 11. Yet this data is being used to justify the conditions in PS 11. If EPA could not achieve the proposed PS 11 specifications in a carefully designed experimental field study conducted by experts, it is doubtful that the proposed PS 11 specifications can be readily achieved by the regulated community during routine operations.

Summary

From the proposal, commenters said EPA should:

- Establish acceptance criteria consistent with what was demonstrated in EPA's tests;
- Errors in reference method should be accounted for;
- Confusion about what EPA means when it says "This specification is not designed to evaluate CEMS performance over an extended period of time";
- Uncertainty over whether the Performance Specification applies to both in-situ and extractive particulate matter CEMS;
- Confusion over how to correlate RM data (for which samples have been collected at different locations) with CEMS data in the case of point CEMS: is it required to conduct multiple spatial measurements with the point CEMS oriented in different positions? Does correlation happen based on data averaged over space as well as over time?; and
- Concern that a correlation line that passes the acceptance criteria could generate CEMS data that significantly differ from what Method 5 would show.

From the March 1997 NODA, commenters said:

- Concern that the CEMS failed to meet the ISO 10155 specification for particulate matter CEMS (from the March 1997 NODA);
- The data acceptance criteria should not be weaker than ISO 10155;
- Particulate matter CEMS showed a large ranges of responses at given concentrations of particulate matter, as measured by the reference method;
- EPA should test the "linearity test kits" used by TÜV to demonstrate they can be acceptable substitutes for NIST traceable standards;
- Light scattering particulate matter CEMS are not a direct measure of particulate matter;
- The correlation equations do not intersect the origin;
- Simulations show that a particulate matter CEMS could indicate a noncompliance when the facility in fact had very low particulate matter emissions;
- EPA needs to show that CEMS meeting the Performance Specification can produce reliable, accurate data in the context of the CAA;
- Confidence and tolerance limits are not redundant and should be maintained;

- The public needs to have the opportunity to comment on changes to the reference method;
- Outlier data should not be excluded unless facilities are allowed to use those same procedures;
- Performance Specification 11 is looser than other Performance Specifications found in Part 60;
- The tolerance interval needs to be loosened to show that there is, say, 90% probability that 75% of future measurements are within 45% of the standard; and
- The early Lafarge tests showed a correlation between the particulate matter CEMS and Method 5.

From the December 1997 NODA, commenters said:

- Confusion about what emissions level the confidence and tolerance interval tests need to be performed at (at the standard, or the highest emissions value during the correlation test);
- Longer time difference between the first and second correlation is needed to say "the calibrations were stable over time";
- The correlation coefficient should be 0.95 or greater;
- ISO 10155 specifications are not precise;
- Presented data from German application of particulate matter CEMS; and
- The CEMS did not meet the proposed Performance Specification 11 criteria.

Response

EPA continues to evaluate the Performance Specification requirements and will take these concerns into account when Performance Specification 11 is proposed again.

Relative to comments received concerning the proposed rule, we believe the data acceptance criteria should be consistent with the outcome of the available field data, from both foreign and US origin. We will take manual method measurement errors into account by requiring paired data and a methodology for eliminating imprecise data. We believe the correlation tests are an evaluation of CEMS performance at the time the tests are being performed and a comparison of tests at different points of time can evaluate the validity of the correlation over time. We believe CEMS outputs (which may be point measurements) should be compared to manual method measurements (which are traverse measurements) conducted at the same time to develop a correlation. We believe a CEMS correlation is accurate, but also agree that it can be shown that any probability determination can show that measurements do lie outside the statistical measure of central tendency (in this case, manual method measurements that differ from the correlation curve).

Relative to comments received during the March 1997 NODA, we took these comments into account

as we further studied the CEMS and later released the draft final report. The December 1997 NODA specifically took comment on this report. The most significant result of this was we eliminated the earlier manual method data (September though November) from consideration for establishing data acceptance criteria. Instead, used the data as a "learning tool" to better understand how Method 5 measurements could be improved. These improvements resulted in Method 5i. We agreed that both the confidence and tolerance interval tests need to be retained. We do not believe Performance Specification 11 is significantly less stringent than other Performance Specifications. We disagree, however, that the early CEMS tests at Lafarge showed a correlation. Instead, we believe it pointed out the need for paired data.

Relative to comments received on the December 1997 NODA, EPA will allow facilities that cannot generate a correlation curve which exceeds the numerical value of the standard to calculate their tolerance and confidence intervals at the highest measured particulate matter emissions point. The first and second correlation spanned December through March, and April, respectively. An RCA was performed in May and compared to the first and second correlations. The cumulative data set, however, included all data from September through May. This data set showed a stability of the particulate matter CEMS over time, excluding times when some CEMS were not operating properly. We do not believe the correlation coefficient needs to be based: 1) on what the data shows can be achieved but 2) within limits which shows a correlation exists. We do not believe the correlation coefficient needs to be more stringent that necessary. We believe the ISO Performance Specification is precise. We recognize the German data the commenter shared with us and will use it to help gage what the final acceptance criteria should be. We disagree with the commenter's point that the CEMS did not meet the Performance Specification.

b. PS11 Should Be Technology-Indifferent

Comments

CS6A-002 (2) Our general comment on this PS 11 is that it should be more of a performance specification for the continuous monitors. The specifications should be given and should be the same for all analyzers. Batch CEMS (Beta gauges) have a different response time specification in this PS 11. If a response time of 15 minutes is the requirement, it should be the requirement for all technologies. Historically, batch CEMS have more down time and require more maintenance than other CEMS. It would not be fair to put an availability specification at 70% for batch CEMS, and 90% for all other types of devices.

The same performance specifications should hold true for all devices. The procedure is appropriate in the rest of the world, where they have performed thousands of calibration tests and have years of experience. Also since Method 5I is new, there is a greater chance that a failure will be caused by a test team's inexperience, rather than by a device which has been certified by a highly respected testing organization (TUV). The additional calibrations required by the light scattering devices appear to be a method of making the Beta gauges price competitive when compared to the less expensive and more reliable light scattering devices and is not supported by real world data.

In 40 CFR, Part 60, Appendix B, Performance Specification 6, the specifications do not distinguish between different measuring technologies. There was a great deal of concern before the

requirements for flow monitoring were promulgated that there was no device available that could perform as desired. The flow monitors have performed better than most expected regardless of the technology used (ultrasonic, thermal, differential pressure). Even though certain technologies were not appropriate for all applications they were not forced out of the market by excessive RATAs. Differential pressure and thermal flow monitors are not as well suited for wet stack applications as ultrasonic devices. Their devices are however, performing well in other applications. If differential pressure and thermal sensors had been placed under a requirement of performing a RATA every three months, it is unlikely that many would have been sold. The limited number of vendors of ultrasonic flow sensors would have had less competition and this probably would have created higher prices in the marketplace.

As the above example demonstrates, fair competition in industry has advanced technology and reduced prices. Any action which would disrupt the marketplace in favor of a broad ruling against one particular technology group runs contrary to the principles upon which this economy is based.

CS6A-024 (2) The proposed rule places requirements on "Beta-gauge" PM CEMS that are less stringent than are the requirements for other measurement principles, e.g., light-scattering. Specifically, data availability as required in this proposed rule for Beta-gauge systems is only 85%, while all others must demonstrate data availability at 95%. Similarly, this proposal requires that extrapolation of calibration curves beyond the "125% point" be constructed in a manner that is "environmentally conservative" for all measurement systems except those employing Beta-gauge technology. The justification for these requirements needs to be synopsized in the rulemaking itself, rather than merely referenced in background documents, so that it is more readily available to the public and creates a proposal that is complete and understandable.

CS6A-030 (2) An additional general comment is that EPA should consider incorporating additional flexibility on acceptable PM CEMS approaches into these requirements to reflect more up-to-date emissions monitoring, such as those that have been developed by EPA and the American National Standards Institute (ANSI) for radionuclide NESHAPs emissions, which are applicable to CEMS under this rule.

Summary

Commenters showed support for the idea that the same performance specifications should hold true for all devices. Also mentioned:

- Data availability should be less for batch CEMS;
- The additional correlations for light-scattering CEMS mentioned in the December 1997 NODA appear to make beta gage CEMS more price competitive;
- Information regarding flow measurement technologies;
- The extrapolation procedure needs to be in the regulations, not just guidance; and
- The Performance Specification should allow for technology innovation over time.

Response

It is EPA's intention to develop performance specifications that are equivalent for all monitors. Some specifications need to be different, though, to account for inherent differences in technique afforded by the various technologies.

EPA believes the Performance Specification 11 should be based on what the available data shows to be achievable, and if beta gage CEMS have a lower data availability than other CEMS yet that level of performance is acceptable, a lower data availability should be allowed. EPA has rethought its proposal for requiring multiple correlation curves for light-scattering CEMS and will likely require only one correlation curve for all particulate matter CEMS. We note the commenters issues raised relative to flow measurements. We agree that the Performance Specification 11 should be written to allow for better technologies as they are introduced into the marketplace.

c. Minimum Equipment Specifications Should Be Included in PS 11

Comments concerning the March 1997 NODA

CS3A-004 (3) Calibration. The current demonstration project is designed to develop initial calibrations for five PM CEM's and monitor their accuracy and reliability. As stated earlier, CRWI is unsure of the proper way to develop calibration equations for these instruments. The classical method for calibration is to use a series of NIST standard gases to challenge the unit. This would allow the development of an unambiguous calibration curve. However, it is difficult to imagine the development of such a standard gas for PM. Not only would it have to have a consistent mix of particulates, it would be difficult to match the particulates characteristics (color, size, refractivity, etc.) with that of the PM in the stack of a particular unit. EPA's solution is to calibrate against a modified method 5. Some CEM's vendors have been hesitant to compare their output with Method 5. This demonstration shows that there are tremendous variations in Method 5 applied to the same stack, supposedly burning the same material. Twenty percent of the MM5 data collected in this demonstration has been discarded (8 out of 42) due to paired train RSD's greater than 30. During the December tests, 44% of the data was discarded based on RSD differences. This is a very large amount of data to discard and should cause the Agency to question the methods being used and the conclusions drawn from this data. According to the data reduction sheets in the appendix, all December runs were under the same set of burning conditions (low EDV voltage, burning solvents and solids). If there is this much difficulty getting consistent data under the same conditions, it will be very difficult to meet the DPS 11 conditions of a minimum of three runs at three different PM loading conditions. In spite of the problems with getting accurate MM5 data, it may be the only choice of a method to calibrate PM CEM'S.

CS3A-011 (3) The CEMs are measuring data which is not related to oxygen concentration. The reason for the oxygen correction in reporting and compliance is to establish a standard value. CMA urges EPA to clarify this issue. CMA members think calibration should be done using raw data. Correcting calibration curves for oxygen serves no useful purpose as far as we can see and possibly might explain some of the deviations. Permit values and compliance will then be done using corrected values. These corrections are usually performed by the CEMs computer or process control systems.]

CS3A-015 (3) Standards & ACA'S: Standards for Absolute Calibration Audits (ACA's) must be NIST traceable standards when and if full-time operation of these referenced CEMs is required.

Comments concerning the December 1997 NODA

CS6A-001 (3) For stack gas CEMS, where the analyzers are typically housed in a temperature controlled environment, the allowable calibration drift is 2.5% of the span value. As we understand the formula in section 12.1, the allowable calibration drift is 1-2% of the span value, depending on the choice of reference value. We do not believe that this specification for PM CEMS should be 1.25-2.5 times more restrictive than for gas analyzers. This is especially true when considering the repeatability of the reference method measurement! Furthermore, we do not believe this specification can be realistically achieved. Considering that PM CEMS are typically exposed to the full range of ambient temperatures, and that electronic drift is a function of temperature, meeting this specification will likely require a more sophisticated control of analyzer electronics temperature, with a corresponding increase in both cost and size of the analyzer.

CS6A-002 (3) Is this section trying to define the instrument zero check at 0 to 20% of the instrument span and the span check at 50 to 100% of instrument span? The zero check and span check (upscale calibration check) should be in the definitions and this section should state the instrument must perform and logging system must record a zero and span check.

CS6A-010, -011, -023 (3) EPA must evaluate and define the adequacy of the daily calibration checks to determine zero drift and calibration drift. These procedures must not be left to the instrument manufacturers. This is a critical deficiency and fundamentally compromises the proposed particulate monitoring program. The daily checks provide the only means to assess the validity of the monitoring data on a day-to-day basis. The validity of these checks is therefore of vital concern to both the CEM operator and the regulatory agency. This is of particular concern because there are no NIST traceable standards for use with particulate monitors that are comparable to the EPA Protocol 1 calibration gases used for gas CEMS. EPA must identify acceptable calibration check procedures and calibration materials.

... Additional design specifications and design specification verification procedures are required to ensure that PM CEMS are capable of providing reliable results.

The CEM Equipment Specifications in Section 6 are not adequate to prohibit the sale or use of poor quality instruments, instruments for which the manufacturer claims are not supported, and in fact have not even been evaluated. This places an inappropriate burden on inexperienced users in the selection of instrumentation and ultimately compromises the quality of monitoring data. Again, previous experience with opacity monitoring systems in the US has demonstrated the significance of this problem. Inadequate specifications have allowed installation of poor quality monitors even within the electric utility industry with its long years of experience in this field. ASTM efforts to develop appropriate specifications for opacity monitors recognized the omission of basic specifications and test procedures for thermal stability, insensitivity to line voltage variations, insensitivity to ambient light and numerous other necessary design specifications critical to the application of transmissometers to measure in-stack opacity. Certainly all of these same constraints should apply to other in-situ optical systems used as particulate monitors. A different, but extensive

set of specifications would apply to extractive systems, and also depend on the type of sampling system and the analytical procedure employed.

PM CEMS programs have existed for over 25 years in Germany. Monitors used for environmental purposes must be TUV certified prior to being sold. (Additional source-specific calibration requirements apply to these monitors after they are installed.) The TUV certification includes tests to verify the ambient temperature operating conditions, line voltage sensitivity, and maintenance interval for these monitors. It is clear that an equivalent TUV type certification will not be forthcoming in the near future within the US. Absent such a program, the need for additional design specifications and design specification verification procedures for PM CEMS greatly increases.

CS6A-011 (3) On page 1-17 the Agency explains that individual instruments undergo factory calibration to ensure the same response for a given set of PM conditions. CKRC is concerned this statement has not been justified by field trials. If the factory calibration is done using span and drift calibration standards, then the reaction to actual particulate matter can be significantly different for a replacement monitor.

...Absolute calibration audit challenges only a portion of the PM CEMS. Its purpose is to verify that the electronics are working properly. Depending on specifics of the ACA challenge, the optics may or may not be involved. As a result, CKRC does not believe that ACAs provide an assessment of PM CEMS accuracy.

CS6A-021 (3) Finally, the fact that cement kilns operate continuously manufacturing a product raises serious concerns about a kilns' practical ability to perform Zero and Span Drift requirements. Cement kilns are not necessarily "off-line" often enough to meaningfully perform Zero drift calibrations.

Summary

In response to the March 1997 NODA, commenters said:

- NIST traceable standards are not possible, since every stack has different particulate matter;
- There is tremendous variability in the Method 5 results when measurements are taken at the same stack presumably burning the same material; and
- NIST traceable standards for ACAs must be required.

In response to the December 1997 NODA, commenters said:

- Calibration drift is 1-2% of the span value, but for other CEMS (which are housed inside, not in the environment like particulate matter CEMS) allowable calibration drift is 2.5%;
- EPA must evaluate and define the adequacies of daily calibration drift;
- Additional design specification and design specifications verification procedures are needed;

- Absent a certifying body (like TÜV), equipment specifications are needed to prohibit the sale of poor quality instruments;

- Particulate matter CEMS have been used in Germany for 25 years;

- Concern that despite a factory calibration, the CEMS results differ when measuring stack particulate matter; and

- A misunderstanding that the facility needs to be "off-line" to perform an ACA.

Response

EPA takes these comments into account when it releases future versions of Performance Specification 11.

EPA agrees that NIST traceable standards to determine the correlation are not possible, but believes the scheme of site-specific correlations determined using actual stack particulate at the source results in an acceptable correlation. The early data (from September to November) were eliminated from consideration as correlations because of unusually high reference method errors. We do not agree that NIST traceable standards should be required for ACAs. The difficulty here is that each monitor requires its own type of standard. No one NIST traceable standard is possible.

EPA notes that the calibration drift published in the December 1997 NODA is more stringent than what is allowed by other CEMS, but believes the criteria should be more stringent if it is demonstrated to be achievable. We agree we should define the adequacies of daily calibration drift. We agree that additional design specification and design specifications verification procedures may be needed, but believes the necessity of these requirements should be weighed against the benefits that would be realized. EPA agrees that, absent a certifying body (like TÜV), equipment specifications are needed to prohibit the sale of poor quality instruments. Particulate matter CEMS tests in Germany first started at a cement kiln in the early 1970s, so EPA notes Germany's experience with these CEMS is nearly 30 years old. EPA agrees with the commenter, that the factory calibrations are performed using particulate matter which is more uniform than stack gas particulate matter. We did not intend to mean (nor do we believe we said) that a facility needs to be off-line to perform an ACA. We hope ACAs would be performed automatically by the CEMS without any intervention or change in operation by the facility.

d. PS11 Should Clarify All Preparation Requirements

Comments

CS6A-006 (4) Technically, RMB supports the change/addition to § 8.4.6 (Correlation of Reference Method and CEMS Data) of PS-11. That is, reference method test results should be converted, as necessary, to be on the same moisture, temperature, and pressure basis as are the continuous PM monitoring data. Practically speaking, this means that the reference method results will be converted to a wet stack gas basis and the continuous PM monitor calibrations will be expressed as, say, milligrams per actual cubic meter of flue gas. While this approach is likely to produce the most

robust continuous PM monitor calibrations, it does present a "compliance" problem. Most, if not all, concentration-based emission standards are in the units of weight of pollutant (milligrams, for example) per dry standard cubic meter. Therefore, if PS-11 were applicable, most every affected facility would have to ... also measure stack gas temperature and moisture in order to convert the continuous PM monitor data to units of the emission standard.

This creates additional problems. First, temperature sensors and moisture monitors represent additional measurement systems with each having it own accuracy, precision, and error terms. Thus, while achieving the statistical criteria of PS-11 provides some measure of agreement/correlation between reference method measurements and continuous PM monitoring data, EPA has now added at least two additional sources (temperature and moisture) of measurement error and/or uncertainty. To conduct a true evaluation of its continuous PM monitoring proposal, EPA needs to independently measure/monitor stack gas temperature and moisture, convert the continuous PM monitoring data to units of the standard (e.g., mg/Nm3), and then compare these values to reference method values. We see no evidence that EPA has done this, so EPA really does not know how well continuous PM monitoring data, when converted to units of the standard, would compare to reference method measurements. Lastly, RMB knows from its experience in working with utility companies that must meet EPA's Acid Rain monitoring requirements (40 CFR Part 75), that continuous moisture monitors are largely unproven and very problematic.

CS6A-007 (4) Specifically, EPA should allow for the site-specific development of requirements covering: 1) the location of monitoring devices; 2) averaging periods; 3) allowable downtime for the system; 4) system calibrations; and 5) the treatment of excursions.

CS6A-010, -011, -023 (4) In addition, CKRC believes EPA must resolve the issues of representative measurement locations and sampling points. The EPA's specification of manual testing location at the 8/2 equivalent diameters to calibrate the particulate monitor is not achievable or available at many portland cement plants. The guidance for location of the particulate monitor measurement sampling point or path is adopted from other monitoring regulations and are not applicable to particulate monitoring. EPA should perform additional studies to develop appropriate guidance or requirements for locating particulate monitors to provide representative measurements. Appropriate procedures also need to be developed for detection of particulate stratification where it is believed to affect the representativeness of monitoring results.

CS6A-011 (4) The stated PM CEMS location requirements are unnecessarily cumbersome. The intent seems to be to have PM CEMS monitor along the longest centerline (diameter for a circle). Both path and extractive PM CEMS must sample the flue centroid. Not stated, however, is the portion of the stack that constitutes the centroidal area or the conditions under which alternative locations can be used. The portion of the stack that must be monitored is not explicitly stated. For example, a light-scattering PM CEMS that monitors the center of a HWI's stack may only penetrate the outer third of a cement kiln's stack.

Since the purpose is to produce representative data, the site-specific calibration curve will relate specific PM CEMS responses to integrated particulate loadings. Consequently, as long as a PM CEMS location provides a consistent relative response to changes in particulate loading, calibration takes care of location-induced problems. These requirements should be guidelines and not objective

standards.

CKRC recommends that the proposed language be modified to accomplish the intent and not impose potentially unworkable location requirements.

CKRC suggests variances from traditional manual method sampling locations be included in the procedure.

CKRC understands the Agency's concern that manual method samples be representative and that traditional Method 1 criteria reproduced in PS-11 conservatively describe some such sampling locations. There are other technically acceptable sampling locations that fall outside these general criteria.

Due to physical, zoning and process constraints, some cement kiln stacks do not meet the stated sampling location requirements. Nevertheless, these facilities have been successfully performing trial burns and other BIF-required testing. Consequently, a variance procedure must be included. CKRC requests that this provision be modified to allow the use of other sampling locations that are already approved by the governing agency.

CS6A-030 (4) Stacks and ducts do not have unlimited space to place the instruments in the required eight diameters. Most stacks have existing instrumentation and/or test ports. Placing a permanent instrument in test ports does not solve the space issue as performance tests will be required. Also, CO and oxygen meters, flow and temperature indicators are in the stack. The rule should specify that the presence of other instrumentation and performance testing probes need not be considered in meeting the eight diameter criterion. Assuming laminar flow (as opposed to turbulent flow), then additional re-engineering will be required. That time will significantly increase the amount of time that it will take for a facility to install a PM CEMS.

Summary

In response to the December 1997 NODA, commenters said:

- Supported the idea of developing a correlation using manual method measurements in units consistent with the CEMS outputs;

- That if the correlation is not in the units of the standard, additional measurements must be made continuously (using temperature, pressure, moisture, and oxygen readings) and that these additional measurements can lead to more errors in the final result;

- That EPA should allow for the site-specific development of requirements covering: 1) the location of monitoring devices; 2) averaging periods; 3) allowable downtime for the system; 4) system calibrations; and 5) the treatment of excursions;

- EPA must define measurement location and sampling points; and

- Specifying the CEMS location is unnecessary.

Response

Particulate matter CEMS correlation curves are traditionally developed using manual method measurements in units consistent with the CEMS outputs. This has since become accepted practice. We agree that additional measurements must be made continuously to convert the CEMS outputs to the units of the standard, but this is also true for all other standards complied with using a CEMS in today's final rule. EPA believes a site specific determination of hardware specific parameters is appropriate, specifically the location of monitoring devices, system calibrations; and the treatment of excursions. Averaging periods, however, are an integral part of the standard and therefore cannot be determined on a site specific basis. EPA agrees with commenters that said the measurement location should be left up to the facility, however we believe permitting authorities have the right to insist a measurement location be changed if the results obtained are erroneous due to the location the facility selected.

d. EPA Should Clarify Key Terminology in PS11

Comments concerning the March 1997 NODA

CS3A-012 (6) (1) Section 6.0 allows the use of a calibration standard that "challenges the pollutant analyzer part of the CEMS (and as much of the whole system as possible), but which does not challenge the entire CEMS, including the sampling interface". Calibration standards for PM CEMS are not commercially available. The use of EPA protocol type standards for gaseous CEMS is common in commercial facilities - but no such standards can be purchased for particulate matter. The use of the gravimetric Method 5 for PM is the only EPA recognized PM determination at this time.

Comments concerning the December 1997 NODA

CS6A-001 (6) The word in-situ should be removed from the last sentence, as this should apply to all PM CEMS. The last sentence is unclear. Does this mean that the administrator may approve a calibration drift determination based on only one point (rather than both a zero and span value) or does this allow the administrator to delete the requirement for daily calibration drift checks? We do not believe that any PM CEMS can be considered to be performing adequately unless at least two points are checked on a repetitive (typically daily) basis.

The phrase "saturated with water" is not clearly stated. A system can be "saturated with water vapor" without being "saturated with condensed water vapor" or "saturated with water droplets." This distinction should be noted throughout the document.

CS6A-002 (6) Established Reference Value is not defined in the definitions. It is unclear if this section (6.1.1) is referring to the data recorder or the CEMS. This section could state the resolution of the data logger (e.g. 0.5% instrument span) and the data logger must be ranged to match the CEMS. A different section should be added that could state the output range of the CEMS (3 times the emission limit) and where the zero and span checks must fall (0 to 10% and 70 to 90% of CEMS span for example.

Is this section (6.1.2) trying to define the instrument zero check at 0 to 20% of the instrument span and the span check at 50 to 100% of instrument span? The zero check and span check (upscale calibration check) should be in the definitions and this section should state the instrument must perform and logging system must record a zero and span check.

CS6A-009 (6) The report states that the CEMs be calibrated to twice the proposed standard (page 2-3). This is different from the "full operating range" criterion in the NODA. CRWI suggests that the draft report be modified to reflect the discussions in the NODA. Even at full operating range, CRWI has two concerns. First, this may require operating above the manual PM MACT standard. This cannot be done unless the regulating agency suspends any enforcement action during the calibration. CRWI suggests that the Agency make it clear in the rule and in the preamble that data collected during calibration may not be used to demonstrate a violation of the PM MACT standard. This should also extend to the relative calibration audit (RCA) process as well, since it has the same range criterion. This would allow facilities to develop calibrations without having to walk a tightrope between compliance and a robust calibration.

CS6A-011 (6) There appears to be an omission in equation 14 (FR 67811) in the definition of k_t. CRWI suggests that EPA check this equation to make sure the correct version is incorporated into the final rule.

CS6A-030 (6) Cycle time is not defined in this specification. DOE believes that EPA should define the term or omit it. In the PS section(s) dealing with response time (or measurement interval time), DOE requests EPA to provide the rationale for specifying a particular maximum time period. As noted above, measurement results from periods that are very short compared to the averaging period for the applicable standard are extremely difficult (if not impossible) to check and have little usefulness for determination or documentation of compliance. Likewise, it is difficult to justify specification of a maximum delay of only 3 minutes between the end of a sampling time and reporting of the sample analysis result. Why must this delay be less than the longest response time allowed under section 6.2.2?

Summary

Commenters to the March and December 1997 NODAs pointed out several key terms that were not clearly identified or were presented in an inconsistent manner in PS-11.

Response

EPA agrees that PS-11 should provide a better definition of each of these terms.

5. Procedure 2

a. RCA Test Frequency

Comments from Proposal

RCSP-097 (1) 2.6. CEM Test Frequency and Type of Test Concerns If hazardous waste incinerators are to proceed with a strategy to utilize CEM's for demonstration of compliance with MACT Standards, a combination of calibration audits and test audits will be required as part of the quality assurance and quality control programs. CRWI is concerned with application of the procedures for the Response Calibration Audit and Absolute Calibration Audit for the PM monitor. This is addressed in section 2.5 of our comments. CRWI is also concerned that proposed QA/QC requirements for PM CEM's are more stringent than the "German Approach," EPA's basis for suggesting these monitors are commercially available.

Potential Solutions With the exception of the PM QA/QC, CRWI supports the EPA's suggested frequency of testing and type of testing proposed in the MACT Rule for CMS and CEM's instruments as listed in Table 2.2. With respect to QA/QC for PM CEM'S, we suggest an approach more similar to that used by the Germans in certification of instrumentation. In this approach, a frequency of PM CEM calibration at 3 - 5 years has been established. It is suggested the EPA consider decreasing the QA frequency if there is repeated assurance that calibration of the PM CEM is not changing based upon the 18 month tests (good actor incentive). It is also suggested that a certification of CEM's be considered that incorporates a combination of laboratory and on-site certification similar to the German TUV Certification Process as discussed in Section 2.2 of these comments. TABLE 2.2 [See original comment, page 48]

CEM5.047(129) A problem is seen with the application of the procedures for the Response Calibration Audit and Absolute Calibration Audit for the PM monitor. This is addressed elsewhere in our comments.

For PM CEMs an approach more similar to that used by the Germans in certification of instrumentation is recommended In this approach they have established a frequency of PM CEM calibration of 3 to 5 years. It is recommended EPA consider decreasing the QA frequency of repeated assurance that calibration of the PM CEMs is not changing based upon the 18 month tests. It is also recommended that a certification of CEMs be considered that incorporates a combination of laboratory and onsite certification similar to the German TUV Certification Process.

CEM5.071(182) 7. Dow does not believe EPA meant to require recalibration of the PM CEM for each fuel type burned and suggests EPA delete this from Performance Specification 11. In the proposed new CEM specifications in 40 CFR 60, Appendix B, Performance Specification 11 details requirements for PM monitors. Dow believes that the calibration requirements need to be revised for better clarity. In particular, section 1.1 of the PM Performance Specification suggest that the CEM must be recalibrated for "changes in emission control system or fuel type) - - .. " (emphasis added). This certainly cannot be EPA's intent because from purely a practical standpoint, many facilities have several thousand waste streams burned in various combinations with one another which would make recalibration at such facilities, under a straightforward interpretation of the

specification totally unworkable. Once PM CEMs become available and are installed, in situ calibration against a reference method while the unit is burning typical wastes will provide sufficient corroboration that the CEM is accurate. EPA should clarify the specification text to eliminate the reference to recalibrating when the fuel type changes.

RCSP-183 (1) CEM Test Frequency and Type of Test If hazardous waste incinerators are to proceed with a strategy to utilize CEM's for demonstration of compliance with MACT Standards, a combination of calibration audits and test audits will be required as part of the quality assurance and quality control programs. 3M is concerned with application of the procedures for the Response Calibration Audit and Absolute Calibration Audit for the PM monitor. 3M is also concerned that proposed QA/QC requirements for PM CEM's are more stringent than the German approach that was EPA's basis for suggesting these monitors are commercially available.

With the exception of the PM QA/QC, 3M supports the EPA's suggested frequency of testing and type of testing proposed in the MACT Rule for CMS and CEM's. A frequency of PM CEM calibration at 3 - 5 years has been established. It is suggested the EPA consider decreasing the QA frequency if there is repeated assurance that calibration of the PM CEM is not changing based upon the 18 month tests.

<u>Comments from the December 1997 NODA</u>

C6A-002 (1) The ISO 10155 standard should be followed and each CEMS should be calibrated once per year.

C6A-006 (1) Our comments on the quality assurance requirements, proposed as Procedure 2 to Appendix F, focus on § 5. Data Accuracy Assessment. Section 5.1.1 states that a response calibration audit (RCA) must be conducted at the frequency specified in the applicable regulation. While RMB does not have a technical basis upon which to recommend an RCA frequency, we recommend that EPA establish a frequency and include it in Procedure 2. We would argue that appropriate quality assurance procedures for any continuous PM monitor being used for compliance determinations should be independent of the "applicable regulation." In other words, appropriate quality assurance procedures should be dictated by the monitoring technology/instrumentation - not by the emission standard or regulation. We also observe that our recommendation would make Procedure 2 consistent with Procedure 1, which is EPA's Appendix F quality assurance requirements for gaseous CEM systems that are used for compliance determinations.

C6A-008 (1) CMA supports the required 5 year recalibration frequency for RCAs...
...Failed recalibration audits should not trigger immediate full recalibrations. If the results fail to confirm the original calibration relation, the re-test should be performed as soon as practical. If the second recalibration still fails, then a new calibration should be performed.

...CRWI agrees with the Agency that the RCA should be done in conjunction with the comprehensive performance tests. The daily checks on zero and calibration drift should be adequate to determine if there are significant changes in the electronics of the instrument. These daily checks and the experiences in Germany make the RCA on a five year basis justified.

CS6A-009 (1) RCAs should be conducted on a five year basis.

CS6A-016 (1) Section IV C discusses the relative calibration audit (RCA) test frequency and require immediate re-calibration for any failed RCAs. An arbitrary re-test frequency should not be necessary at a facility burning well-defined and consistent non-solid waste streams. For such sites, re-testing should only depend on the representativeness of the most recent test. We propose that the regulations should parallel federal and state air compliance programs that generally use a 10% change as a basis for requiring re-testing.

CS6A-025 (1) The ETC supports EPA's proposal to require the RCA test frequency every 5 years. This will provide opportunity for cost savings since this will be simultaneous with the performance tests required by MACT. It will also provide an opportunity for reviewing calibration data and ensuring that the basis for the OPL is still valid.

CS6A-030 (1) In the proposed rule, EPA said that facilities would be required to perform relative calibration audits (RCAs) on their PM CEMS every 18 months. This testing interval would have been relaxed to 30 months for small on-site incinerators. These time intervals coincided with the proposed Performance Test intervals. The Agency is considering requiring all facilities to conduct comprehensive performance tests every five (5) years, including concurrent RCA tests. (62 FR 67801, col. 1-2). DOE agrees that RCA testing should be performed coincident with Performance Tests and both should be performed, at a minimum, at 5 year intervals.

Summary

Most commenters generally agreed that RCAs should be performed every 3-5 years. One commenter suggested RCAs every year. Another said that historical data should be used to extend this retest frequency if a facility successively passes successive RCAs. One commenter said the retest frequency should not be source specific, but specified in Procedure 2 as a requirement for all sources.

One commenter took issue with the proposal that calibrations be required for every fuel type.

Response

EPA agrees that RCAs should be conducted at least every three to five years. This is standard practice overseas. We do not believe retesting every year is cost effective. We do not believe that the time should be extended if a facility passes several RCAs. There are too many variables that effect the reliability of the correlation, such as the quality of the manual method test crew, which cannot be extrapolated into future years. EPA believes the retest frequency should be specified in the regulations (at least initially) until a broad set of data is accumulated over a number of source types.

Correlations of light-scattering CEMS are effected by the type of particulate in the stack. This means the correlations are effected by fuel type. However, this situation can be overcome by mixing together as many modes of operation into a single correlation curve. If doing this causes a poor correlation, though, the facility might have to establish different correlations for different modes of operation (such as one for fuel oil, and a second for waste fuel.)

b. Integration of RCA Data into the Correlation

CS6A-003 (2) Combining all calibration data is the best way to ensure calibrations are accurate and that they meet the PS-11 standard. EPA has proposed that RCA data can be combined with initial calibration data if RCA does not meet specifications. This is a good way to make use of all calibration data. to improve the accuracy and precision of the calibration.

CS6A-009 (2) Facilities should be allowed to incorporate data developed for an RCA into the cumulative database for calibration if this data increases the confidence in the calibration.

...Section 5.2 appears to require that a failure to meet the RCA requirements would result in a re-calibration. CRWI suggests that instead of re-calibration, the facility should be allowed to redo the RCA within three months. Given the problems with Method 5I, this will allow the facility to gather additional data to determine if the problem is with the reference method or with the monitor. If the monitor fails the second RCA, the facility should then initiate re-calibration.

Summary

Commenters requested that RCA data be allowed to be incorporated into a commutative database for improving the correlation equations.

One commenter said a facility should be allowed three months to perform a new RCA to verify the first was correct.

Response

Procedure 2 will provide specific instruction on handling RCA data. We agree that RCA data can (and probably should) be incorporated into the existing correlation.

The second issue, of allowing additional time to perform a second RCA to confirm the results of the first, will be addressed later.

c. Clarification of Daily Zero and Span Drift Specifications

Comments

CS6A-001 (3) Calibration Drift Test Period. The facility load should have no effect on the CD Test. We suggest this part of the first sentence be deleted...

Does this mean that the administrator may approve a calibration drift determination based on only one point (rather than both a zero and span value) or does this allow the administrator to delete the requirement for daily calibration drift checks? We do not believe that any PM CEMS can be considered to be performing adequately unless at least two points are checked on a repetitive (typically daily) basis...

CS6A-009 (3) The Agency has stated its intention to require maintenance whenever individual or cumulative drift corrections exceed specific levels. CKRC is concerned that the basis for these

triggers is not well established and can result in unnecessary loss of data. CKRC is also concerned that if more stringent triggers are needed, performing maintenance in response to them could put the plant in jeopardy of non-compliance with what appears to be arbitrary data availability requirements. In particular, since there is little experience with PM CEMS on North American CKs, LWAKs or HWIs, no one knows if complying with these maintenance triggers will preclude compliance with monitor availability requirements. Until the internal consistency of the maintenance and availability requirement is demonstrated, compliance by properly operated and maintained sources cannot be reasonably assured.

CS6A-010, -011, -023 (3) EPA must evaluate and define the adequacy of the daily calibration checks to determine zero drift and calibration drift. These procedures must not be left to the instrument manufacturers. This is a critical deficiency and fundamentally compromises the proposed particulate monitoring program. The daily checks provide the only means to assess the validity of the monitoring data on a day-to-day basis. The validity of these checks is therefore of vital concern to both the CEM operator and the regulatory agency. This is of particular concern because there are no NIST traceable standards for use with particulate monitors that are comparable to the EPA Protocol 1 calibration gases used for gas CEMS. EPA must identify acceptable calibration check procedures and calibration materials.

CS6A-011 (3) Since the purpose of the RCA is to verify that the calibration curve is still applicable, the Agency needs to include objective criteria for accomplishing that end. That 75 percent of the new data resides within the 75% tolerance interval for the initial calibration provides a good check. Another check is to calculate the confidence interval for a calibration curve based on the RCA data. As long as the previous calibration curve resides within the new confidence interval, there is no reason to believe that significant change has occurred at the 95 percent statistical confidence level. As an additional check, the similarity of the intercept and slope coefficients can be verified by dividing the difference between the new and old coefficients by the standard error of new coefficient.

CS6A-025 (3) In general, the ETC supports requiring additional data quality objectives related to calibration drift for a proposed new “Procedure 2" of Appendix F to 40 CFR Part 60. The ETC, however, urges EPA to publish for comment the calibration drift criteria. Our comments above regarding PS11 are also applicable here, in that EPA needs to make certain that these data quality objectives are demonstrated and achievable. We also note that EPA does not appear to have used these drift criteria in the demonstration tests performed to date. EPA needs to make certain that the demonstration test data supports the achievability of the drift criteria.

CS6A-030 (3) In discussing its calibration drift performance specification EPA states The CEMS internal calibration must not drift or deviate from the value of the reference light, optical filter, Beta attenuation signal, or... ,

Much of the content of these sections (e.g., calibration drift, calibration standard, zero drift, Response Calibration Audit, Absolute Calibration Audit) has nothing to do with calibration in the strictest sense, namely, the relationship between the CEMS response and the results of the manual PM Reference Method. DOE suggests EPA consider using other language (e.g., span drift, check standard, instrument zero drift, etc.) to distinguish between various instrument checks and the CEMS calibration.

Summary

Many commenters requested clarification of the procedures and requirement for performing zero and span drift checks. Specifically:

- Facility load should have no effect on the CD test;
- Clarification on what whether both a zero and span drift are required;
- Maintenance should not be required after a zero or span drift failure;
- Asserted that EPA has not fully evaluated or defined the necessity for a zero and span drift check;
- Request that the RCA test be made more rigorous, that the confidence interval be checked as well; and
- A general confusion between calibrating the CEMS using manual methods and the calibration in the sense of zero and span drift.

Response

Both a zero and a span drift checks will be part of the final Procedure 2, when promulgated. Many of the CEMS tested (primarily the in-situ, light-scattering CEMS) do these checks automatically. These checks are standard practice with gaseous CEMS and necessary to ensure that the analyzer portion of the instrument is operating properly. Failure of a zero and span check nearly always is caused by some malfunction of the instrument, such as a clogged extraction tube or fogged optics. Therefore, we believe the instrument should be checked after a zero or span drift check is failed. These checks are external checks of the analyzer; no changes in facility operation are necessary to perform these checks.

We agree that making the RCA test more rigorous has advantages, but the RCA test may not have enough data to ascertain a correlation from it. Therefore, doing a correlation interval check may not be possible.

Finally, we agree that calling the correlation between the manual method results and the CEMS outputs a “calibration” (as it was called in previous notices) causes confusion. EPA has modified its terminology and now calls this a “correlation” to highlight that it differs from an analyzer “calibration” using some standard of measure.

d. Treatment of Outliers

Comments from the March 1997 NODA

CS3A-003 (4) [From Appendix A, RMB Consulting and Research Memorandum to UARG, April 18, 1997] Statistical Analysis In the Federal Register notice, EPA requests comments on its

statistical approach to data analysis, especially with respect to the Agency's treatment of "outliers." RMB supports EPA's approach for dealing with paired reference method measurements. That is, if two concurrent Method 5 runs fail to agree within some pre-determined tolerance, than at least one of the tests is inaccurate, and both runs should be rejected. On the other hand, R-MB believes that EPA must be very careful in rejecting responses from any of the continuous PM monitors. We can easily argue that using any type of statistical outlier test merely assumes away the problem. That is, the basis of an outlier test is that all of the observations are drawn from the same distribution, and, because a particular observation does not fit that distribution. it can be discarded. In reality, EPA does not have sufficient data from any given continuous PM monitor to know that all of the measurements are from the same distribution. Therefore, we do not believe that EPA can or should reject responses from continuous PM monitors on the basis of statistical outlier tests.

CS3A-004 (4) 3. Handling of outliers. There are two areas in the report where outliers are discussed.

1) RSD outliers. The first issue pertains to significant differences between the two trains on MM5. Here, CRWI agrees with EPA that any paired data train of MM5 that has an RSD greater than 30 should be discarded (equations 1 and 2 on pages 6 of 37, section 2 need to be corrected). Based-on MM5 data corrected for oxygen, CRWI agrees with removal of the data shown on page 6 of 37, Section 2 with some exceptions. We suspect that the following statement "(No. 1 0) in October" (page 6 of 37, Section 2) should read "(No. 20) in October" since Run 10 was in September and Run 20 had a RSD of 52. CRWI could not find data reduction tables for Train A for either Run 41 or 42 in the appendix, making it difficult to determine if these RSD eliminations were correct.

2) Statistical outliers. The second discussion of outliers pertains to whether statistical outliers should be discarded when developing the calibration for each CEM's unit. There are statistical reasons for discarding data that is greater than three standard deviations from a regression line. However, it should be noted that removing of outliers would im prove the correlation coefficient and reduce the confidence limits. While this may initially appear positive, it may create problems with subsequent RCA'S, unless statistical outliers are discarded in the RCA using the same criteria. Thus, removal of outliers to improve the correlation coefficient so that the calibration meets Draft Performance Specification (DPS 11) may insure that it will fail the RCA. Also, if outliers are discarded during calibration, EPA should develop methods for discarding outliers during compliance. Due to the lack of corrected data, CRWI has not been able to complete the analysis to determine the full implications of discarding statistical outliers. When this data is provided, we will continue to work on this issue and submit results to the Agency at a later date.

CS3A-011 (4) IV. EPA'S TREATMENT OF OUTLIER DATA DOES NOT APPEAR TO BE STATISTICALLY RIGOROUS Because of the many errors in the report we have not yet been able to conduct a statistical analysis of the data, nor a review of EPA's data manipulation. It appears, however, that EPA's treatment of outlier data is arbitrary, often based on unarticulated judgments rather than systematic established criteria. Only outliers due to problems with the Method 5 trains or other identifiable causes should be removed from the data set. Discarding the data when the paired Method 5 train results differ by more than 30% is reasonable, since this large difference indicates a problem with one or more of the Method 5 test results[FN2]. Without a reliable reference method, there is no way to evaluate the accuracy of the CEMs data. [FN2: CMA notes, however,

that the 30% value may warrant reevaluation in the current context. It was based on multiplying by three the 10% RSD calculated from Method 5 data collected in the 1970s. However, analysis of a more relevant database --EPA's own HWC MACT database yields an apparent RSD of 30% based on the two most extreme data points from triplicate test runs. See Attachment #1. This result may be a function of attempting to measure the very low pollutant concentrations emitted from HWCs, as compared to the conventional pollutant emissions measured in the 1970s.] There has been no determination of the cause of the other "statistical" outliers, so this data should not be removed just because it is greater than 3 standard deviations from the regression line. The only justification for removing the statistical outliers is if the cause is identified and would be considered a valid and identifiable cause for removing data during routine operation to determine compliance. Otherwise, these same outliers will be likely to occur during normal operation and will cause a facility to appear to be out of compliance, when the facility's emissions are actually within the emissions limits. EPA should recall that the proposed HWC rule did not allow any CEMs data to be thrown out for compliance purposes, even if a reason for its unreliability was found. Fundamental fairness requires that the same data outlier procedures followed when certifying a monitor should be followed when deciding what data must be used for compliance determinations. Since outliers comprise a significant percentage of the test data, removing them calls the whole test into question.

CS3A-012 (4) 2. The PM CEMS tested only meet the DPS-11 specifications with significant data deletion. As noted in the NODA, without significant deletion of outliers" the PM CEMS would not meet the specifications of DPS-11. Recommendation - These CEMS must be able to meet the specifications of DPS-11 without significant data deletion before they can be considered for use in regulatory compliance unless the same data deletion techniques can be used in a regulatory compliance, unless the same data deletion techniques can be used in a regulatory compliance situation.

CS3A-012 (4) (4) Attached are trial burn data for PM showing the individual sampling runs and the results. It can be seen that individual runs can easily be +/- 10% of the average value calculated for the 3 run set required by Method 5. This is much higher than the 1% range maximum required of an EPA protocol standard reference gas. This 10+% variation between individual runs can be expected at the PM levels found in RCRA units - (approximately 0.08 grains/dscf). Accuracy of Method 5 at the MACT level of 0.03 grain/dscf is approximately +/-20% and relative accuracy at the .015 - 0.02 level could be as high as +/- 100% (estimate from Paul Gorman of Midwest Research Institute). This high degree of variability leads to a very crude calibration of an instrument that potentially could be the cause of many Automatic Waste Feed Cut Offs (AWFCOs). METHOD 5 PARTICULATE MATTER INCINERATOR TRIAL BURNING DATA AMERICAN CYANAMID - HANNIBAL PLANT [DATA NOT REPRODUCED HERE. SEE COMMENT.]

CS3A-014 (4) 7. Only outliers due to problems with the Method 5 trains or other identifiable causes should be removed from the data set. Discarding the data when the paired Method 5 train results differ by more than 30% is reasonable, since this large difference indicates a problem with one or more of the Method 5 test results. Without a reliable reference method, there is no way to evaluate the accuracy of the CEMS data. There has been no determination of the cause of the other "statistical" outliers, so this data should not be removed just because it is greater than 3 standard deviations from the regression line. The only justification for removing the statistical outliers is if the cause is identified and this would be considered a valid and identifiable cause for removing data

during routine operation to determine compliance. Otherwise these same outliers will be likely to occur during normal operation and will cause a facility to appear to be out of compliance, when the facility's emissions are actually within the emissions limits. Ironically the proposed HWC rule did not allow any CEMS data to be thrown out, even if a reason for its unreliability was found. The same data outlier procedures followed when certifying a monitor should be followed when determining whether to use data for compliance determinations. Since outliers comprise a significant percentage of the test data. removing them calls the whole test into question.

Comments from the December 1997 NODA

CS6A-003 (4) Kodak supports EPA's method of identifying data outliers in the demonstration test. When analyzing the PM CEMS demonstration data, EPA removed data when the difference within the paired Method 5I tests was outside 3 SDs of the typical Method 5I data variation. This is a reasonable way to remove bad data. EPA has proposed that the same approach be used when operators calibrate their PM CEMS. We support this approach.

CS6A-006 (4) Procedure 2 and Method 5I. RMB does not see any regulatory language in those provisions that discusses the use of an outlier procedure. That language must be proposed before this rulemaking may proceed.

CS6A-008 (4) CMA supports EPA's method of identifying data outliers in the demonstration test.

When analyzing the PM CEMS demonstration data, EPA removed data when the paired Method 5I results varied by more than 3 significant deviations from each other. This is a reasonable way to remove bad data. EPA has proposed that the same approach be used when operators calibrate their PM CEMS. We support this approach.

Additionally, EPA threw out entire data sets when they did not feel confident in the data, particularly in the initial learning stage. Facilities should have the same opportunity to throw out an entire data set if they are not confident that the data are accurate and represents the true relationship between the PM CEMS reading and the PM concentration.

During normal operation and calibration of the instruments on a permitted combustor, guidelines will be needed for a facility operator to determine when such data can be discarded. If the Agency allows such data to be discarded for calibration purposes, it should also clarify that such data may not be construed as "credible evidence" for enforcement purposes.

Summary

Commenters requested EPA provide a better description of the rationale used for removal of outliers in the DuPont data. They generally favored EPA's approach to eliminating imprecise manual method data (paired data outliers) but not CEMS outliers ("statistical" outliers). Commenters also said that facilities should be allowed to eliminate outliers if EPA eliminates outliers during its tests.

Response

EPA has (or will in the case of Performance Specification 11, Procedure 2) addressed the method, or paired data outlier issue in Method 5i. EPA agrees with commenters that eliminating data that does not agree with the CEMS response is not advisable.

6. Correlation Issues

a. Light Scattering Devices and Multiple Correlations

Comments

CS6A-001 (1) We see no evidence in the test results to require multiple calibrations for the In-situ light scattering PM CEMS. ... The requirement for an unlimited number (3 minimum) of calibration tests for light scattering instruments is unreasonable. Clearly, this specification will result in the elimination of these instruments from consideration by the affected industries, thus leaving only one viable technology.

CS6A-002 (1) There is no valid data to support the requirement of additional calibration for light scattering devices. The data on the PM CEMS demonstration at DuPont is incomplete and the paired trains do not appear to compare well with each other in many instances.

CS6A-003 (1) Only one calibration should be required for light scattering units. EPA suggests that 3 calibrations over time are needed for light scattering units. They found that the 3 data sets collected over time each defined different linear calibration slopes. However the reason that the data sets had different slopes was that each data set covered a different range and the slope was not constant over the whole data range (it was non-linear). If these data sets had been collected in the same time period over the same range, the same results would have likely occurred. Therefore, the need is to collect good data over the operating range, not to run several calibrations over time, which might or might not cover the whole operating range. It is most important to get the relationship correct in the upper range, where compliance could be an issue. Therefore we suggest that only one calibration be required for all PM CEMS, but that additional data be collected if the operating CEMS data falls outside the specifications as defined in the previous comment on calibration range.

CS6A-006 (1) In the NODA, EPA introduces the concept of requiring multiple calibrations if a light-scattering continuous PM monitor is used. If a light-scattering device is used, EPA would require a second calibration within 9 months of the "Compliance Date" and a third calibration within 12 months of the "Compliance Date." While RMB agrees, and has commented earlier, that the calibration of a light-scattering device is strongly dependent on particle characteristics (e.g., size, shape, and color), EPA's 9- and 12-month calibration dates appear arbitrary and without scientific derivation. That is, process operating variability that would give rise to a complete range of variability in emission characteristics is not necessarily tied to a clock or calendar. We believe that EPA should be less proscriptive with respect to calibration timetables and allow affected sources to choose the appropriate times at which to conduct the calibration runs.

CS6A-008 (1) Only one calibration should be required for light scattering units. EPA suggests that three calibrations over time are needed for light scattering units (compliance date plus 6, 9, and 12 months). They found that the 3 data sets collected over time each defined different linear calibration slopes. However, the reason that the data sets had different slopes was that each data set covered a different range and the slope was not constant over the entire data range (it was non-linear). If these data sets had been collected in the same time period over the same range, the same results would likely have occurred.

CS6A-011 (1) The Agency is proposing that all light scattering units have three calibrations over time. This was based on the different slopes calculated from the two calibration periods of the DuPont test. CRWI believes PM monitor calibrations are not influenced by time. The reason for different slopes from the two calibration periods is not because the shape of the curves are different but because the second calibration period did not have the same range as did the first calibration. Had the two calibrations had the same range, it is likely that the slopes would have been similar. However, it is fortuitous that the range was different. If this were not so, a linear relationship would have been assumed and a non-linear possibility would not have been explored. However, at this time, EPA has established that it is possible to have a non-linear relationship and that should be taken into account when the form of the calibration relationship is calculated. CRWI fails to see why multiple calibration periods are needed for any monitor as long as a full range of PM emissions are included in the initial calibration. CRWI suggests that this requirement be dropped and all units have the same calibration requirements.

CS3A-011 (5)(c) Relatedly, CMA opposes any requirement that units should have to establish different calibration curves for different waste streams. Again, the monitoring technology should be robust enough to handle the variety of waste streams that incinerators commonly manage.

CS6A-014 (1) For the Calibration of a light scattering CEMS a number of no less then 45 (3 x 15) runs, preferably paired trains, with the reference method are requested. This is causing significant personal and financial effort to the facility, which to our experience is not really necessary. As reported in the NODA, this procedure is mainly based on the single experience at the DuPont incinerator and the uncertainty what might happen at other facilities. The experience on similar facilities in Europe, which has been finally fixed in the German regulations, supports on the other hand, that a single calibration using at least 15 runs is sufficient (17. BimSchV and related regulations / guidelines).

So we would propose a procedure similar to the German one:

- Initial calibration using at least 15 runs of Manual Method (preferably paired trains)
- New calibrations using 15 runs only
  - every 3 to 5 years
  - with changes to the incinerator setup or operating conditions
  - if the actual data are regularly beyond the calibration range

CS6A-020 (1) After conducting the CoC test, completing the first calibration, and submitting the CoC results, cement kilns will be required to submit two additional calibration performance demonstrations. Essroc believes it is unnecessary to require facilities to perform 3 calibrations. It is neither cost nor resource effective.

<u>Summary</u>

EPA cited a requirement for multiple correlations of light scattering devices but offered no basis for this requirement. PM CEMS vendors felt this requirement would make their systems noncompetitive on a cost basis.

<u>Response</u>

EPA no longer believes multiple correlation tests will be required to ensure the mathematical characteristics of the true correlation curve for light-scattering PM CEMS. Instead, facilities would be required to develop a correlation from zero emissions up to 100% of the emissions potential of the facility. Extrapolation of the curve to 125% of the maximum data point would be allowed, but a facility would be required to *expand the current correlation* to include higher emissions data if emissions higher than this 125% point are experienced for a sufficiently long period of the (*i.e.*, more than three hours).

b. *General Correlation Issues*

Comments concerning Proposal

CEM5.007(101)(c) Another concern with the implementation of PM CEMs is the impact of changes in the particulate size distribution due to changes in waste feed. The calibration for these CEMs may be waste specific. No data is currently available to evaluate this potential problem.

CEM5.026(125)(b) • The calibration requirements in PS 11 call for one line (or curve) to be developed that best fits all three mass loadings at which the calibration testing is to be done. However, because particulate size distributions for a given source may differ at different mass loadings, using just one line (or curve) may create significant inaccuracies in the compliance monitoring results at the typical mass loading of the source. See RMB Memo at p.2.

CEM5.039(127)(a) • Continuous Emissions Monitoring Systems (CEMS)--The proposed application of CEMS to HWCs should be modified to.... Better describe, explain, and justify the proposed PM CEMS calibration procedures.

CEM5.039(127)(b) 3. A site-specific calibration of the PM CEMS must be performed using manual stack sampling methodology. (A total of at least fifteen reference method measurements are required spanning at least three different grain loadings.) Different CEMS calibrations will be required for each of three different waste/fuel types: gas, liquid, and solid. Clearly, all three of these feed types are often burned simultaneously. Moreover, the proportions of gas, liquid, and solid feed types can vary significantly during normal operation.

CEM5.039(127)(c) Proposed Performance Specification 11 recommends that the CEMS be calibrated over PM levels ranging from a normal minimum level to a level roughly twice the emission limit. Accordingly, the proposed rule should be amended to provide a waiver allowing PM emission concentrations in excess of 69 mg/dscm (or the site-specific limit) during the CEMS calibration process.

The practicality of varying the PM emission concentration over the full calibration range will depend on the PM emission control device. In some cases, the only way to cause any wide variation in PM emission concentration without disabling the control device is to vary both waste feed types and rates. In this case, PM characteristics affecting the instrument response could vary from one point to another along the calibration curve. Variable, partial bypassing of the PM control device would avoid this problem. The proposed rule should be amended to provide a waiver allowing APCD bypassing (normally forbidden) expressly for PM CEMS calibration purposes.

CEM5.017(114)(c) 3. The development of individual calibration curves for each "fuel type" or combination of fuel types is not clear and sufficient information is not available to adequately comment on this requirement. The definition of "fuel type" is not adequately explained. Many hazardous waste incinerators have multiple feed streams, including high and low organic liquids, low and high ash solids, sludges, gases. They may also utilize multiple auxiliary fossil fuels. Conducting performance testing (three tests at three different emission rates with a minimum of 15 tests) on all waste feed combinations is not possible and is probably not a common practice where PM CEM's are used. However, it is not clear how waste stream variability is addressed in the performance specifications process. CRWI operating experiences show that particulate characteristics are more affected by the chemical and physical characteristics of the specific wastes being burned than the "fuel type.

CEM5.017(114)(h) 4. EPA needs to better define the calibration procedures which are required for different waste and/or fuel types. Presumably, the particulate characteristics may not be affected by certain waste streams and it may be dominated by others. The requirement for calibration curves for different fuel types should be determined on a case-by-case basis with operating experiences from other facilities being used to devise the actual calibration requirements.

CEM5.031(125A) CALIBRATION STABILITY AND ROBUSTNESS Figure 1 (attached) is illustrative of how a continuous PM monitor calibration curve might look, especially when the instrument is calibrated at three distinctly different mass loadings as required by PS 11. [Footnote 3: While RMB's Figure 1 is hypothetical, it is entirely consistent with Figure 2-1, Volume IV: Compliance with the Proposed MACT Standards, Draft Technical Support Document for HWC MACT Standards, U.S. Environmental Protection Agency, February 1996 [Docket Item RCSP-S0053].] As Figure 1 suggests, the characteristics of the particulate emissions are quite different at the three different mass loading loadings (i.e., low, medium, and high). It is easy to imagine that as the particulate mass loading increases, there is an accompanying change in the particle size distributions. Since most, if not all, of the commercially available continuous PM monitors are sensitive to particle size distribution, it is clear that each mass loading regime needs to be characterized by a different calibration curve. Unfortunately, PS 11 provides for only a single calibration curve - that may reflect significant inaccuracies for different mass loadings as particle size distributions change.

Referring to Figure 1, let's assume that the second particulate mass loading regime (i.e., the one where the best fit line is given by $y = 0.89x + 0.24$) includes the particulate emission standard. Furthermore, for values within the second data regime, we must assume that the regression equation based on the second regime of data is more accurate than the regression equation based on all three regimes of the data. For an assumed continuous PM reading of 6 units, the regression equation for the second regime of data would predict a stack test reading of 5.55 units; however, the overall regression equation would predict 6.24 units. There is a significant difference between the two predictions, with the overall regression equation predicting a reading 11 percent higher than the regression equation for the second regime. It is important to recognize that this is solely a difference in predicted readings (resulting from two different predictive equations) and does not include any variability or calibration scatter issues that will be discussed below. Suffice it to say, any owner/operator should be very troubled by a potential "error" of 10 - 11 percent when his facility is operating near the emission limit.

CEM5.040(127)(a) 2. To support provisions of the proposed rule requiring PM CEMS, the EPA cites the findings of its investigation of PM CEMS applications to HWCs in Europe, particularly Germany. Ciba commends the EPA's attempt to assess the technical feasibility of continuous PM emissions monitoring through an empirical approach.

CEM5.040(127)(b) How will this affect the physical characteristics of the resulting PM emissions, the response of the PM CEMS, and the validity/applicability of the calibrations performed? The proposed rule fails to quantify the relative uncertainty in the indicated PM emission concentration stemming from the proposed calibration method. Until and unless this issue is resolved, Ciba believes that it would be inappropriate to use PM CEMS data to monitor real-time compliance with the PM emission standard.

CEM5.042(128) 3. Normal variations in sample matrices will significantly impact instrument responses, impacting compliance monitoring accuracy. Another complication that needs to be addressed is that the sample matrix effect is significantly different for particulate and mercury than for CO, HC and O_2. It is then documented that the sample matrix effect significantly affects the instrument response. For example, the same amount of mercury in three different sample matrices may yield three different results. Hazardous waste incinerators' sample matrices can change daily based on the waste being burned, so reliable and meaningful results are doubtful. This factor alone should be sufficient to disqualify current CEM technology for particulate and mercury monitoring until it has advanced further.

CEM5.046(129) PARTICULATE MATTER (PM) CALIBRATION PROCEDURES Problem EPA has proposed the use of PM CEMs for all hazardous waste combustion facilities. This requirement is based on the commercial availability of these devices and their demonstration and use for compliance purposes in Germany. An international standard (ISO 10155) describes performance characteristics, test methods, and specifications for these systems and a technical inspection agency (TUV) has been charged by the German government with the environmental testing and certification of CEMS. In evaluating the assessments of these technologies, there are a number of issues which are not clear. Much or all of the information that has been generated during the development of performance specifications is proprietary and many performance issues cannot be adequately evaluated.

An underlying concern is that while the methods used to determine performance specifications in Germany may be appropriate to German regulatory practices, they may not be consistent with EPA enforcement practices and/or the U.S. legal system. Due to the lack of available information, it is not understood how EPA adequately addressed many important issues regarding the use of PM CEMs and the associated costs.

Specific issues of concern include: ...

3. The development of individual calibration curves for each "fuel type" or combination of fuel types is not clear and sufficient information is not available to adequately comment on this requirement. The definition of "fuel type" is not adequately explained. Many hazardous waste combustors have multiple feed streams, including high and low organic liquids, low and high ash solids, sludges and gases. They may also utilize multiple auxiliary fossil fuels. Conducting performance testing (three tests at three different

emission rates with a minimum of 15 tests) on all waste feed combinations is impractical and is probably not a common practice where PM CEMs are used. However, it is not clear how waste stream variability is addressed in the performance specifications process. Operating experiences show that particulate characteristics are more affected by the chemical and physical characteristics of the specific wastes being burned than by the "fuel type".

...

Possible Solutions

...

3. EPA needs to better define the calibration procedures which are required for different waste and/or fuel types. Presumably, the particulate characteristics may not be affected by certain waste streams and it may be dominated by other by other characteristics. The requirement for calibration curves for different fuel types should be determined on a case by case basis with operating experiences from other facilities being used to devise the actual calibration requirements.

CEM5.051(141)(b) For example, the PM CEMS is calibrated by a curve from Reference Method 5 test, which requires the very significant assumption that feed stream characteristics (e.g. reflectivity) remain constant. This is not an appropriate assumption for the combustion of variable hazardous wastes. EPA notes that the German TUV desires notice and recalibration of PM monitors with a change in fuel or fuel supplier. TUV evidently expects that PM monitor accuracy may be adversely affected by as small a change as from one source of coal to another. Hazardous waste feedstreams would exhibit greater variability than oil and coal. Thus, the use of PM CEMS involves a very big assumption.

CEM5.055(144)(c) Additionally, PM CEMS have not been shown to be accurate. In the preamble, the Agency states that a different correlation must be established with each waste feed; Kodak has over a 1000 waste feeds making this totally impractical.

<u>Comments concerning the March 1997 NODA</u>

CS3A-003 (2) [From Appendix A, RMB Consulting and Research Memorandum to UARG, April 18, 1997] Multiple Calibration Curves In discussing the relatively poor correlation coefficients obtained from the regression analysis, EPA observes that it may not be possible to develop a single calibration curve for the Dupont incinerator that will be valid for every operating condition[13]. This is the exact situation that was predicted in RMB's August 1996 Memo, which stated: [FN13] 62 Fed. Reg. 13782. Col. 2 (March 21, 1997). ".....the characteristics of the particulate emissions are quite different at the three different mass loading loadings (i.e., low, medium, and high). It is easy to imagine that as the particulate mass loading increases, there is an accompanying change in the particle size distributions. Since most, if not all, of the commercially available continuous PM monitors are sensitive to particle size distribution, it is clear that each mass loading regime needs to be characterized by a different calibration curve. Unfortunately, PS 11 provides for only a single calibration curve - that may reflect significant inaccuracies for different mass loadings as particle size distributions change." In the Federal Register notice, EPA requests comment on the acceptability of having multiple calibration curves. RMB believes that the need to even mention multiple calibration curves should be a clear signal to EPA that continuous PM monitoring

technology is not sufficiently developed to be used as a compliance determination method. If multiple calibration curves are required for a continuous PM monitor to accurately predict particulate emissions, then it follows that the owner/operator must know the particulate emission level before it could know which calibration curve to use. In other words, one must know the answer in order to predict the answer. Upper Range Calibration EPA states that the Dupont incinerator did not emit particulate matter at its permitted limit -- much less at twice its permitted limit, as specified in the calibration procedures of proposed PS 11. Since the permitted limit could not be reached, EPA proposes to evaluate the confidence and tolerance intervals at the highest measured PM concentration, not at the emission limit. RMB believes that this is a reasonable approach. As explained in RMB's August 1996 Memo, requiring a source to operate at twice its permitted emission limitation, even to conduct an instrument calibration, is unacceptable. It is difficult to comprehend that Dupont could not disengage enough control equipment to exceed its particulate emission limit. Does this mean that EPA is implying that the Dupont incinerator does not need any control equipment to comply with its particulate emission limitation? To the contrary. RMB believes that Dupont management exercised prudent judgment and elected not to disable enough control equipment so as to exceed its particulate emission limit -- even for the sake of an EPA field demonstration program. Again, referring to the RMB August 1996 Memo, we do not understand how EPA believes it has authority to not only allow but to require a source to deliberately exceed its emission limitation -- not by a small amount but by a factor of 2.

CS3A-004 (2) 4) Need to Synchronize MM5 to Beta Monitors Volume I of the Particulate Matter CEMS Demonstration Report, (section 2.4 paragraph 3), indicates that EER was unaware of the need to synchronize Method 5 and beta monitors. The short-run times and variability of the values should have been important factors in the development of the study. The non-synchronous sample times are stated in the report to have resulted in "semi-representative" data. Semi-representative data infers non-representative data. The study should be designed to be representative. The study did exclude the time it takes to change test ports from the study, but the beta monitor test times were not synchronized in the earlier calibrations. If these data are to be not truly representative, then they should not be included in developing the initial calibrations for the beta units.

CS3A-004 (2) 6. Comparison of different units. Another method of checking different CEM units is to compare them to each other. The DuPont demonstration has five PM CEM's that use two different types of technology. One technology uses light scattering (Sigrist, ESC, and Durag) which can take multiple readings each minute. The other technology uses beta tests took up to 12 minutes per sample. CRWI wishes to thank EER for providing-the CEM's calibration data in a machine-readable form. This made the comparisons much simpler. CRWI used this data in two ways to examine how the five units tracked each other. Selected runs were chosen from each calibration set based on MM5 results for those runs. The first method plotted each CEM versus time. This gives a visual representation of how each CEM tracked with each other. The second method is to plot one CEM against another. If the data creates a straight line, then the two units track closely. For the September calibration, Runs 8 and 10 were chosen. As can be seen from Figure 1, it does not appear that any of the CEM's track well with any other for Run 8. However, when the Sigrist unit is plotted against the ESC unit (Figure 2), there is close agreement. The scale of the Sigrist unit is significantly below that of all the other units. When the Sigrist unit is plotted against the Durag (Figure 3), the Verewa (Figure 4), and the ENVSA (Figure 5), the data shows a large amount of scatter. Thus, for calibration Run 8, only two units (Sigrist and ESC) give similar results.

A somewhat different picture emerges when the data for Run 10 are plotted over time (Figure 6). The ESC and the Durag units track very closely. Although it is not obvious due to the scales, the Sigrist unit also tracks closely (Figure 7). Thus, all three light scattering instruments give similar readings. However, it should be remembered that just because these units give similar readings does not mean that any or all of them give accurate readings. This has to be determined in a comparison with a calibration method or MM5. It is clear from Figures 8, 9 and 10 that there is no relationship between the two beta units nor is there a relationship between each of the beta units with a light scattering unit. Before the October calibrations, the range and the gain of the Sigrist unit was altered to bring the absolute value of that unit in line with the other two light scattering units. Now all three light scattering units track very closely in all the runs checked (Run 4 - Figure 11, Run 6R2 - Figure 12, Run 20 - Figure 13, and Run 21 - Figure 14). Although the peaks match fairly well in all four figures, it should be noted that the differences in relative output between the CEM units varies between runs. For example, the ESC and Sigrist units are very close on Runs 4 and 20, but there is a significant gap between these two units in Runs 6R2 and 21. This indicates that something (perhaps different PM characteristics) is causing the units to react differently, potentially creating problems during calibration and RCA's. This difference shows up in later runs as well. For the November calibrations, Figure 15 (Run 24) shows a similar pattern to the October calibrations with the ESC and Sigrist tracking closely, the Durag unit matching peaks and valleys well with the other light scattering units but having a higher relative output. The Verewa unit output does not appear to match any of the light scattering units. The same relationships appear for Runs 28 (Figure 16) and 30 (Figure 17). By the December calibrations, the sampling period for the beta units had been reduced to a short enough period that they should be able to match peaks and valleys with the light scattering units. As with the other calibration period, all light scattering units track closely (Figures 18 and 19) while neither beta unit tracks well with each other or with the light scattering units. In January, one beta unit (ENVSA) appears to catch the first few peaks and valleys but completely misses that last major peak (Figure 20) of Run 40. For Run 48 (Figure 21), the ENVSA unit appears to track well with the light scattering units but again misses the last major peak. The Verewa unit does not appear to match with any other CEM. While this analysis does not prove that one unit is more accurate than another, it does show that for the most part, the light scattering units may give similar results. A major concern for the light scattering units is that the relative magnitude of the readings appears to vary with different runs. One explanation for this is that the physical properties of the PM in the stack may cause different units to give different readings. This could cause problems getting a good calibration curve and meeting later RCA requirements. The beta units do not appear to track each other or any of the light scattering units for many of the runs examined.

7. Accuracy of Beta Gauges for This Application Beta gauge measurements may not be accurate where the particulates contain elements of significantly different atomic weights. Beta gauges are successfully used to measure the weight (for consistency) of thin coatings applied to substrates at high speeds. However, if coatings containing different average atomic weights are applied, the gauges must be recalibrated. Thus, at the DuPont facility, where the particulate matter may consistently contain a high percentage of sodium chloride due to upstream spray dryer additives, this analyzer may respond consistently. However, at a facility where no additives are used, water scrubbing is involved in the APC system, and the waste charged to the thermal treatment system varies over time (which may represent many other hazardous waste treatment incinerators), the average atomic weight of the particulate may change enough to make consistent beta gauge measurement extremely difficult, if not impossible. Further, in such cases, it may not be possible to

recalibrate as a function of waste feed composition due to the variability of the feed and other factors affecting the combustion and APC performance.

CS3A-006 (1) I. Testing and Operational Conditions. Continental notes at the outset that the DuPont incinerator PM CEMS operation does not meet the draft performance specifications. By way of illustration, the proposal required three test runs in order to be valid. None of the EPA tests we reconducted with more than two runs (in some cases only two were conducted, in others data was thrown out). Moreover, the method 5 runs for particulate matter were all conducted over a 20 minute period. The proposal required that Method 5 tests be conducted on bums lasting at least one hour. Continental questions whether EPA can properly propose a standard which EPA itself will not - or cannot - meet under rigorous test conditions. As we have commented in the past, MACT standards must be achievable in practice; the March 21 NODA provides proof that the current proposal is not achievable.

CS3A-011 (2) 2. Time Match Between Method 5 and CEMS CMA questions whether the sample times for the MM-5 tests and the averaging times for the CEMS were concurrent. If not, CEM data and calibration could be inaccurate. This is especially true of the Beta monitors, which do not sample for a significant amount of time while the previous sample is being analyzed. MM-5 should only be correlated to the results of the CEMs during the times they are actually taking a sample.

3. Accuracy of Beta Gauges for this Application Beta gauge measurements may not be accurate for particulate containing significant amounts of elements with significantly different atomic weights, particularly higher than about 14. Beta gauges are successfully used to measure the weight (for consistency) of thin coatings applied to substrates at high speeds. However, if coatings containing different average atomic weights are applied, the gauges must be recalibrated. Thus, at the DuPont facility, where the particulate matter may consistently contain a high percentage of sodium chloride due to upstream spray dryer additives, this analyzer may respond consistently. However, at a facility where no additives are used, a lot of water scrubbing is involved in the APC system, and the waste charged to the thermal treatment system varies over time (all of which may represent many other hazardous waste treatment incinerators), the average atomic weight of the particulate may change enough to make consistent Beta gauge measurement extremely difficult, if not impossible. Further, in such cases, it may not be possible to recalibrate as a function of waste feed composition due to the variability of the feed and other factors affecting the combustion and APC performance.

4. NaCl based PM SEM analysis shows DuPont particulate to be comprised mainly of NaCl [FN3]. NaCl is hygroscopic and thus the particulate catch will tend to pick up moisture from the ambient air. This could cause irreversible filter weight gain and variable particulate characteristics. [FN3: This result validates CMA's position that particulate control below the MACT floor is not necessary. EPA justifies going beyond the floor based on metals and D/F, but the test findings "showed that the filter was predominately NaCl. Other metals or minerals found on the filters in relatively large amounts were Fe, S, and Al." Section 2.7. Where are all the HAP metals? CMA has contended consistently that salts are the predominate particulate emission in most incinerators and these salts pose little if any risk to the public or the environment, nor are they an indication of combustion control. How can EPA defend using PM as a surrogate for HAP metals and D/Fs if these are not

present in PM emissions?]

5. Need to Synchronize Modified Method 5 to Beta Monitors Volume I of the Particulate Matter CEMS Demonstration Report (§2.4, paragraph 3) indicates that EER was unaware of the need to synchronize Method 5 and Beta monitors. The short run times and variability of the values should have been important factors in the development of the study. The non-synchronous sample times are stated in the report to have resulted in "semi-representative" data. Semi-representative data is a polite way of saying non-representative data, and the study should be designed to be representative. The study did exclude the time it takes to change test ports from the study, but the beta monitor test times were not synchronized.

Comments concerning the December 1997 NODA

CS6A-001 (2) The validity of the response calibration may be affected by changes other than those listed. Therefore, all other parameters of influence should be mentioned if the CEMS must be evaluated with respect to these changes. In particular, stack gas velocity and turbulence have significant effects on single-point extractive measurement devices.

CS6A-002 (2) Beta gauges are sensitive to changes in particulate properties, especially when isokinetic sampling is not maintained. Although the radiation source/Geiger counter may be less sensitive to particle size and shape, than other proven measurement technologies, there are many other components to these systems that must be taken into account. The sampling systems, electronics, filtering tape, maintaining isokinetic conditions and probe locations must all perform flawlessly for proper operation. Also, any changes in the plant operations such as feed rate, control technology, damper position, fuel type, open part, particulate size and density, could cause changes in the particulate stratification in the duct. With the beta gauges single point sampling, any of these changes in the plant could cause drastic changes in the Beta gauges accuracy.

CS6A-020 (2) Furthermore, it is a well known fact that optical PM CEMs can only accurately correlate to mass emissions if the optical characteristics of the dust particles (particle size distribution, shape of particles, complex refractive index, and the dust charge) remains constant. The EPA has not demonstrated that purposely operating APCDs in a manner inconsistent with good air pollution practices for minimizing emissions will maintain the consistency of the optical characteristics of the particulate matter. In fact, we all know that it is unlikely that the optical characteristics will remain constant under these conditions.

CS6A-030 (2) On the first page of the DRAFT Volume I DuPont PM CEMS Demonstration Report (October 1997), that supports the CEM NODA 2, it is stated, However, using a COM (continuous opacity monitor) for PM has a serious limitation for certain sources within the scope of the proposed HWC rule: poor correlation between opacity and PM at PM concentrations near the proposed PM emissions limits ranging from 35 to 69 mg/dscm (at 7% O2.). It is disturbing to note that density, index of refraction, and size distribution are still factors that can affect the validity of the calibration when these appear to be primary reasons (in addition to range) for development of the PM CEMS proposal to replace opacity monitors for PM emissions. HEPAs should keep the particle size distribution relatively uniform, but density and index of refraction might still vary considerably as highly varying waste streams are burned at DOE mixed waste incinerators. EPA should carefully

consider these problems in formulating the final rule.

HEPAs should keep the particle size distribution relatively uniform, but density and index of refraction might still vary considerably as highly varying waste streams are burned at DOE mixed waste incinerators.

Summary

There are many factors (fuel type, type of waste burned, matrix effects, and physical characteristics of the particulate matter) that will affect the response of the PM CEMS. Changes in flue gas characteristics will likely change the response of some instruments. These changes will affect light scattering devices as well as beta gage devices. The extent of these changes has not been characterized.

In response to the proposal, commenters also said there is significant error in the correlation line that could cause a reading to be, say, 11% higher than the actual particulate matter emissions

In response to the March 1997 NODA, commenters also said:

- A single correlation may not be possible at the DuPont facility;
- Some Method 5i runs were only 20 minutes in duration;
- The need for multiple correlations corresponding to different particulate matter physical characteristics shows that particulate matter CEMS are not acceptable;
- The range of particulate matter data was too narrow, not twice the emissions limit as proposed;
- It is not possible to disable enough control equipment to attain an emissions concentration of twice the emissions limit;
- Failure to synchronize the beta gage CEMS to the manual method readings (*i.e.*, make sure the traverse samples start and end at the same time) caused the September to November data to be suspect;
- It is meaningful to compare the CEMS results over time;
- When compared over time, the beta gage results did not compare well to the other CEMS, but the light-scattering CEMS did seem to compare well;
- The beta attenuation analytical technique is sensitive to the atomic weight of the elements being weighed; and
- Particulate matter at the DuPont facility is hydrophillic, meaning a particulate matter sample would tend to gain weight by picking up moisture.

In response to the December 1997 NODA, commenters suggest that

- Stack velocity and turbulence have a significant influence on single-point extractive measurements;

- Beta gage CEMS are sensitive to changes in particle characteristics, particularly when isokinetic sampling is not maintained; and

- DOE's facilities, with HEPA filters, should have a relatively uniform particle size.

Response

EPA will address this issue in PS-11 by requiring the correlation testing be performed over the full range of PM concentrations experienced by the facility in order to characterize flue gas conditions at all anticipated conditions. We believe that so long as a wide range of highly precise manual method and CEMS data is obtained, good correlation can be shown.

In response to commenters other, specific concerns, EPA was able to develop a single correlation all operating conditions at the DuPont facility.

We believe the time durations of the Method 5i tests is not relevant. Method 5i does not require a minimum sample time.

We agree that requiring a facility to perform correlation tests from zero emissions to twice the emissions limit is too prescriptive. Instead, we believe a facility should perform tests over the full range of emissions at the facility, from zero particulate matter emissions to the highest particulate matter emissions the facility expects.

We agree that the failure to synchronize the beta gage sampling times with those of the manual methods was a problem. We corrected this in the December to May tests. This was another reason why the September to November data was removed from consideration when developing correlations.

We agree that it is meaningful to look at the response of various CEMS over time. We agree that the beta gage CEMS did not compare well to the other beta gage or the light scattering CEMS when looked at over time. We believe this is because beta gage CEMS are highly complex monitors that may not have all the "in-use" issues resolved.

We found no evidence that atomic weight of the elements in the particulate matter influences beta gage readings.

We agree that the particulate matter at the DuPont facility is hydrophillic. We ensured the filter weighing area had highly consistent humidity to address this issue.

We agree that stack velocity and turbulence can influence single-point measurements. However, we believe it is best for a facility to consider these issues when a facility chooses a location for the

CEMS. We are not able to say whether failure to maintain isokinetics can influence the outputs of beta gage CEMS or whether those changes are significant. If this is a problem, though, it would have been experienced at the DuPont facility and despite this problem, we showed good correlation.

We note DOE's comment that facilities with HEPA filters will have an easier time correlating particulate matter CEMS because their partial size density is consistent.

c. *Flexible Correlation Range*

Comments concerning Proposal

CEM5.028(125)(a) • There are numerous practical problems with PS 11. For example, PS 11 assumes that a source will easily be able to achieve 3 different mass loadings for establishing the calibration curve, when in fact achieving those different mass loadings may, be very difficult. Moreover, to obtain the high mass loading point, EPA is recommending that a source violate its PM emission limit. See RMB Memo at p.5.

CEM5.037(125) Notwithstanding the compliance issue associated with operating above the emissions limit, there are practical problems with the other calibration points advocated by PS 11. Suppose a utility boiler, with a particulate emission limit 0.1 lb/10^6 Btu, normally operates at 0.07 to 0.08 lb/10^6 Btu. Such a concentration would be an ideal mass loading for the middle calibration point (i.e., the width of the confidence interval would be minimized near, yet below the emission limit). The practical problem occurs with trying to obtain a lower (e.g., 0.02 to 0.03 lb/10^6 Btu) calibration point. If the particulate control equipment routinely achieves emissions on the order of 0.08 lb/10^6 Btu, there is no way to magically make the control device perform better and achieve a lower emission rate.

Suppose the utility boiler routinely operates at 0.03 lb/ 10^6 Btu and has a particulate emission limit of 0. 1 lb/ 10^6 Btu. It is possible to detune the particulate control device to increase emissions, but such action is a very inexact science. The device could be detuned too much resulting in an unintentional exceedance of the emission limit. The control device might not be detuned enough so that the "medium" mass loading is virtually indistinguishable from the "low" concentration. The point is that this all takes times and requires expensive and time-consuming stack testing to evaluate the impact to a change in control technology performance.

CEM5.063(170K)(b) The Performance Specification for PM monitors requires these units will be calibrated over a range of "a normal minimum level to twice the emission limit" [Footnote 3: Volume IV Technical Support Document to HWR, page A-6]. Since the method quantitation level [MQL] for a 2-hour (3.5 dsm3 sample volume) Method 5 test is in the range of 0.003 gr/dscf @ 7% O_2, and the normal operating condition for many cement kilns is near or below the MQL, so minimum 4-hour runs will need.

CEM5.064(170K) For both the PM and Metals CEMS calibrations, it will likely be necessary for facilities to develop a means of raising stack concentrations to the high end of the calibration range. There is a potential for several problems, not the least of which is distortion of the normal performance of the facility over an extended period of time following the testing as the dust residue

built up in the breachings downstream of the mis-operated APCS passes out of the system. At the Southeast Resource Recovery Facility in Long Beach, CA, opacity values (while still less than 10 percent of any regulatory standard) would take 12 to 60 hours to return to normal after a failed bag was isolated.

Comments concerning the March 1997 NODA

CS3A-010 (3) At Section 2, page 30 of 37, CKRC is concerned that EPA is unaware of the effects of detuning APC equipment for the purpose of increasing particulate emissions. Because so much of the particulate matter entering the APCD at a cement kiln is raw feed, monumental changes in firing rate are needed to significantly alter the inlet loading. The over-firing required to achieve the increased particulate, instead of detuning the precipitator, would overheat the kiln and cause damage. In addition, commercially viable cement clinker would not be produced. In order to increase particulate emissions, fields are turned off or the voltage reduced at ESP equipped plants and bags are breached at FF equipped plants. When either of these two actions are taken, the aerosol characteristics are altered. At cement kilns, the majority of the increase is associated with naturally occurring minerals (ground kiln feed) rather than combustion related pollutants. Consequently, the calibration would be performed on a particulate stream that is materially different than that encountered except under APCD failure conditions that are detected as a normal part of each facility's operating program. To address this problem, EPA needs to develop methods for defining APCD operating characteristics that are representative of the conditions likely to produce increased particulate emissions. Testing over a simple range of particulate loadings is unlikely to properly calibrate a PM CEMS at a cement kiln. If the high PM emission point does not have the same type of particulate as the low PM emission point, the connecting calibration curve will be invalid over the expected operating range. The PM CEMS results would then either point to compliance when a facility is really out, or indicate permit violations when the facility is really in compliance. Until EPA addresses this concern with a carefully conducted field trial at several cement kilns, it is premature to conclude that PM CEMS are viable regulatory compliance devices. CKRC is also concerned that EPA would have companies increase their PM emissions to "roughly twice the emission limit" during initial calibration tests (Section 2, Pages 30-1). Operating at twice the limit would result in exceedances of emissions limits found in the Portland Cement NSPS, State Implementation Plans, several plants' permit conditions, and the MACT standard itself. Thus, if EPA ultimately mandates the use of CEMs and also calls for testing above emission limits during calibration tests, the Agency will have to include a "testing variance" in the HWC MACT that permits the temporary exceedance of emission limits. Otherwise, a facility would be placed in the untenable position of having to: (1) ignore the calibration protocol (thus potentially subjecting itself to liability), or (2) violate emission limitations and expose itself to an enforcement action.

CS3A-010 (3) Section 7.2, page 6 of 12, process data reduction. There should be a clear designation of what process data should be gathered and in what manner it should be recorded. As currently detailed in this section this designation is not specified. Section 7.4, page 7 of 12, data. validation. This section should reflect the differences in the process sample analytical methods. Section 8.1.2, process sample QA/QC, should also reflect these differences.

CS3A-012 (3) (2) Section 7.3 determines the number of tests required for calibration of the proposed CEMS. The requirement to determine the CEMS response at three different PM levels

probably cannot be met in all systems without violating interlocks on the waste feed system. Creating sufficiently different PM levels in the scrubber outlet- "by adjusting the particulate control system" - will involve one or more of the following:

* reducing the differential pressure across a wet scrubber
* reducing voltage of an electrostatic precipitator
* compromising the integrity of a baghouse element
* drastically increasing the particulate matter content of the material fed to the system.

The defeat of an interlock that has been established by a Trial Burn as a permit condition is a permit violation. The responsibility for the emission of PM above the permit limit is not a matter to be taken lightly - even if it is suggested by a Performance Specification which requires calibration at PM emission levels "ranging from a minimum normal level to a level roughly twice the emission limit".

CS3A-014 (3) 10. Calibration at PM levels recommended by EPA may not be feasible. Operators may have little quantitative understanding of how PM varies with operating conditions. PM test is to be run at the normal range of operation and should include a run of two times the emissions limit. However, the normal range of operation will be less than the emission limit. It is not clear how the operator should modify the process to run at 2X the limit, or whether this is acceptable under existing permits. The operator can vary the normal range of conditions, but this may or may not create a large range of particulate emissions.

CS3A-015 (3) Calibration: It is desirable to calibrate over a somewhat broader range than that expected to be experienced in operation. This is especially critical on the high side of the measurement. On the low side the relative accuracy is not as important because the measured parameter will not be near a maximum limit. If a meter "pegs out" on the high range there is, of course, no way of knowing what was the true maximum magnitude of the measured variable. In the case mentioned on page 13781, the highest achievable particulate level could be calibrated at some point on scale, say 90%, to provide some room for a later spike higher than expected. This agrees with the approach suggested by the Agency. Finally, the Agency mentions a unique case where "the highest possible emission level is less than the emission standard." If that is true, and can be reliably substantiated, then no PM CEMS should be required at all.

<u>Comments concerning the December 1997 NODA</u>

CS6A-003 (3) Calibration range requirements should be more flexible. The calibration range requirements in PS-11, Section 8.4.5, should be more general, stating that a calibration should cover the normal operating range. The expected operating range should be defined by the operator. Then the calibration would require a minimum of 12 data points with at least 3 data points in the band from 60-100% of expected maximum emissions to be a successful calibration. If during any month of operation, more than 1% the emissions readings (3 hr average readings) exceed 125% of the expected maximum emission rate defined for the calibration, then additional calibration data would be required to cover a higher range. Collection of 3 data points within 60-100 % of the new expected maximum would be all that would be required for the additional calibration. These points would be added to the initial calibration to produce the new calibration. If the operator preferred, a complete new data set could be collected. The previous calibration would continue to be used until the new

calibration was completed.

CS6A-009 (3) The report states that the CEMs be calibrated to twice the proposed standard (page 2-3). This is different from the "full operating range" criterion in the NODA. CRWI suggests that the draft report be modified to reflect the discussions in the NODA. Even at full operating range, CRWI has two concerns. First, this may require operating above the manual PM MACT standard. This cannot be done unless the regulating agency suspends any enforcement action during the calibration. CRWI suggests that the Agency make it clear in the rule and in the preamble that data collected during calibration may not be used to demonstrate a violation of the PM MACT standard. This should also extend to the relative calibration audit (RCA) process as well, since it has the same range criterion. This would allow facilities to develop calibrations without having to walk a tightrope between compliance and a robust calibration.

The second problem may be getting the PM emissions high enough to calibrate at the upper part of the full operating range. With the exception of March, the demonstration project at DuPont had relatively low PM emissions. It is not clear from the report why the emissions in March were so much higher than other times. In fact, without the March data, the responses from all units would appear linear. Facilities may not be able to "de-tune" their systems to get planned emissions up to the full operating range. EPA may wish to consider additional flexibility for units that have problems meeting the three levels requirement.

One of the criteria of the proposed PS 11 is that at least three runs have to be in each of three levels of PM emissions. CRWI, using the assumptions that the full range of calibrations is two times the proposed standard (this also approximates the full operating range found during the DuPont study), checked to see if the two calibrations in the DuPont demonstration met this criterion (see table below). For both the first and second calibrations, the manual methods had at least three runs in each level. It should be noted that if EPA had evaluated the data as described in the NODA, this particular criterion would not have been met (see comment number 2 under the General Comments on the NODA). However the table below points out that most of the data were in the lower levels. This could be easily determined from the graphical representations of each calibration, showing most of the data points at the lower end of the scale. When the CEMs data availability (page 2-20) is combined with the table below, all units pass the minimum three runs per level except Durag for the first calibration. This is due to the problems in March with the Durag instrument (all runs, 62-73, were discarded). However, during the second calibration, EPA did not follow the recommendations in 8.4.5 of PS 11 in that "at least six measurements be performed at the maximum PM emission levels available to produce the most accurate and representative results." In practice, certain facilities may not be able to create repeatable test conditions that generate particulate emissions in all three ranges as required in PS 11. CRWI suggests that additional flexibility in these provisions be allowed in the final rule.

As demonstrated in the DuPont test, one of the hardest parts of the calibration will be to develop data over the entire operating range. The Agency used a time period from December to March to create the first calibration. Although the second calibration was done in one test, the second calibration did not have the same range as did the first. CRWI suggests that since facilities have no experience with these instruments, a certain amount of flexibility be built into the calibration procedure. Requiring that the initial calibration have at least three runs in each operating level is certainly a goal to try to

attain. However, the highest PM emissions in the DuPont test were not seen until March, seven months after the initial calibration efforts began. While it may be desirable to gather all calibration data in a single test, developing a full operating range of PM emissions may be difficult in one setting. Due to this potential problem, CRWI suggests that EPA draft the calibration requirements in such a manner as to allow data taken over time to be cumulated to create a calibration should the facility need that option to cover the full operating range.

CS6A-011 (3) Among our major concerns is the Agency's proposed calibration requirements. CKRC believes the Agency must allow for greater flexibility in the PS11 procedures that require calibration testing to be conducted at three levels (0-30%, 30-60%, and 60-100% of maximum). Well-controlled sources may not exhibit the particulate emission level variability necessary to perform the tests required by the proposed PS11. Detuning of control equipment cannot be technically defended. Even for those portland cement kilns that exhibit a significant range of particulate emission variability, it may not be possible to purposely alter the emission levels during the calibration test program. Instead, testing may need to be conducted over a sufficient period to capture the range of normally occurring emission levels. Alternate methods for conducting particulate monitor calibration relation testing at portland cement kilns needs to be developed. EPA should also decide whether it is acceptable to combine data from different methods (Method 5 and 5I) when developing a particulate monitor calibration relation. EPA's conclusion is that these methods have different variance structures which will affect the calibration curve.

CS6A-025 (3) As stated above, the ETC is concerned that it may not be possible to precisely "de-tune" the APC device to cover the full range of particulate emissions in a calibration curve. The ETC does support EPA's allowance of a waiver of the manual PM MACT standard during periods of calibration. This waiver should not require pre-approval from regulatory officials, since this would delay completion of the calibration data. Pre-approval should only be required if the calibration runs at twice the emission standards were to exceed a period of 6 hours, the maximum time needed for three manual PM runs.

EPA should also allow operators the option of installing PM CEM devices on their existing combustion processes before these are upgraded to meet the new MACT standards. PM CEM measurements using "pre-MACT" APC systems could provide useful calibration data at higher PM emission levels without violating current emission standards. This pre MACT PM CEM data could then be used as the high-range calibration points and later combined with calibration data collected from the post-MACT control period. The pre and post MACT control calibrations could both incorporate particle size testing to ensure that the physical nature of the particulate is reasonably the same. Many operators may prefer this option rather than trying to "de-tune" their post-MACT control systems.

CS6A-026 (3) In the NODA, EPA requires that the PM CEMS be calibrated over the full range of operations. However, the NODA provides no guidelines or protocol on how to accomplish this objective. In fact, EPA has taken a cavalier approach by suggesting that individual sources know best how to vary their PM emissions. EPA unreasonably expects individual source categories to select the appropriate PM CEMS and comply with the proposed performance specifications, even though these sources have no experience with these CEMs.

EPA needs to develop methods for defining APCD operating characteristics that are representative of the conditions likely to produce increased particulate emissions from cement kilns. EPA believes experience gained during their PM CEMS demonstration test suggested a source could obtain a suitable range of emissions by varying process conditions and the waste fed to the unit. This simplistic view is not likely to be the case for cement kilns. In addition, testing over a simple range of particulate loadings is unlikely to properly calibrate a PM CEMS at a cement kiln. This is more acute for light-scattering PM CEMS which are sensitive to particle characteristics. Specifically, if the high PM emission point does not have the same type of particulate as the low PM emission point, the calibration curve derived will be invalid over the expected operating range. The PM CEMS could then potentially indicate a source is in compliance when it is really out, or indicate a violation when the facility is really in compliance. Until EPA addresses this concern with carefully conducted field trials at cement kilns, it is inappropriate to conclude that PM CEMS are viable compliance devices to demonstrate regulatory compliance.

CS6A-028 (3) For facilities with very low particulate emissions, a 0-30% test is in the noise band of the instrument. The prospect of purposefully increasing particulate emissions is not good public policy for mixed waste facilities, yet that is the best way to stay out of the noise band of the instrument. EPA should consider exempting facilities from the PM CEMS if they meet the standard. Should EPA choose to make an incentive for facilities to install a CEM, then some operating parameters should be abolished. Regardless, there is still engineering concern that the PM CEMS cannot measure consistently low particulate emissions.

CS6A-016 (3) Some facilities with no metal bearing wastes could not calibrate to twice the emissions standard The EPA addressed the concerns to sites with air pollution control devices (APCD), recommending “varying process conditions or, alternatively, by adjusting the APCDs”. This does not address sites with sites not bearing metal streams and PM concentrations less than half the proposed PM standard. Such facilities would use spiking as the only available alternative method. Spiking is undesirable, since it would involve introducing particulate matter into an otherwise clean operating system.

CS6A-019 (3) EPA recognizes in the December 30, 1998 NODA the difficulty facilities would have in attempting "... to emit PM at any prescribed level" to calibrate the PM CEMS to twice the emissions limit. However, EPA further states that "... to have accurate PM CEMS measurements, facilities need to calibrate the PM CEMS over the full range of emissions experienced at the facility" and "The experience gained during the PM CEMS Demonstration tests suggests that one can obtain a suitable range of emissions by varying process conditions that affect inlet loading to the last in a series of PM APCDs and adjusting the performance of that last APCD." There are several very significant problems with this last statement. First, the PM CEMS Demonstration test was performed at a hazardous waste incinerator that operates with "a series" of APCDs, making it easier to manipulate PM emissions. Lightweight aggregate kilns typically operate with only one APCD (a baghouse). Second, the statement assumes that it is practical to manipulate PM emissions from any APCD. As discussed in Item No. 4 above and further outlined in the CKRC comments, facilities may experience significant operational difficulties and permit complications in attempting to manipulate PM emissions from a single APCD.

CS6A-026 (3) In the NODA, EPA requires that the PM CEMS be calibrated over the full range of

operations. However, the NODA provides no guidelines or protocol on how to accomplish this objective. In fact, EPA has taken a cavalier approach by suggesting that individual sources know best how to vary their PM emissions. EPA unreasonably expects individual source categories to select the appropriate PM CEMS and comply with the proposed performance specifications, even though these sources have no experience with these CEMs.

EPA needs to develop methods for defining APCD operating characteristics that are representative of the conditions likely to produce increased particulate emissions from cement kilns. EPA believes experience gained during their PM CEMS demonstration test suggested a source could obtain a suitable range of emissions by varying process conditions and the waste fed to the unit. This simplistic view is not likely to be the case for cement kilns. In addition, testing over a simple range of particulate loadings is unlikely to properly calibrate a PM CEMS at a cement kiln. This is more acute for light-scattering PM CEMS which are sensitive to particle characteristics. Specifically, if the high PM emission point does not have the same type of particulate as the low PM emission point, the calibration curve derived will be invalid over the expected operating range. The PM CEMS could then potentially indicate a source is in compliance when it is really out, or indicate a violation when the facility is really in compliance. Until EPA addresses this concern with carefully conducted field trials at cement kilns, it is inappropriate to conclude that PM CEMS are viable compliance devices to demonstrate regulatory compliance.

CS6A-006 (3) PS-11 requires calibration runs to be conducted at three PM levels: (1) 0 to 30% of the maximum PM concentration; (2) 30 to 60% of the maximum PM concentration; and (3) 60 to 100% of the maximum PM concentration. However, PS-11 fails to define maximum PM concentration. In reality, RMB would suggest that the term maximum PM concentration is undefinable and perhaps unknowable. Suppose you encounter an unexpected and unplanned catastrophic failure in the air pollution control system. At least in the short-term, emissions could be very high and well beyond any anticipated maximum PM concentration. The only reasonable approach is to precisely define a point to which all calibration runs can be referenced, and it would seem that the numerical emission limit would be the obvious choice.

In the NODA, EPA introduces the concept of requiring multiple calibrations if a light-scattering continuous PM monitor is used. If a light-scattering device is used, EPA would require a second calibration within 9 months of the “Compliance Date” and a third calibration within 12 months... While RMB agrees, and has commented earlier, that the calibration of a light-scattering device is strongly dependent on particle characteristics (e.g., size, shape, and color), EPA’s 9- and 12-month calibration dates appear arbitrary and without scientific derivation. That is, process operating variability that would give rise to a complete range of variability in emission characteristics is not necessarily tied to a clock or calendar. We believe that EPA should be less proscriptive with respect to calibration timetables and allow affected sources to choose the appropriate times at which to conduct the calibration runs.

CS6A-030 (3) For these options, the owner/operator should have to provide information that demonstrates that the relationship of the actual emissions to the CEMS measured emissions is linear to within an acceptable degree, over the extrapolation range. If the extrapolation includes a nonlinearity or a rapidly changing curve, then more assurance that the MACT will not be exceeded will be needed. Providing the calibration data over the extrapolation range would be necessary at

a minimum. For DOE mixed waste sources that expect to have high variability of feed and are batch fed, there is a concern that high variability of PM emissions and of PM emissions character may result in a need for much more frequent calibration than needed for the situations studied by EPA for this rulemaking and used as a basis for these options. ... Commenters also had concerns that facility personnel may not be sufficiently familiar with the various processes and APCD factors to acceptably calibrate the PM CEMS over the full range of operations experienced at the facility (62 FR 67802, col. 1-2).

The de facto PM emissions limit for any source will be the limit determined by performance testing, not the MACT standard. A suggestion is to require calibration to 1.25 times the CEMS operating parameter limit (as adjusted for low emissions, if this adjustment is used). The sampling periods for calibration should be the same as the sampling time required for manual method sampling for compliance determinations. This will put all data on the same basis and remove unnecessary complexity. ...

In Section 6.1.1.1 of the calibration procedure (Appendix II) it is stated that alternative high-level values may be used for calibration, provided the source can measure emissions throughout the full range of emissions concentrations experienced by the facility. The emissions concentrations referred to can only be those averaged over the time period required for compliance determinations and used for obtaining the calibration data, i.e., the time period required for three manual method runs for that facility. One or two minute data cannot be calibrated with time averaged data obtained over a one-hour or longer period. The regulation wording should take this into account to avoid unnecessary and useless calibration efforts outside the expected range for integrated (average) emissions.

CS6A-008 (3) CMA supports requirement of calibration only over normal operating range, with specific focus on the high end of the range.

CMA supports EPA's revision of the required calibration range from the original proposal (twice the emissions standard) to the current proposal of normal operating range.

The proposed PS-11 requirement for a minimum of three data points at each of three levels (0 to 30, 30 to 60, and 60 to 100 percent of maximum PM concentration) should be made more general, however, as it requires facilities to expend what may be considerable effort capturing data at lower calibration ranges. Achieving emissions over the requested ranges will likely be problematic for many sources, as changing operating conditions to produce a narrow band of PM emissions levels could be very difficult to achieve. Because the upper end of the calibration range is most critical, we recommend that the requirements be made more general, and set requirements only that a minimum number (e.g., three) of the total data points required be included at the 60-100% range of the expected maximum emissions. The remaining data points could be distributed anywhere within the normal operating range.

The Agency should consider relaxing the requirements to perform recalibrations across the entire operating range and focus on the high end of the range. Future calibrations could be accomplished solely through collection of a minimum number of data points in the 60 to 100% range of the new expected maximum. These points would be added to the initial calibration to produce the new calibration. If the operator preferred, a complete new data set could be collected.

CS6A-025 (4) We are concerned, however, that it may not be possible to deliberately "de-tune" the APC equipment during calibration runs, to achieve particulate emissions in three distinct ranges called for by PS 11. It is also noteworthy that EPA's own data collected in the demonstration test was not able to achieve this (see CRWI's comments). EPA should allow flexibility in data collected during calibrations runs, and not mandate a specific number of runs in narrowly defined ranges.

Summary

Many commenters view the correlation testing over a wide range of conditions (from zero emissions to the facility's maximum emissions level) to be the most challenging component of the PM CEMS implementation. Many technical issues discussed by commenters directly relate to just how well the facility range can be expanded. Commenters also pointed out several inconsistencies between preamble and rule language.

Commenters objected to the NRPM proposed language stipulating that CEMS correlations be conducted at emissions levels up to twice the emissions limit. They said this would cause the facility to be in violation.

Commenters also took issue with the highly prescriptive nature of how many data points need be within a certain percentage of the facility's maximum emissions level.

Response

EPA has re-defined the range requirement in recognition of the importance of this issue. The facility will also have additional options to obtain (or as a last resort, infer) CEMS response at the zero emissions level. The range issue will be addressed in the upcoming version of Performance Specification 11. We believe facilities can obtain high emissions measurements by identifying situations where particulate matter emissions are the highest, then recreating those situations during their correlation tests. The operational data used to ascertain the cause of the high emissions is those parameters used prior to using CEMS for compliance and possibly other factors. Facilities can identify these situations during the "shakedown period" which occurs after the CEMS is installed, but before the correlation test is performed. We are not willing to prescribe the exact methods a facility should choose to obtain high emissions data, but we will provide guidance on how this can be accomplished as knowledge is gained from experience. Inconsistencies between preamble and rule language will be resolved.

Note that one of the single most important factors that can influence the success of a particulate matter CEMS correlation test is the range of data obtained. It is absolutely necessary for a facility to obtain a wide range of data. If a wide range of data is not obtained, a facility will find it has a scatter of data around a single point. Correlation in this case is not possible because a wide range of data has not been obtained.

EPA agrees that it should not mandate that a correlation be performed up to some arbitrary level, such as twice the standard. Instead, EPA believes facilities should correlate CEMS so that all readings of the CEMS are bracketed by method data obtained at the facility, with some flexibility

given for extrapolating beyond this range.

As a matter of policy, EPA also agrees that it is more important to define a valid correlation at high emissions than it is to enforce an emissions standard during correlation tests. Therefore, EPA has included language to explicitly state that no PM standard exists while high range PM CEMS correlation tests are being performed so long as certain notification procedures are followed.

d. Extrapolation of Correlation Range

Comments

CS6A-008 (4) CMA agrees that sources should be able to use a calibration curve up to 125% of the maximum Method 5 measurement during calibration. We believe that if a facility operates more than 10% of the time (based on a monthly average) above the 125% point, additional calibrations could be required. CMA supports allowing sources to use a calibration curve up to 125% of maximum M5 measurement during calibration. CMA supports EPA's recognition of the need for facilities to occasionally operate above the maximum M5 measurement during calibration. Use of the existing calibration curve up to 125% of the maximum M5 measurement is appropriate.

CS6A-009 (4) CRWI agrees with the Agency that there will be an occasional need to extend the calibration curve past the highest Method 5I calibration point. CRWI also agrees with the Agency's position on extrapolations above 125%. The Agency asked for comments on when it should be necessary to recalibrate or add to the calibration. CRWI suggests that a facility should consider re-calibration if the monitor output exceeds 125% for a 24-hour period. This length of time would indicate a set of operational conditions that can be repeated for subsequent Method 5I data collection.

CS6A-011 (4) CKRC is concerned that extrapolating a log normal calibration curve by fairing a line through the lowest measured point and the indicated value for 125% of the highest measured value is incorrect. Specifically, the lowest measured point does not have to reside on the calibration curve. The 125th percentage point is extrapolated and may not represent the data. If the low value is below the calibration curve, it will produce erroneously high values. If it is higher, it will produce erroneously low values. Inverse problems exist with the 125th percentage point.

CS6A-0025 (4) The ETC agrees with the allowance for extrapolation of the PM CEMS calibration data for reasons associated with the different averaging periods of manual methods (block averaging) and PM CEMS (rolling averages). The 25% allowance above the maximum Method 5 measurement is reasonable. This also helps to compensate for the difficulty with trying to "de-tune" the APC device to cover the widest range of PM emissions during calibration. In response to EPA's request for comment on continuous periods of exceedance of the 125% point, the ETC feels that such a sustained exceedance for 6 or more hours of operation is cause for requiring additional calibration points. The 6 hours is justified on the basis of the maximum sampling time required for the Method 5 test.

CS6A-030 (4) One-minute or batch PM CEMS readings during the course of operations are likely to occasionally exceed the highest M5I calibration point during the course of PM CEMS use. This is because the manual method results used to derive the calibration are (nominally) one hour block

averages of emissions over the sampling period while the PM CEMS readings are averages of emissions on the order of minutes...In addition, emissions variability within the sampling period of M5 is not likely to represent the full range of emissions variability over all periods of PM CEMS operation. Therefore, a system is needed to allow the extrapolation of data beyond the calibration curve...[T]he Agency proposes to allow the calibration curve to be used for measurements up to 25% more than the maximum [manual method] measurement observed during the calibration. (This will be referred to as the "125% point.") Beyond this point (125% of the highest M5 measurement) EPA is concerned that extrapolating the calibration data might lead to false compliance determinations. Therefore, some environmentally conservative approach must be employed.

Note that the ability to extrapolate beyond the calibration curve in no way would mitigate the facility's requirement to calibrate over its full range of PM emissions. If a facility experiences continuous periods of PM emissions beyond the calibration curve, it would be obligated to perform tests to capture these data into the calibration curve. For example, a facility may determine that it occasionally has several continuous hours of PM CEMS readings which are greater than the 125% point. Several continuous hours are enough time to conduct a M5 test, so the facility would be obligated to conduct M5 tests at this emissions level and include these data in the calibration curve used at the facility. EPA requests comment on how long a period of sustained operations at emissions levels greater than the 125% point would be necessary to require these additional calibration data points.

Summary

Most commenters recognized and supported the requirement for allowance of extrapolation of the correlation range up to 125 percent beyond the highest correlation point. They also mentioned that one minute CEMS readings would be more variable than one hour measurements used during the correlation tests.

Response

EPA will clearly define the rationale and procedures for appropriate ranges for correlation in the latest revision to PS-11. As stated above, facilities would be required to develop correlations up to their full emissions readings. Secondly, the CEMS readings will be converted to emissions using the correlation curve every hour–not every minute–to ensure that the need for extrapolation is reduced.

7. Method 5i

a. Method 5i should be Validated as a Separate Reference Method

Comments

CS3A-010(1)(b) At Page 13778, column 2, first full paragraph after C, EPA states its determination that during the Lafarge test "much of this (particulate measurement) error comes from sample recovery and analysis." CKRC believes that EPA should document that finding. CKRC members' experience is that this problem is a relatively small contributory factor when the test team puts any filter fragments in with the front-half probe rinse for recovery. CKRC requests the opportunity to review EPA's basis for the conclusion.

CS3A-010(1)(c) At Page 13778, column 2, second full paragraph after C, EPA describes the Method 5 modification involving the use of a lightweight filter assembly. CKRC reminds EPA that the method validation studies for Method 5 showed it to be suitable for monitoring sources emitting & on the order of 0.08 gr/dscf @ 12% CO. The method needs to be validated at the 69 mg/dscm (0.03 gr/dscf) @ 7% O, level. (CKRC recommends that EPA at least analyze the paired sampling data collected during the PM CEMS validation test to establish the practical quantitation limit for the method rejecting only invalid data that would be scrubbed from a compliance test. Absent such a determination, given the presence of suitable data, EPA may be attempting to fix the wrong problem.

CS3A-010 (5)(a) Specific Issues of Concern Regarding the Agency's Approach Found in the DRAFT Particulate Matter CEMS Demonstration --Status Report No. IV --DuPont Experimental Station On-Site Incinerator, Wilmington, DE, Volumes 1-3, USEPA, February 12, 1997 and Site-Specific Quality Assurance Test Plan PM CEMS Demonstration, August 7, 1997. At Section 1, page 1 of 11, EPA asserts without reference or data that the reason they undertook the validation of particulate CEMS is because "of the poor correlation between opacity and PM at low PM concentrations near the proposed PM emission limit of 69 mg/dsm3 @ 7% 02"' While this is an oft-repeated hypothesis, EPA needs to use the information available in its database to adequately demonstrate it. CKRC has done such a review and finds that at PM levels above the practical quantitation limit for particulates - the level at which the measured value is likely to be ±30 percent of the true value - the correlation is reasonable. When the dual train data collected as part of this effort are analyzed using Method 301 procedures, the PQL is found to be 145 mg/dSM3 @ 7% 02 (0.0635 gr/dscf @ 7% 02) when the runs identified as being outliers are excluded. When a different approach to outlier identification is employed, the PQL calculated for the minimum variability alignment is 52 mg/dSM3 @ 7% 0, (0-023 gr/dscf @ 7% 02). Consequently, the lack of precise relationship between low PM concentrations and opacity readings is just as likely to be due to the variability of the PM measurements as it is to be related to a fundamental flaw in the monitoring approach. CKRC urges EPA to determine the PQL of the methods being employed to set and enforce limits. EPA should verify that the emissions limit bears a reasonable relationship to source emissions and not just data noise. In addition, CKRC questions the justification of the duplicate monitoring requirement that would result from having both a PM CEMS and an opacity monitor. If the stated purpose is to detect likely exceedances, existing simultaneous PM and opacity data at cement kilns demonstrates that on a plant-specific basis there is a reliable relationship that can be

calibrated using the formulas in proposed PS 11 provided the data is all collected near or above today's practical quantitation limit for Method 5. While CKRC agrees that the relationship dissipates when the emitted concentrations are very low, we are uncertain that this is relevant to the compliance demonstration problem.

CS6A-003 (1) The specifications describing when to use Method 5 and when to use Method 5I should be guidance and not absolute regulation. PS-11 Section 8.4.2 states that, "Method 5 should be used instead of Method 5I if PM emissions exceed 45 mg/dscm (0.02 grains/dscf)." There should not be a bright line defining when to use Method 5 instead of Method 5I. If a facility's emissions fluctuate across this line, there would be no way of knowing whether the correct method was being used for the particular test run. To avoid this problem, choice of method should only be guidance. The guidance should state that "If it is anticipated that PM emissions will exceed 45 mg/dscm (0.02 grains/dscf), Method 5 is recommended instead of Method 5I."

CS6A-006 (1) UARG agrees with EPA that Method 5I represents a likely improvement over Method 5 for measuring low levels of particulate matter at facilities other than HWCs. However, if it is to be used for facilities other than HWCs, it must be proposed pursuant to §§ 111 and 307(d) of the Act as an “equivalent” or “alternative” method, as EPA has done for other methods added to Appendix A of Part 60. EPA has not proposed Method 5I as an “equivalent” or “alternative” Part 60 method in this case. Until it does, Method 5I cannot be added to Part 60.

CS6A-008 (1) Additional work is required to validate Method 5I. EPA should not set a bright line governing when use of Method 5 or Method 5I is required.

More Validation of Method 5I is Required. Method 5I has only been tested on a single source, operating at PM concentrations below those anticipated to be specified in the MACT standards. CMA is concerned that the robustness of this new sampling technique has not demonstrated. The proposed requirements to use Method 5I and policy/implementation conclusions (e.g., appropriate averaging periods) drawn from the limited experience base may be erroneous. CMA recommends that this technique be validated through additional testing, at a variety of source types, operating with low PM concentrations. Such testing could be incorporated into the additional demonstration program tests proposed in these comments.

Method 5I Use Should be Guidance, Rather than Required. Performance Specification 11 Section 8.4.2 (Reference Methods) states that "Method 5 should be used instead of Method 5I if PM emissions exceed 45 mg/dscm (0.02 grains/dscf)." There should not be a bright line defining when to use Method 5 instead of Method 5I. If a facility emissions fluctuate across this line, there would be no way of knowing whether the correct method was being used for the particular test run. To avoid this problem, the choice of method should only be guidance. The guidance in PS-11 should state that "If it is anticipated that PM emissions will exceed 45 mg/dscm (0.02 grains/dscf), Method 5 is recommended instead of Method 5I."

...Method 5I has only been tested on a single source. CMA is concerned that the robustness of the new sampling technique has not been demonstrated.

CS6A-011 (1) Method 5I may not be applicable to the range of grain loadings found at cement

kilns. Until EPA has conducted an adequate demonstration on a cement kiln to address such issues, EPA cannot conclude that the PM CEMS tested at the Dupont facility will meet PS11 criteria at all HWCs.

CS3A-011 (1) VI. SUGGESTIONS ON HOW TO PROCEED WITH CEM WORK EPA has asked for suggestions on how to proceed on CEM work beyond the pilot studies presented in the NODA. As stated at the outset, CMA supports the goal of demonstrating compliance via accurate, reliable, and cost-effective methods. We believe there are three key elements that are necessary for CEMs to meet these criteria: * testing CEMs under the requirements faced in a compliance setting; * demonstrating CEMs on other unit types; and * improving Method 5 calibration.

CS6A-011 (1)(a) EPA claims that the Dupont demonstration program shows that PM CEMS will meet the performance measures "described in the revised draft PS11 at most HWCs sources." (62 FR 67793) PS11 includes Modified Method 5i (M5i) which contains changes to Method 5 aimed at improving its precision. The Agency states that M5i is "effective for total train catches of 50 mg/dscm [0.02 gr/dscf] or less." (See NODA Appendix I, Method 5i, page 67803, paragraph 1.1 and 62 FR 67792). The intrinsic nature of the cement manufacturing process, however, often results in PM emissions above 50 mg/dscm. The proposed PM MACT limit for HWC cement kilns is 69 mg/dscm, which is comparable to the New Source Performance Standard (NSPS) for cement kilns (0.3 lbs/ton of kiln feed, generally equivalent to 0.03 gr/dscf).

CS6A-020 (1) EPA claims that the DuPont test shows that PM CEMs will meet the performance criteria described in the revised draft PS11 at most HWCs (62 FR 67793). PS11 includes Modified Method 5I (M5I) which contains changes to Method 5 aimed at improving its precision. The Agency notes that M5I is applicable to sources with particulate matter emissions less than 0.02 gr/dscf (50 mg/dscm). The intrinsic nature of the cement manufacturing process, however, results in higher PM emissions.

The proposed PM MACT limit for HWC cement kilns is 69 mg/dscm, which is comparable to the New Source Performance Standard (NSPS) for cement kilns (generally equivalent to 0.03 gr/dscf). Therefore, M5I is not applicable to the higher grain loading found in cement kilns. For that reason, EPA's claim that the PM CEMs demonstrated at DuPont are commercially available based upon their calibration characteristics vs. M5I cannot be applied to cement kilns.

CS6A-021(1)(a) The proposed PM MACT limit for HWC cement kilns is 69 mg/dscm, which is comparable to the New Source Performance Standard (NSPS) for cement kilns (generally equivalent to 0.03 gr/dscf). Therefore, M5i is not applicable to the higher grain loading found in cement kilns. For that reason, EPA's claim that the PM CEMs demonstrated at DuPont are commercially available based upon their calibration characteristics vs. M5i cannot be applied to cement kilns.

CS6A-022 (1) EPA indicates that Method 5I is an improved version of Method 5 and that it will be the manual method used to correlate with the CEMS. Method 5I may be the best method to correlate with the PM CEMS, however, since the HWC MACT standard will be based on historical Method 5 testing, it is inappropriate to use Method 5I for comparison to the PM MACT standard until the relative accuracy of the two methods is established. (will be further developed)

Summary

Many commenters agreed that Method 5i appears to have several improvements over Method 5. Commenters requested that a Method 301 validation be performed to demonstrate the methods are equivalent. Other commenter concerns include:

- EPA must document the problems it experienced in the filter extraction step using Method 5;
- Whether Method 5i measurements exceeding 45 mg/dscm invalidates the method;
- That Method 5i cannot be placed in Part 60 until it is proposed as an "equivalent" or "alternative" method;
- Method 5i needs to be validated at more sources before promulgating;
- The procedure should be offered as guidance and not an absolute requirement for particulate matter CEMS correlation testing;
- This procedure may not be appropriate for use at cement kilns; and
- Method 5i cannot be used as the compliance method for HWCs since Method 5 was used to derive the standard.

Response

EPA has revised Method 5i to address each of these concerns. Method 5i is not required in all cases particulate matter CEMS are used. What method a facility uses to correlate particulate matter CEMS would be found in the applicable regulations. The changes to Method 5 explained in Method 5i did undergo a Method 301 validation. See Appendix A of the DuPont report. Only those parts of Method 5i that differ from Method 5 were validated, though, since these other aspects are identical to the procedures in Method 5 or not significant enough to warrant a complete 301 validation. The relative standard deviation, plotted at various emissions levels, shows Method 5i is a great improvement over Method 5 at low emissions sources.

The filter extraction problems experienced at the Lafarge facility were observed problems which can only be qualified, not quantified. Therefore, EPA believes the NODA preamble language given on the subject adequately documents the issue.

Method 5i measurements which exceed the 45 mg/dscm advisory statement found in the applicability section of the method are not violating method criteria. Rather, the 45 mg/dscm instruction is an advisory statement for users of the method.

EPA believes Method 5i should be placed in Appendix A to Part 60 because it is the repository for all stationary source air methods. We also believe we have adequately shown (and proposed) that Method 5i is equivalent to Method 5 and should be used as an alternative to Method 5 at sources with low particulate matter emissions.

EPA believes the validation performed on the method is sufficient to say it is validated in all low particulate matter emissions situations Method 5 can be used. We note the minor modifications to Method 5 is largely the basis for this determination.

EPA believes the changes to Method 5 described in Method 5i are significant enough for incorporation into the regulations. This is largely because these modifications need to be strictly adhered to. If Method 5i were guidance and not a promulgated method, we fear that these changes would not be followed.

EPA also agrees that as a class of sources, cement kiln particulate matter emissions may be sufficiently great that the small filter used in Method 5i may plug. However, EPA does not believe there is anything inherently different with cement kilns that would cause Method 5i to not work at cement kilns.

Method 5i uses the same measurement principal as Method 5. The modifications to Method 5 found in Method 5i are largely descriptions of how to make more accurate, precise measurements. Therefore, we believe requiring Method 5i instead of Method 5 at low emissions sources is acceptable since it will only give a more accurate, precise determination of the same result.

b. Method 5i Procedure Issues

Comments

CS3A-004 (2)
1. Modified Method 5 accuracy. 1) Use of Modified Method 5 EPA has not provided adequate documentation for the modified method 5 (MM5) for particulate matter used in the DuPont demonstration. In general, it appears the modification involves using a smaller diameter filter and housing assembly and weighing them as a unit rather than removing the filter as in the normal Method 5. EER, EPA's contractor for this study, indicates that the method has been changed to improve the accuracy, but little information is included to support these changes to the method. It appears that weighing the entire filter assembly rather than removing, desiccating and weighing the filter alone, significant accuracy is lost by relying on a larger number of significant digits from the balance. In fact, these additional required digits may exceed the precision of the balance. Also, it appears that desiccating the-entire filter assembly may be ineffective. There is little contact between the air in the dessicator and the air in contact with the filter inside the holder, making moisture removal much more difficult. Yet instead of compensating by extending the desiccating time, EPA appears to have shortened the time. In the experiment described in the beginning of Appendix II, ("Analytical Precision of the Modification", supported by data provided in a table titled "In House Filter Weighings") indicate the samples may have had ineffective desiccation, particularly at the reduced one-hour intervals as compared to the normal six-hour intervals. Thus, the true weight variance between weighings may have been significantly greater with true dessication of the filters. CRWI is concerned that the reduced dessication time combined with the passive nature of the dessication process on an entire filter assembly may not allow for consistent drying. CRWI suggests that EPA determine if this dessication method is appropriate and share the documentation for that determination with the public.

2) Sodium Chloride based PM SEM analysis shows DuPont particulate to be comprised mainly of sodium chloride. Sodium chloride is hydroscopic. Thus, the particulate catch will tend to pick up moisture from the ambient air, causing filter weight gains. This moisture induced weight gain would not be removed by dessication and could be one reason for the considerable amount of scatter in the data. Perhaps, EPA should consider other methods for drying the samples to a constant weight.

3) MM5 Precision The precision of Method 5 is 10% based on studies performed in the 1970's. Method 5 technology has advanced since then due to better balances, electronic manometers, better equipment, better procedures, computers to calculate isokinetic rates, etc. Certainly Method 5 as currently employed has better precision than when it was originally sanctioned. This study seems to reject the Method 5 data validity in favor of the unproven CEM's data, even though EER reportedly took steps to make Method 5 more precise. Considering -this, EER still used 1970's precision data to determine outliers. The study's 30% RSD criteria will allow a study to prove nearly anything desired. CRWI suggests that the precision of Method 5 should be re-evaluated and the precision of MM5 should be established.

CS3A-004 (2) 5) Additional MM5 Concerns Many sample runs are as short as 18 minutes. EPA typically requires a minimum of 60 minutes test duration. Short test runs and low sample volumes contribute to method inaccuracy. Sample volumes are all less than 30 dscf. Though Method 5 does not require a minimum volume, emissions regulations usually stipulate volumes for particular source categories. Generally 30 dscf is the minimum, but that increases when the source is expected to be clean. Minnesota Air Quality Rules, Section 7017.2060, Performance Test Procedures, Subp. 3 A states; "For Method 5, the sampling time for each test run shall be at least 60 minutes and the minimum sampling volume will be 32 dscf (0.9 dscm)." CRWI suggests that EPA can help minimize MM5 data variability by developing consistent sampling times and volumes. Typical probe wash gains are about 0.00025% of the beaker weight. The reported precision in weighing the filter assemblies is less than 0.0007 percent of the weight of the holder. Iowa, for example, requires a minimum particulate weight of 50 mg and sampling times are supposed to be adjusted to meet that. This alludes to the sensitivity of Method 5. Typical results for these tests were 10-20 mg. When factoring in filter holder and beaker weights of 140,000 mg (combined), the analytical sensitivity may not be adequate. These numbers require an analytical sensitivity of 99.999% or better if you want to have values near 10 times the IDL (instrument detection limit). As a result, sample duration and sample volumes should be increased greatly to increase accuracy. It appears that all gravimetric results are a single weighing. EPA Method 5 requires additional weighings to verify constant weight. Specifically, there must be at least two consecutive weights separated by a six-hour desiccation period. In this study, front half particulate recovery included the use of paper towels. Paper towels have substantial amounts of lint and extraneous fibers that could create errors when weighing very small amounts of particulate. Back half weights were recorded to the nearest gram rather than 0.5 gram as specified in EPA Method 5. The support data are incomplete with much of the Method 5 raw data missing and inadequate support for the CEM's results. A complete review will require this information. Documentation is often sketchy and includes many non-initialed strikeouts. Based on these concerns, CRWI suggests that EPA conduct a Method 301 validation on MM5 before any conclusions are made from the, data generated from this study. Demonstration of an accurate and repeatable MM5 is essential to using this method to calibrate each CEM. 2. Data inconsistencies. CRWI identified at least eight places within the report and the supporting appendices where data was inconsistent. After several discussions with EER, most of the

inconsistencies were explained. However, the number and the types of differences creates questions about all the data. This forces the reviewers to question whether there was sufficient QA/QC on this project. Without accurate data, the results of the entire demonstration project are questionable. EPA and EER should be commended on their openness and willingness to explain these discrepancies. The specific differences have been pointed out to EPA and EER. The following list is designed to provide those differences for the record.

CS3A-010 (2) CKRC also is concerned that EPA is using the average of the paired runs to calibrate the PM CEMS rather than the individual run results. CKRC agrees that the number of "runs" to use in the statistical analysis is the number of paired tests conducted, rather than the number of valid individual runs remaining after outlier identification. However, using the averages inflates the correlation coefficient and deflates the confidence and tolerance limits for the calibration. Given that dual train calibration is the exception and not the expected rule for commercial installations, it is inappropriate for EPA to depart from the methods the regulated community will be required to employ. This becomes particularly important given the results reported in Table 2 on page 13782 of the FR notice. Initial calibrations were uniformly failed. Although several passed on subsequent calibrations, this likely is due to the treatment of outliers. Identifying and treating outliers differently will change the compliance percentage. Unfortunately, EPA did not provide the complete data needed for CKRC to perform the calculations in the reports provided. Thus, CKRC requests that EPA revise its report to present all the data - rejected and retained - with run identifiers so that meaningful comment can be made. In addition, regarding the treatment of outliers (62 FR 3780, column 2a), CKRC is concerned that EPA's approach to outlier detection and management may be biasing the results of the PM CEMS validation program. When a pair of results shows an excessive spread, it is important to inspect the data and determine if one of the pairs is obviously wrong (e.g., excessive probe catch due to touching the wall of the probe port or loss of filter). When this occurs, both samples should not be excluded, rather the erroneous run should be rejected because there is a known cause invalidating the data. On the other hand, if neither value can be assigned a cause for invalidation that would apply in a regulatory setting, neither of the values should be rejected. CKRC agrees that it is standard statistical practice to exclude outliers in exploratory situations. However, the Agency admits that it "would have serious reservations regarding this practice of defining what is or is not acceptable after the fact [in a] compliance demonstration." Of concern to CKRC is EPA's next statement that "this [demonstration test] is not a compliance evaluation, and [therefore] EPA does not believe the same cautions apply" (62 FR 13780). CKRC disagrees with this premise as the Agency is using this demonstration to identify acceptable practice and establish the precision of a compliance method. Because of the importance of this determination, EPA should be held to at least as high a standard during this demonstration as the complying facilities. If the regulated community cannot use similar practices (i.e., excluding outliers), especially regarding noncompliance issues, the technique should not be used by EPA as part of demonstrating a CEMS' reliability. The variances in procedure are of particular concern as the test results are intended to demonstrate the viability of requiring CEMS as a regulatory compliance tool. Thus, in conducting the test, EPA should follow the same methods required of regulated facilities. Use of the prescribed methods and employed procedures provides a "control" to which the testing results and difficulties can be measured to help determine the true accuracy and reliability of these instruments.

CS3A-010 (2) As a result, CKRC encourages the EPA to investigate outlier identification methods like the Dixon Method and Rousseeuw's MAD described in our August 19, 1996 comments on the

proposed HWC Rule. EPA should then provide explicit. guidance on the identification and handling of both low and high outliers in the regulatory context. At Section 2, pages 3 & 4 of 37, EPA continues its discussion of outliers. Again, CKRC agrees that outlier identification is standard practice in statistical analysis of a database. Unfortunately, this is a regulatory proceeding. As a result, CKRC objects to the elimination of outliers unless the resulting regulation also allows such elimination when comparing PM CEMS output with allowable emissions limits. Specifically, CKRC encourages the use of statistical outlier identification techniques to flag data points which must be checked. After checking, technically invalid data must be either corrected or eliminated. Data points that are simply unusually large or small, however, must be kept in the analysis since there is no reason to believe that they could not occur during normal operations. EPA may wish to analyze the valid data set twice, one with outliers included and once with them excluded. Both results, however, must be reported to avoid misleading regulators and the affected community as to the accuracy of the PM CEMS. At Section 3, page 4 of 37, EPA used the "standard deviation between each data point and the regression line of the calibration" as a second outlier identification criteria. CKRC believes that this is a powerful tool, but is concerned about two details:

1. The regression line should be fit to each data point, not the average of the data points. This way, individually aberrant results can be identified for inspection and correction. If no obvious procedural or calculation error is uncovered, the data point is valid and should be retained in the analysis to avoid understating the range of individual points likely to be encountered when the source is emitting the average PM concentration indicated by the instrument.

2. The EPA's technique breaks down if the aberrant data point is also a leverage point. That is, if it is establishing the slope of the regression line by being at the extreme value of the range and the rest of the data is clustered relatively closely together. To avoid this problem, CKRC recommends EPA perform the screening analysis using a robust regression technique such as Rousseeuw and Leroy's PROGRESS technique. Such techniques first fit the data to the median of the results from all possible data subsets and identify data points that deviate from the median regression by more than 3 standard deviations. That data is eliminated and the regression line refit using linear least squares regression and final deviations are calculated. For the PM CEMS data set, this produces three potential outcomes for a pair of data: both points are statistically valid, one of the pair is an outlier that should be inspected, or both points are outliers. In the last case, the cause of the deviation needs to be identified. If it cannot be, then the data point should be retained since it is indicative of real performance. CKRC believes that EPA should continue to identify outliers, but should use it as a means of identifying potentially aberrant data rather than a data rejection-technique. At Section 2, page 5 of 37, CKRC is concerned about the specific implementation of the relative standard deviation approach by EPA. The criteria laid out are generally reasonable, but the 1970s method validation study results need to be reanalyzed using modern statistical procedures before it can be used to establish benchmark criteria. While a relative standard deviation was indeed calculated, the original analysis of the 1970s method precision study data did not specifically look at the relationship between precision and concentration. When that is done using something as simple as a Turkey Mean-Difference Plot - plot the difference between paired results on the vertical scale and the average on the horizontal - or a more sophisticated regression plot of the paired data aligned so that the larger value is always the response, it is readily apparent that the Method 5 is absolute (doesn't change with concentration) and not proportional to PM level. Consequently, the criteria for acceptable deviation is not 10 percent of the data average

for a pair of runs, but is 3 times the standard error of the regression for the entire data set. EPA should also realize that the minimum variability paired data alignment just described is only a lower bound for the error term. The upper bound is provided by a Fisher Symmetrical Table alignment where each data set is entered into the regression twice: once with the largest value as response and again with the smallest value as the response. Alternatively, but without an explicit recognition of the uncertainty of the estimate, the Method 301 Practical Quantitation Limit procedure can be used and 30% of that value taken as an estimate of the 3-sigma bound on particulate measurements since that band is intended to cover 99 percent of the data. EPA should use the results of reanalyzing the 1970s precision study with caution. The methods have been evolving and a more recent precision study indicates that Method 5 is about 50 percent better today than the previous study indicated. In addition, the effect of sampling time or volume on variability needs to be considered. The 1970s precision study used nominal 60 ft3 samples while the PM CEMS calibration is based on a mixed bag of sample volumes that tend to be around 20 ft3. As a result, the individual run results will be 170 percent more variable than an analysis of the 1970s precision study indicates because the variability increases as the square root of the sample size ratio. At Section 2, page 7 of 37, EPA indicates that it explored testing error problems. However, CKRC is unable to comment on how the methods being considered "would provide protection against other forms of outliers or anomalies which are prone to occur if the reference method is not carefully performed by experienced personnel." While some sort of guidance is needed, the criteria needs to be objective and executable using the data normally available, not just at a site that decides to perform dual train testing. This becomes particularly important when screened data is used to calibrate monitors or determine regulations, but all data is used to determine compliance. EPA is also cautioned that whatever method is selected, it must consider both low and high outliers. If low results are incorrect or not reproducible, then they result in ratcheting downward of limits or provide a false indication of compliance when a facility really needs to be looking into the performance of their APC. CKRC has used the Dixon Method for identifying potentially aberrant data and recommends that EPA consider this approach. It is a technique that can easily be included in regulations and would use all available data if the range test is met and use the close cluster if it is not. As an alternative that has a strong theoretical statistical basis, compliance and calibrations could be determined using the median of the results. In effect, by averaging the dual-train PM results in this report, EPA is using the median of two simultaneous runs. In the regulatory context, basing compliance on the median is the same as using the arithmetic average if the data is normally distributed and error free; otherwise, it is a robust estimate of average emissions. Since the median is the central value (average of the two central values for an even number of runs) it is easier to compute than performing an outlier screen. CKRC believes, however, that performing an outlier screen is good practice since it enables the identification of correctable data. CKRC cautions EPA, however, that no outlier identification method will detect systematic errors such as using incorrect conversion factors. For example, during CKRC's review of the HWC MACT database we found that a test team failed to convert gas volume in ft3 to m3 when determining concentration, thus all the concentrations were 1/35 of what they should have been. At Section 2, page 7 of 37, CKRC is concerned about EPA's proposal to partition the Method 5 sampling train. If the intent is to suggest that the probe and filter captures should be separately inspected to identify runs where the probe tip may have touched the port wall (i.e., extraordinarily high particulate mass in the probe rinse), then this is a prudent step. However, if the intent is to require further subdivision of samples for analysis, EPA must consider the implications of introducing additional sources of error and variability. In addition, if weighings are done piecemeal, then the method quantitation limit increases. CKRC requests that EPA carefully consider

the full implications of any partitioning and make them available for public comment before promulgating such a change. At Section 2, page 9 of 37, CKRC is concerned that EPA's conclusion that "the particle size distribution results show that about 85% of the PM at the EDV inlet is <1 micron, indicating that a smaller particle size distribution (approximately 90% < I micron) would be expected at the EDV outlet and at the stack sampling location" may indicate a lack of understanding of EDV performance. An EDV charges the PM and water droplets to cause them to coalesce and agglomerate. They are then removed by impaction within the venturi. As a result, the emitted particle size distribution could be smaller than the inlet distribution as suggested, or it could be larger if the agglomerates are not effectively removed. Thus, EPA should measure the outlet size distribution rather than make this potentially incorrect assumption. Inspection of the data indicates that this is more than a theoretical concern. There is a significant shift in the distribution of the total Method 5 collection between the probe rinse and filter with the November testing being much different than the balance of the results. This is a phenomenon that needs to be investigated because many of these test results are flagged as outliers by EPA and the outlier detection techniques used by CKRC. As noted elsewhere in these comments, the particulate size distribution exiting cement kilns is mostly greater than 1 gm. As a result, if the EPA is correct and the size distribution being analyzed by the PM CEMS is mostly less than 1 µm, then the method validation is not applicable to cement kilns. CKRC is concerned that EPA explicitly recognize this reality and conduct method validation studies at enough different types of HWCs to demonstrate the general applicability of the monitors. At Section 2, page 11 of 37, EPA states that it investigated and found that certain "filters were improperly identified." However, EPA has not identified which filters were affected and whether or not the runs could be salvaged. Also, the method used to salvage the results should be described. At Section 2, page 12 of 37, CKRC recognizes that the PM CEMS calibration procedure described in the second paragraph is essentially the standard method found in ISO 10155 (1995-04-01) "Stationary source emissions Automated monitoring of mass concentrations of particles - Performance characteristics, test methods and specifications." CKRC believes that in addition to performing the calibration in this manner, the response and independent variables should be exchanged and the process repeated to provide an indication of the range of PM CEMS responses likely to be encountered at a measured particulate concentration. That is, the confidence limit and 99% coverage (not 75%) tolerance limits for the PM CEMS given measured particulates are required. Note that this is not the same thing as looking at the calibration curves already generated - from the other axis. The standard error of the regression will change which in turn produces different confidence and tolerance intervals (See for example, Draper and Smith, Applied Linear Regression, Second Edition, Wiley, 1981). In addition, if the results are to be used at sampling times other than those used during the calibration test, it is important that the standard deviation of the regression used to calculate the confidence and tolerance intervals be adjusted in a statistically correct manner. Absent these results and corrections, it is impossible to determine compliance status. At Section 2, page 13 of 37, CKRC is very concerned that none of the PM CEMS meet the calibration criteria when all the valid data are considered. While arbitrary exclusion of anomalous results is allowed in gaseous CEMS calibrations, this is potentially understandable given the point sampling nature of most of these devices. It does not take much short-term stratification over a 30 minute calibration to cause a sizable deviation between measurements that has nothing to do with the monitor itself. On the other hand, both Method 5 and the majority of the PM CEMS being tested are spatially integrating devices that measure particulates along a path as well as over time. Consequently, the effect of localized stratification should be substantially less. CKRC is concerned that EPA may base its evaluation of the PM CEMS on an outlier-free data set. The outlier

identification is appropriate. It is inappropriate, however, to delete outliers. Only invalid data should be excluded from the analysis. It is indeed a standard statistical technique to eliminate outliers to avoid biasing a result. Such exclusions are inappropriate for the purpose of validating monitoring systems that will be used for regulatory compliance purposes. Deleting outliers in this situation will minimize apparent instrument variability and provide an impression of greater instrument precision relative to the reference methods than really exists. This practice can have major unintended compliance implications.

CS3A-010 (2) At Section 2, page 15 of 37, EPA indicates it is examining the data to identify statistical outliers. CKRC is concerned that the methods being employed are from EPA's Quality Assurance Handbook for Air Pollution Measurement Systems because unless these techniques can be used by the regulated community, they should not be used in a program designed to be the compliance basis for regulatory standards. In addition, CKRC disagrees with EPA's representation that these techniques "are available for justifying the removal of individual data points." EPA is referred to Natrella, Experimental Statistics, Handbook 91, United States Department of Commerce, National Bureau of Standards, 1963, Chapter 17 for the full text from which the following snippets have been excerpted: "(In) a set of observations, purportedly taken under the same conditions, in which one observation was widely different, (it is called) an outlier from the rest. The problem that confronts the experimenter is whether he should keep the suspect observation in computation, or whether he should discard it as being a faulty measurement. The word reject will mean reject in computation, since every observation should be recorded. It should be emphasized that we are not discussing the case where we know that the observation differs because of an assignable cause, i.e., a dirty test-tube, or a change in operating condition. We are dealing here with the situation where, as far as we are able to ascertain, all the observations are on approximately the same footing. One observation is suspect, however, in that it seems to be set apart from the others. We wonder whether it is not so far from the others that we can reject it as being caused by some assignable but thus far unascertained cause. If on investigation, a trustworthy explanation of the discrepancy is found, common sense dictates that the value concerned should be excluded since these presumably are intended to apply to the unadulterated system. If, on the other hand, no explanation for the apparent anomalousness if sound, then common sense would seem to indicate that it should be included. Statistical rules are given primarily for the benefit of inexperienced investigators, those working with a new process, or those who simply want justification for what they would have done anyway. Whatever rule is used, it must bear some resemblance to the experimenter's feelings about the nature and possible frequency of errors. For an extreme example - if the experimenter feels that about one outlier in twenty reflects an actual blunder, and he uses a rejection rule that throws out the two extremes in every-sample, then his reported data obviously will be "clean" with respect to extreme blunders - but the effects of "little" blunders may still be present. The one and only sure way to avoid publishing any "bad" results is to throw away all results. Based on this view of outlier detection, CKRC urges EPA to revisit its approach to outlier management. Instead of discarding both results if the average is apparently aberrant, EPA should discard only the extreme (high or low) result when there is an assignable cause (i.e., high probe catch or filter housing weight loss). Otherwise, EPA is losing valuable information. Also, when EPA is deciding that the deviation between trains is within method precision, EPA should use a proper definition of precision based on examination of the method validation study data, not an unjustified and unsubstantiated assumption that the uncertainty is proportional to concentration and not a homogenous characteristic of the method itself. At Section 2, page 23 of 37, CKRC strongly urges the Agency to be consistent

with good statistical practice and report all the data, not just that which is associated with what EPA considers valid run pairs. This is particularly important given the shift from dual-train to single train sampling in January, 1997. Since this data cannot be studied using the same techniques used earlier, CKRC believes that it is imperative that the PM CEMS results for all runs and not what may prove to be an arbitrarily selected subset, be provided for review. We also note that when that Referenced Table 2-30 is compared to its predecessors, many of the manual method results also change. It is imperative that EPA correct or provide an explanation of this inconsistency. At Section 2, page 28 of 37, CKRC objects to the unsubstantiated assertion that "the SEM data demonstrate that even in upset conditions, the PM characteristics are not likely do differ enough to bias the PM results over the range of the CEMS' calibrations." To support this conclusion, EPA must present SEM data on the size distribution and composition for the particulate characteristic during the calibration runs and under upset conditions. EPA must then analyze the data to show that the calibration runs cover the range of characteristics likely to be encountered at the facility over time. This has not been done.

CS3A-010 (2) At Section 4, page 11 of 20, CKRC is concerned that the data needed to verify that the QA/QC objectives were met is not provided. For example, 11 a field train blank was taken. This normally means that a train was assembled, leak-checked the requisite number of times, recovered and the laboratory analysis and data reduction performed as if a typical sample volume had been collected. The results do not appear to have been provided in the report.

CS3A-010 (2) 1. EPA DID NOT CONDUCT THE DEMONSTRATION TEST IN ACCORDANCE WITH THE PRESCRIBED REFERENCE METHODS PERFORMANCE SPECIFICATIONS. AND COMPLIANCE PROCEDURES THAT REGULATED FACILITIES WILL BE REQUIRED TO FOLLOW. EPA states (Section 1, page 2 of 11 of the Draft Status Report) that the "demonstration test has involved installing the CEMS and carrying out testing prescribed in the performance specifications as if the facility were buying and using the CEMS for compliance purposes." This is not an accurate representation as CKRC has identified several instances where the particulate testing does not conform to procedures or practices that would be required of regulated entities. Table 1. Required Procedures for Complying Facilities vs. DuPont Demonstration Procedures Required Testing Criteria Performance Specifications, and Compliance Requirements [FN1]. NSPS for Portland Cement Plants requires minimum sampling time of 60 minutes and sample volume of 30 dscf. Some HW-burning CKs are New Sources and must comply with NSPS (40 CFR Part 60, Subpart F). 2. Each run is handled individually in determining compliance (40 CFR Part 60.8 (f)). 3. When the eight- and two- diameter criterion cannot be met, the minimum number of traverse points is determined from Figure 1-1. Figure 1-1 shows a minimum number of traverse points of 20 (40 CFR Part 60, Appendix A - Method 1 Section 2.2.1) 4. No substitution of Data. 5. States the reason for using the 47 mm filter is to minimize inadvertent loss of small filter pieces and allow the filter and housing to be desiccated and weighed before disassembly (Section No. 3 Draft Status Report, December 11, 1996, page 10 of 26). 6. Proper chain of custody procedures need to be followed to assure accurate results (40 CFR Part 60, Appendix A, Method 5.) 7. Moisture concentration is determined by weighing the impingers to the nearest 0.5 mg (40 CFR Part 60, Appendix A, Method 5). 8. Agency would "have serious reservations" about allowing the exclusion of outliers in a compliance demonstration (62 FR 13780). 9. Modifications to test methods must attain a full field validation in accordance with Method 301 (40 CFR Part 63, Appendix A). DuPont Demonstration Deviation From Standard Methods, Performance Specifications, and Report Inconsistencies 1. Field practice was mostly 20 minute samples, but

occasionally 60 minute samples, averaging 20 dscf volume. 2. Dual train runs were averaged to produce results used in calibration (Draft Status Report, Section 2, P.7 of 37). 3. ".....nearest flow disturbance is five diameters upstream and two diameters downstream of the sampling location." Field data sheets indicate that only 12 traverse points were used during sampling (Section No. 3 Draft Status Report, Page 1 of 26 and Page 4 of 26 -- Figure 3-3.) 4. In the case of questionable data due to operator error, the average results of the other runs were used to correct the results of this run where applicable, but EPA did not identify when this was done (Section No. 3 Draft Status Report, Page17 of 16). 5. States the front half of the filter housing and the filter were recovered by loosening the rings of the holder and separating the filter halves (Section No. 3 Draft Status Report, Page 12 of 26). 6. There were lapses in filter tracking inconsistent with appropriate procedures during the initial test (Section No. 3 Draft Status Report, Page 20 of 26). 7. Some field data sheets reflect impinger weights only to the nearest 1 g. 8. Outliers are excluded, and not reported as the Agency views that this demonstration "is not a compliance evaluation" even though it will be used to establish the precision of a compliance method (62 FR 13780). 9. The Agency modified Method 5 without conducting a full field validation and "expects that this modified Method .... will be required for use when calibrating CEMS" (62 FR 13778).

CS3A-011 (2) 6. Other Method 5 Concerns Many sample runs are as short as 18 minutes, but EPA typically requires a minimum of 60 minutes test duration. Short test runs and low sample volumes contribute to method inaccuracy. Sample volumes are all less than 30 dscf. Though Method 5 does not require a minimum volume, emissions regulations usually stipulate volumes for particular source categories. Generally 30 DSCF is the minimum, but that increases when the source is expected to be clean. For example, Minnesota Air Quality Rules, Section 7017.2060, Performance Test Procedures, Subp. 3 A states; "For Method 5, the sampling time for each test run shall be at least 60 minutes and the minimum sampling volume will be 32 dscf (0.9 dscm)." The analytical sensitivity of the Method 5 runs may have been inadequate. Typical probe wash gains are about 0.00025% of the beaker weight. The reported precision in weighing the filter assemblies is less than 0.0007 percent of the weight of the holder. Iowa, for example, requires a minimum particulate weight of 50 mg and sampling times are supposed to be adjusted to meet that. Typical results for this test were 10-20 mg. When factoring in filter holder and beaker weights of 140,000 mg (combined), the analytical sensitivity may not be adequate. These numbers require an analytical sensitivity of 99.999% or better for values near 10 times the IDL (instrument a detection limit). As a result, sample duration and samples volumes should be increased greatly to increase accuracy. It appears that all gravimetric results are a single weighing, even though Method 5 requires at least two consecutive weights, separated by a six-hour desiccation period, to verify constant weight. In this study, front half particulate recovery included the use of paper towels. Paper towels have a lot of lint and extraneous fibers and could be an issue when weighing very small amounts of particulate. Back half weights were recorded to the nearest gram, rather than 0.5 gram as specified in EPA Method 5. The supporting data are incomplete, with much of the Method 5 raw data missing. A complete review will require this information. Documentation is sketchy and includes many non-initialed strikeouts.

CS6A-006 (2) Proposed Method 5I states: The method is effective for total train catches of 50 mg or less. The minimum detection limit for this method can be determined by repeatedly collecting and analyzing blank samples. This method describes a procedure to determine the limit of detection using the results from seven “blank” test runs. <u>RMB believes that EPA should establish minimum</u>

sample weight detection limits for the samples collected using this procedure. Historically, many testers have used the acceptable sample weight variability limit (0.5 mg) and expected sample volumes to determine a "lower" limit for RM 5 results. However, logic dictates that other factors (e.g., recovering the filter and rinsing the probe) contribute to the test method's true detection limit. When collecting samples of 50 mg or less, a lower limit should be established below which the data should be considered suspect (when compared to a particulate monitor, for example) and sample times should be increased in order to obtain more accurate results. Two final, specific recommended changes to proposed Method 5I areas follow.

1.The use of a cyclone should not be needed or allowed and should be removed from the text in Section 2.1.2.
2.When drying filter holder assemblies in an oven at 105°C, EPA should state a precise minimum time period (e.g., 2 hours), not some range like, "2 to 3 hours."

CS6A-008 (2) The anticipated improved precision of the Method 5I source test method for low concentrations of PM will likely require longer sampling times. As noted in the NODA, industry experience with traditional Method 5 (used on higher PM concentrations) indicates that up to 8 hours of sampling time may be required. The low PM concentrations of MACT sources will almost certainly require longer sampling times due to the small amount of PM that will be collected and weighed. Short sampling times would likely result in an inadequate mass of PM from which to base the estimate of the concentration in the stack gas. We urge EPA to assess the realistic sampling times required for Method 5I, and include this information when determining an appropriate averaging time for CEMS.

CS6A-010 (2) EPA should specify the minimum detection limit for Methods 5 and 5I. EPA should also specify the precision of Methods 5 and 5I as a function of catches weights (i.e., mg catches) or particulate concentrations (i.e., mg/dscm) within the effluent stream. The applicability of these and/or other methods for use in establishing the particulate monitor calibration relation must be prescribed over appropriate measurement ranges. EPA should decide whether it is acceptable to combine data from different methods (Method 5 and Method 5I) when developing a particulate monitor calibration relation.

CS6A-011 (2) CKRC questions the need for glass or quartz nozzles. Section 2.1.1 of the procedure requires nozzle tips to have a sharp, tapered leading edge and be fabricated out of either borosilicate or quartz glass. After grinding, nozzles made from these materials are usually heat burnished to relieve stress and temper the tip. This action produces a slightly rounded leading edge. If the probe tips are not flame polished, they are subject to cracking during thermal cycling (heating and cooling) as they are pulled in and out of the stack.

CKRC requests that the Agency consider whether any benefit is actually achieved by using glass probe tips with M5I. Probe nozzle sample contamination only becomes a concern when the probe catch is submitted for metals analysis. We doubt, given the difference in available flow capacity between the M5I and M29 filter housings, that a M5I housing should be used in a M29 train. The impinger collection efficiency would be altered.

To the best of CKRC's knowledge, "pesticide grade" refers to the purity of the chemical acetone,

not the amount of residue left behind upon evaporation. What constitutes "low residue" must be defined to avoid inadvertent non-compliance and after-the-fact arguments. CKRC contractor's experience is that HPLC grade acetone also produces minimal residue blanks.

Another, potentially larger, concern is probe brush contamination. In the field, there are many opportunities to contaminate even a carefully pre-cleaned and proofed and handled probe brush. The correct way to implement this requirement is to define and require the use of low residue acetone rather than specifying a specific grade. In addition, since background correction is a standard laboratory practice, CKRC is unaware of any argument, other than tradition, that allowing full background correction would in any way compromise M5 results when "low residue" acetone is used. Restricting the magnitude of the acetone residue correction may have been intended as an extra incentive to use "low residue" acetone. "Low residue acetone" is defined as acetone having a residue concentration less than 0.001 percent (10 ppm). Since Method 5, 3.2 already requires "only acetone with low blank values (less than 0.001 percent) shall be used" it is questionable that this is a change at all unless an even lower residue concentration is intended.

CKRC also urges the Agency to reconsider the statements indicating that good field practice can avoid contamination. CKRC concurs that good field practice, especially the steps enumerated by the Agency are important, but these steps simply minimize the chance of undetected contamination. They do not and cannot assure avoidance of contamination.

CKRC also believes that the M5I procedure should provide for an acetone blank adjustment like M5. In fact, if the full blank adjustment is employed in M5, instead of being capped by an implicit allowable amount of acetone residue, there may be no need for test teams to use the more expensive pesticide grade reagents.

CKRC suggests that the Agency perform the testing needed to establish that blank-corrections are less precise than using "low residue" reagents. The acceptable amount of reagent residue should be established considering cost and availability.

Procedural requirements, such as maintaining the relative humidity of the gravimetric laboratory below 30 percent relative humidity, using Teflon liners to minimize the probe rinse container tare weight, elimination of static electricity, etc., are not incorporated into proposed M5I draft distributed for comment. CKRC requests that EPA make revisions and provide an opportunity to review the specific language.

CKRC is especially concerned with the practicality and need to maintain entire laboratories below 30 percent relative humidity.

Given the need for precise results, CKRC recommends that the Agency include proofing and recovery verification procedures in M5I. Specifically, before any test or recovery equipment is used, it should be cleaned and recovered as if a sample was collected. The residue in the recovered acetone should be within allowable gravimetric error (±0.5 mg). It is particularly important that the recovery step include all the nozzles, probe liners, filter holders and probe brushes to be used in the field.

At the end of the field test, each train should be recovered again and the acetone evaporated to

demonstrate negligible sample loss and carry-over between individual runs. These additional QA procedures are currently used when low-level particulate sources are tested by particularly experienced test teams.

CKRC member companies' testing contractors have experienced sample weight gain from probe brush contamination. Steps to minimize this problem include pre-cleaning all probe brushes, at least keeping the brushes under cover between field uses and preferably using a different, proofed probe brush for each recovery.

Recent CKRC contractor experience with probe brushes also indicates that stainless steel wire windings may be problematic for low-level emissions sources. In one test, two of 38 samples evidenced enormously elevated nickel and chromium concentrations. The nickel to chromium ratio matched that of 316 stainless steel. This indicates that chips may have been lost from the 316 stainless steel used in the Method 5 and 17 specified 316 stainless steel probe brush. While this occurred during M29 (metals testing), if the loss was from the probe brush, it would contribute to Method 5 and 5I probe catch weight gain. To avoid this problem, the Methods 5 and 17 specified 316 stainless steel wire probe brush is now replaced by an all Teflon brush and extension in low-level particulate testing by this contractor.

Specific issues raised in NODA Preamble Text

Within the NODA Preamble, the Agency discusses several issues concerning M5I; however, we were unable to locate any discussion regarding concerns within the draft M5I published for comment. The comments are as follows:

CKRC recommends that a dual-train fabrication specification be included in M5 and M5I.
The specification should clearly state the allowable distance between nozzle centerlines, planar alignment requirements, the number and location of pitot probes, and provide guidance on the need for independent diluent measurements for each sampling train. In addition to considering the consistency of the diluent corrected particulate matter results, additional quality assurance requirement such as allowable deviations in moisture and molecular weight determinations should also be included.

The target precision for repeated weighings is ± 0.5 mg. This implies the minimum sample size has to be 20 mg for the imprecision associated with weighing alone to be less than half the 5 percent variability the Agency says is associated with M5I. For a low-emitting source, one with standardized and diluent corrected particulate concentration of 0.0015 gr/dsft^3 @ 7% O_2, roughly 3.5 mg/dsm^3 @ 7% O_2, sampling times in excess of 3 hours are required to meet this requirement with the pressure drop limitation imposed by the smaller filter and conventional M5 sampling trains. This in turn indicates that more sampling team time will be required on-site to accurately measure normal emissions from low-emitting sources and an 18-hour block is the duration of reasonably precise M5I tests conducted at ultra-clean sources. Consequently, CKRC believes that, given the Agency's stated desire to match the duration of manual method and PM CEMS rolling averages, the absolute minimum averaging time that should even be considered is 18 hours.

62 FR 67793 -- CKRC supports the Agency's conclusion that measurement precision must be known

at the regulatory level and properly considered in establishing data-derived rules.

CS6A-022 (2) Appropriate sampling durations for Method 5 runs are calculated using the minimum quantifiable PM sample weights (approximately 1 mg) and the volume of stack gas pulled through the sampling device. The volume of stack gas pulled is based on the stack gas velocity and sample orifice since Method 5 sampling is performed isokinetically. If the total volume of stack gas drawn through the sampling device is too small, a non-detect value may not be low enough to demonstrate compliance with the PM standard. The Hospital/Medical/Infectious Waste Incinerator (MWI) rule mandates Method 5 sampling runs for PM be a minimum of 1 hour in duration. There is actually an inverse relationship between the PM emission standard and the appropriate run duration, that is, a lower PM emissions standard requires a longer sampling period (specifically more stack gas sampled) to demonstrate that the standard has been met. Since the hazardous waste incinerator PM standard is likely to be lower than the standard for medium and small MWIs the minimum sampling period to demonstrate compliance for a hazardous waste incinerator is likely to be longer, that is more stack gas will need to be sampled to demonstrate compliance.

Summary

Many commenters offered recommendations for revisions to Method 5i. These additions included clarifications for: minimum sample volumes, minimum sample times, pesticide grade acetone, the requirement for glass nozzles, and several other general issues.

Response

Each recommendation was added or clarified in the revised version of Method 5i with exception to the request for additional quality control samples such as proofing and recovery verification trains.

c. Condensibles

Comments

CS6A-010 (3) EPA must address the issue of condensible particulate matter in cement kiln operations. When conducting calibration relation testing using an extractive particulate test method with a specified filtration temperature to calibrate an in-situ monitor, the presence of condensable particulate material at some kilns, and temporal variations in the condensable particulate matter content, may make it impossible to calibrate particulate monitors at some sources using the proposed methodology. Use of a manual test method with the filter maintained close to the effluent temperature at the monitoring location is recommended for in-situ monitors. Additional study is required to resolve this issue.

CS6A-011 (3) Many PM CEMS are in-situ devices being calibrated with extractive methods. In the introduction to Method 17 (40, CFR 60, Appendix A), the Agency advises that "particulate matter is not an absolute quantity; rather, it is a function of temperature and pressure. Therefore, to prevent variability in particulate matter emission regulations and/or associated test methods, the temperature and pressure at which particulate matter is to be measured must be carefully defined In Method 5, 250°F is established as a nominal reference temperature."

While the reference temperature is applicable to extractive devices which operate at 250¡F, it is not representative of the particulate concentrations being measured by in-stack PM CEMS exposed to a significantly different temperature. That is, with M5 and M5I, the resulting mass is an unknown sum of what was solid under stack conditions and unmeasurable gaseous material that condensed and increased the extracted sample weight.

Rather than attempting to increase the M5 and M5I probe and sample box temperatures to match stack conditions for the purpose of PM CEMS calibration, a much simpler approach is to use an in-stack filter-based sampling method. This would eliminate the effect of temperature differences and whatever problems might be associated with sampling probe recovery.

Method 17 is an EPA approved, in-stack filter sampling methodology. It measures the matter that is solid at stack conditions. This is the particulate matter measured by an in-stack CEMS. Both France and Germany are refining sampling methods similar to M17 for calibrating PM CEMS at low-concentration sources. The improvements to date include the use of titanium filter housings which can be weighed without disassembly and elimination of the button-hook or elbow type nozzle to minimize probe recovery problems.

M17 is restricted to unsaturated gas streams without entrained water droplets. These same restrictions apply to in-stack light-scattering PM CEMS because water droplets reflect light and cause a high “particulate” bias while saturated gas transmits light poorly and monitor response is compromised.

CKRC urges the Agency to include M17, improved as indicated by Agency research and European developments, in PS11 as an approved manual method for PM CEMS calibration. The Agency will also have to develop multi-train fabrication specifications for M17-like sampling apparatus if dual-train sampling results are to be employed in the calibration procedure.

CKRC also recommends that the Agency require the probe and sampling box temperatures for extractive PM CEMS be set to match the monitor temperature. That way, the manual method and PM CEMS are measuring the same material. CKRC suggests that the Agency investigate the trade-offs involved in using in-stack calibration procedures with an in-stack PM CEMS. Both results measure the solid particulate matter that can be captured by a particulate control device. This is not necessarily equivalent to M5. The PM CEMS will be reporting what can actually be measured and captured, so the disconnect has no effect on determining when an APCD is working properly. It does pose a potentially significant problem when establishing equivalent emissions limitations. An extractive and in-stack PM CEMS are unlikely to have the same national PM CEMS emissions standards. The magnitude and significance of this problem needs to be addressed by the Agency and the results provided for public review and comment.

CS6A-013 (3) 1. The method allows only for the collection of particulate matter out-of-stack in a temperature controlled sample box. Although this is consistent with Method 5, the application of this technique for correlation to instrumented methods in PS-11 is not appropriate in general.

In order for a PS-11 correlation to be scientifically supportable, the continuous particulate monitor

and the test method used must measure the same thing. If the out-of-stack 5I filter is maintained at a temperature of 120°C (or other as specified by the Administrator) and aerosols condense on the filter, will be measuring condensibles that are not sensed by in-stack particulate monitors. In such cases, it is not valid to develop a correlation between two methods that are measuring different samples. This has been pointed out in previous literature (e.g. EPA 450/2-84-004 and references therein).

2. Allowing for an out-of-stack filter only, makes inconsistent with developing standards of the International Standards Organization (ISO), the Committee for European Normalization (CEN), and the American Society for Testing and Materials (ASTM). Data obtained using therefore would not in all cases be comparable to that obtained by using the ISO, CEN, or ASTM methods. Since ISO Methods are used in Canada, the disparity in data could cause concern with regard to international comparisons or agreements. The CEN, ISO, and ASTM standards are referenced as follows:

> CEN WI 264010 Stationary source emissions - Determination of low range mass concentration of dust - Manual Gravimetric Method.
> ISO/CD 12141.2 Stationary source emissions - Determination of mass concentration of dust at low concentration - Manual gravimetric method
> ASTM (Committee D22.03) Standard Test Method for Determination of Mass Concentration of Particulate Matter from Stationary Sources at Low Concentrations (Manual Gravimetric Method)

3. Although it is understood that there exists historical justification for specifying an out-of-stack filter temperature and that this temperature is integral to the definition of particulate matter by EPA, the justification may not be scientifically appropriate when is applied in PS-11 correlations.

It is recommended from a technical standpoint that if specifies that the filter temperature be maintained at a given temperature, that only particulate monitors capable of extracting a sample and measuring the sample at that specified temperature be allowed. On the other hand, if continuous particulate matter emission standards are established on a source-by-source basis, in-stack particulate monitors should be allowed to be tested versus in-stack manual techniques to develop the best possible correlations. The issue of condensible aerosols should be treated separately on a case-by-case basis.

The ISO standard addresses this issue in the following manner:

"Emitted dusts are generally thermally stable. However, gases to be sampled may contain unstable or semi-volatile compounds (in particulate form at low temperature, in gaseous form at higher temperature). In such cases, the measured concentration depends on the filtration temperature and/or on the drying temperature before final weighing.

Particulate matter may be defined in national standards in terms of a specified standard temperature (e.g. 125°C, 15°C). In such cases, the sampling system must be designed so as to collect pollutant materials that exist as particulate matter (solid phase or liquid droplet (aerosol)) at the specified temperature. This may be done by installing the filter and filter assembly externally to the probe, into a temperature controlled chamber.

If materials that are condensible in ambient air are incorporated into the national standard for

particulate matter, it may be necessary to include materials caught in a cooled impinger assembly added after the filter. Suitable extractive methods for organic or other materials must then be defined in the national standard. This standard does not address such procedures, however it is noted that care must be taken that any procedures applied must not result in the introduction of artifacts non-representative of actual emissions.

Industries where condensible materials may occur, include the following:

- power plant equipped with desulfurization processes, resulting in the formation of unstable hydrates;
- heavy fuel oil power plants or diesel engines, causing the formation of SO_3 and/or organic emissions;
- glass furnaces, causing the occurrence of semi volatile boron compounds.

In some cases, very high discrepancies (up to a factor of 10) have been reported, and it is therefore clear that, in such a case, the measured result has only sense when associated with conventional temperature, which is the highest temperature sustained by the sampled dust before weighing,

Because of the extreme variety of the situations that may be encountered, it is not possible to find a conventional temperature which could be relevant in all the cases.

However, since the complete trapping of volatile compounds would necessitate a very low filtration temperature and special care during sampling, more reproducible results may be achieved if these compounds are not trapped or are further evaporated when drying. For this reason, a conventional temperature of 160°C, that avoids trapping of most volatile compounds and to decompose most of the hydrates is generally convenient.

Summary

Commenters raised the issue of condensable particulate in the stack being compared to manual method measurements using extractive procedures.

Response

EPA agrees that some chemical compounds that are particulate matter at a lower temperature may not be particulate at higher temperatures. As such, EPA agrees that Method 5i may “catch” (at 250°F) more particulate matter than is present in the stack (at 350°F, for example) and measured by in-situ light-scattering particulate matter CEMS. A method such as Method 17 that makes stack measurements at stack temperature (that is, the same temperature as the CEMS is measuring at) would eliminate this interference. This is largely a problem at cement kilns, and possibly other sources not directly effected by this rule, such as utility boilers. EPA will investigate the applicability of Method 17 at cement kilns at its upcoming tests at Lafarge.

8. PM CEMS Costs

a. Below the Floor Incurs Significant Costs

Comments

CS6A-005 (1) Also, the site-specific particulate matter concept is not consistent with the MACT concept of the floor and beyond-the-floor. If a facility can meet the published standard of 34 mg/dscm, then it has met the standard protective of human health and the environment. To go beyond the standard must be justified on a cost versus performance basis. For example, at the DOE incinerator at SRS, the worst-case particulate emission from the 1997 Trial Burn was 5 mg/dscm. Given that the particulate emissions cannot be manipulated for radiological reasons, one year of non-trial burn emissions would result in emissions in the range of 3-4 mg/dscm (the best measured during the Trial Burn) or lower. How much more protective of human health and the environment is an emission rate of 3-4 mg/dscm when the protective level is 34 mg/dscm? No justification of the protectiveness of human health and the environment when emissions are so much lower than the standard has been offered.

CS6A-008 (1) Worse, the more stringent site-specific limit would be equivalent to going beyond the MACT "floor" without justification. Section 112(d) requires the Agency to set emission levels that reflect "the *maximum* degree of reduction in emissions . . . *achievable*." 42 U.S.C. § 7412(d)(2) (emphasis added). To the extent the Agency wants to go beyond the MACT floor established in Section 112(d)(3), the Agency must demonstrate that such additional reduction is *achievable.* This is not just a technical feasibility issue, but also involves consideration of costs and other factors. *Id*. When it reevaluated the floor standard for PM emissions from incinerators, the Agency concluded that while 0.015 grains per dry standard cubic foot (dscf) was an achievable floor standard, going any lower raised "significant cost considerations . . . suggest[ing] that a B.F. [beyond the floor] standard may not ultimately prove to be appropriate." 62 Fed. Reg. 24222 (May 2, 1997). EPA cannot create a mechanism that will set a wide variety of more stringent B.F. standards without demonstrating that those lower limits are technically achievable and cost-effective – which has not yet done.

CS6A-011 (1) In addition, EPA may not set MACT standards more stringent than the "floor" levels specified in §112(d)(3) without first taking into consideration the cost of achieving such emission reductions and any non-air quality health and environmental impacts and energy requirements. CAA §112(d)(2). Prescribing a methodology that results in more stringent limits than the manual method-based national PM standards represents an end-run around this requirement to consider costs and other factors before going beyond the MACT floor.

While the above paragraphs highlight some of the cost and resource burdens associated with the implementation of PM CEMS anticipated by CKRC, this discussion is in no way comprehensive. The cement industry has initiated a comprehensive PM CEMS implementation cost analysis that is expected to be completed in the next few weeks. The NODA's very short comment period and delays experienced in obtaining the modified background cost analysis model from EPA's Office of Air Quality Planning and Standards (OAQPS) prevented a more timely completion of the work product. However, CKRC will forward the document -- as a supplement to this comment package --

for Agency consideration as soon as it is complete.

Because of the complexity of EPA's proposed implementation and compliance scheme, as illustrated by the concerns raised above, the potentially significant increased costs associated with EPA's approach, and the concerns about inappropriate potential impacts on final MACT standards (presented in B and F of this section), CKRC urges the Agency to incorporate into the final rulemaking an option enabling facilities to by-pass the cumbersome OPL-setting procedure.

CS6A-030 (1) EPA s proposed approach to establishing a site-specific standard appears to reward facilities that can increase their particulate emissions for one year to establish a higher PM limit. In the case of DOE s mixed waste incinerators, the option to manipulate for higher PM emissions is not available because of the radiological National Emission Standards for Hazardous Air Pollutants (NESHAP) permits. To increase the amount of particulate being emitted is not even fathomable from a responsible care perspective, yet this rulemaking appears to inadvertently promote that behavior. For example, at the DOE mixed-waste incinerator at Savannah River Site (SRS), the worst-case particulate emission from the 1997 Trial Burn was 5 mg/dscm. Given that the particulate emissions cannot be manipulated for radiological reasons, DOE estimates that one year of non-trial burn emissions would result in emissions in the 3-4 mg/dscm range (the best that was measured during the Trial Burn) or lower. DOE believes that a standard at such a level could adversely affect future DOE burn activities, because of our highly variable feed. Also, the site-specific particulate matter concept may be inconsistent with the CAA statutory language for developing maximum achievable control technology (MACT) "floor" and "beyond-the-floor"standards. If a facility can meet the proposed "floor" standard of 34 mg/dscm (0.015 gr/dscf), then it has met the level achievable by state-of-the-art air pollution control devices (APCDs). Section 112(d)(2) of the CAA states that to establish a standard beyond-the-floor, EPA needs to consider cost-effectiveness, any non-air quality impacts, and energy requirements. DOE requests that EPA revisit the concept of establishing site-specific PM limits.

Summary

The site-specific particulate matter concept is not consistent with the MACT concept of the floor and beyond-the-floor. If a facility can meet the published standard, then it has met the standard protective of human health and the environment. To go beyond the standard must be justified on a cost versus performance basis. EPA may not set MACT standards more stringent than the "floor" levels specified in §112(d)(3) without first taking into consideration the cost of achieving such emission reductions and any non-air quality health and environmental impacts and energy requirements. CAA §112(d)(2). Prescribing a methodology that results in more stringent limits than the manual method-based national PM standards represents an end-run around this requirement to consider costs and other factors before going beyond the MACT floor.

Response

EPA has abandoned attempts at controlling particulate matter to what was achieved during the comprehensive performance test and will reevaluate the PM limit based on measurements using a CEMS at a reasonable worst case (for emissions) MACT source. EPA disagrees that requiring particulate matter CEMS changes the meaning of "floor" or "beyond the floor" since the need to

control PM emissions to assure compliance with metals standards is current practice for these sources. Therefore, continuous control of PM to ensure compliance with metals and PM standards represents what the "floor" is doing.

b. EPA Overlooked Several Key Cost Issues

Comments

CEM5.007(100)(b) Ciba is concerned that continuous emission monitors (CEMS) for PM are mandated in the proposed rule. These units cost about $20,000 each (equipment only) and redundant analyzers will be required due to uncertain reliability. These PM analyzers typically have interference from moisture, which causes false high readings. EPA has indicated that there will be no provision for removing bad data points from CEMS. This will cause considerable problems at both of our incinerators, which have wet stacks. Moisture control, accomplished by re-heating the stack, would cost hundreds of thousands of dollars. EPA has not addressed this problem or considered this cost in their evaluation of the PM standard.

RSCP-114 (5) TABLE 2.1

Concern	**Suggestion**
There should be an appropriate cost benefit to CEM use as a compliance assurance tool.	Users support the concept that EPA has presented if there is a cost savings over alternative measures of compliance. They support keeping options open for alternative compliance strategies. For some units (especially BIFs or incinerators with relatively few waste feed streams), CEM's do not provide appropriate cost/benefit. Increased tradeoffs in compliance testing frequency and operating parameter (CMS) limits are suggested as CEM's are applied for compliance assurance.

CS3A-010 (2) For example, although the minor modification developed to minimize filter loss - using a lightweight filter holder - may not be of particular technical concern, the fact that EPA sampled less than the required volume (30 dscf) for less than the required 60 minutes specified in Subpart F produces more variable data and poorer method precision than would be allowed cement kilns subject to NSPS. Therefore, the actual accuracy of the tested PM CEMS and the cost estimates EPA is developing for initial certification and periodic recertification must be questioned. In addition, the Agency did not follow standard procedure for sampling the minimum number of traverse points required under Method 1 (40 CFR Part 60, Appendix A). This results in a nonrepresentative stack sample and does not take into account the effect of disturbances on gas flow.

CS3A-012 (2) 4. The high cost of PM CEMS are not warranted. The installation of CEMS on each individual stack is a very costly item with installed cost of an individual CEM (with associated sampling system) estimated at $200,000-250,000. In reality, redundant analyzers will be required

to assure that an individual analyzer can be calibrated and repaired while keeping the incinerator in operation since it would be a violation to run the incinerator without required monitoring equipment in operation. The cost for redundant analyzers for each of 4 incinerators at the Hannibal plant site could exceed $1,000,000 just for installation. It is also expected that experimental type instruments of the type presently being studied will be under constant repair and calibration. The high degree of maintenance of these and other CEMS proposed for incinerators will most likely necessitate the employment of skilled instrument engineers or technicians to keep these instruments operating. There is a high cost for additional technical staff to maintain these CEMS.

RSCP-111 (2) *Quality Assurance and Control Procedures for CEMs* Quality Assurance and Control procedures for CEMs have become commonplace to RES. Where the instruments in question are well supported by vendors, and in broad use, tying stack analyzers to the ability to burn waste is broadly accepted. It is this lack of background which makes the PM (and metals) analyzer(s) so difficult to accept. The HWI industry actually relies on the installation of redundant analyzers for key parameters, so that unit on-stream time is not impacted by instrument failure. If and as the new CEMs become institutionalized, a similar redundancy for them may be warranted. That cost should be factored into any assessment.

RSCP-139 (2) The current draft version of Hazardous Waste Incineration MACT requires up to five different analyzers monitoring for different waste constituents. Estimates of CEMS reliability, based upon field experience, range between 75 and 90 percent. This translates into a potential lost operating time for our on-site hazardous waste incinerator of up to 2,190 hours per year. The cost for off-site incineration of wastes, including transportation, for 2,190 hours of downtime is estimated at $3.5 million annually! These costs, due to lost operating time due to CEMS malfunction alone, are unacceptable.

To deal with these costs, CEMS operators have installed redundant analyzers, and in some cases, redundant CEMS systems, doubling the cost of emission monitoring systems. The costs associated with redundant CEMS systems approach seven figures. These costs are also unacceptable and cannot be justified. With the increased cost of operating commercial and on-site incinerators due to monitoring and enhanced performance testing requirements, the cost of off-site incineration could easily be expected to double. In the proposed rule, CEMS failures would result in waste feed interruption due to interlocking with the AWFCO system which would increase % emissions due to interrupted operation. No alternatives are allowed. This approach is not realistic.

FMC and FCC propose the development of a provision in this rule to allow for Predictive Emission Monitoring ("PEM") of key incinerator pollutants based on an experimentally developed model relating process variables to predict pollutant concentrations or mass flow rates. Both particulate and hydrocarbon emissions are good candidates for predictive modeling. Predictive Emission Monitoring Systems ("PEMS") would be able to be cheaply implemented, but still be able to satisfy public concern over the availability of continuous hazardous waste incinerator emission information. We also propose the use of PEM in lieu of Automatic Waste Feed Cutoff requirements, provided that there is adequate information to perform model estimates of incinerator emissions. For information on PEM, please refer to the PEMS specification document available on the CEMS section of the TTN EMTIC bulletin board.

RSCP-143 (2) The addition of so many additional CEMs will virtually require the assignment of at least one additional instrument technician full-time to test and maintain these CEMs. In addition, the investigation of corrective action and reporting requirement associated with the AWFCOs connected to the EMs is likely to require an additional employee for the first one or two years of operation until these new systems have been debugged.

RSCP-144 (2) 3.0 CEM Operating Cost The maintenance of the particulate and mercury CEM's is an additional burden of this proposed regulation. These costs include replacement parts and calibration chemicals, and daily periodic maintenance by a properly trained technician. Generally, annual cost for parts and chemicals are estimated at 10% of the capital expense. The wages and benefits for a technician at a cement facility are estimated at $50,000 per year. Consequently, the annual cost to maintain particulate and mercury CEMS is expected to be $67,000 per year. There is no way to estimate the cost of lost revenues due to a malfunctioning CEM. In addition to these routine maintenance costs, there will most probably be substantial costs during the first year of operation for charges to cover the vendor's technicians' time and travel for system debugging not covered by the warranty. These changes were substantial for the first year for the total hydrocarbon and carbon monoxide monitors required under BIF.

4.0 Other Potential Costs The capital costs above are based on current prices for the equipment. With the promulgation of the proposed regulation and the availability of data currently being gathered on the efficiency of the various vendors' monitors, it is very likely that one or two vendors will be inundated with orders. It is unreasonable that under such conditions these prices would remain at these levels. Additionally, as was experienced during BIF when CO and THC monitoring requirements were promulgated, the promised delivery times were unattainable necessitating additional expense to expedite construction and installation resulting in more costs to cover air transport and overtime. None of these costs can be accurately quantified, but a facility would be remiss in estimating the capital cost at anything less than 150% of quoted prices, and the first year's expense at less than 200% of the estimated routine maintenance cost estimate.

CEM5.063(170K)(d) A second issue related to calibration is that the minimum number of calibration runs with unique PM CEM data must be at least 15. It is doubtful if any of the tests can be run in the 1-hour time frame outlined in the cost estimate in Table 4.4 [Footnote 5: Volume V Technical Support Document to HWR.]. The cost attributable to a Response Calibration Audit [RCA], as defined in Appendix H [Footnote 6: Volume IV to HWR.], is thus at least 15% higher than estimated. This is a far cry from the stated calibration costs for these units as noted in the conversations with Mr. Buhne of TUV Rheinland [Footnote 7: Volume IV page 2-12]. To achieve the low level calibrations discussed for the German facilities with 30 minute samples implies the use of methods different than Method 5. Review of Dr. Martin's papers [Footnote 8: Martin, P., "Continuous Emissions Monitoring in Flue Gases", presented at the Congress on Continuous Emissions Monitoring for Process Control and Regulatory Compliance, May 2-4, 1994, London, Ontario, Canada; Footnote 9: Martin, P., "Measurement of Low Particulate concentrations with Stray Light Instruments", ISA/93, September 19-24, 1993, Chicago, IL.] on the subject indicates that the particulate sampling method employed in Germany samples about 4 m^3/hr. Method 5, on the other hand, is limited to about 1 ft^3/m (1.7 m^3/h) to avoid overloading the Greenburg-Smith impingers.

CEM5.063(170)(f) TSD Vol. IV discussed the inherent uncertainty and variables that affect particulate CEMS output. Response is influenced by particle size distribution and composition as well as concentration. EPA even notes in the background documents that facilities burning a range of fuels may have to develop a series of calibrations curves and use an extensive set of software to select the correct curve for current operating conditions. This has to add to the cost of calibration since at least15 runs are needed for each calibration series.

RCSP-181 (2) Comparing the cost of operating a CEMS in Germany cannot be compared to the cost of operation in the US since the EPA regulations require more system checks than the German regulations. In Germany, the zero point drift, sensitivity drift and automatic sensitivity correction must be checked at the maintenance interval (four weeks was the maintenance interval given for the example presented in this section) compared to daily checks required by the EPA. The German regulations require a yearly instrument response check compared to EPA's mandated quarterly cylinder gas audits. And finally, German regulations require a calibration check against a manual reference method every three to five years but the EPA would require a yearly RATA. Performance of a PM CEMS in the US cannot be inferred from PM CEMS performance in Germany because the regulations proposed by the EPA are much more stringent than the German regulations. The information presented in this support document does not begin to compare the performance of a PM CEMS with the proposed EPA regulations or to the proposed performance specifications.

RSCP-191 (2) 30. Page 105 The Agency is in error on their statement that CEMS are less intrusive on the facility than operating parameter limits. Installation and maintenance for a CEM are burdensome, requiring dedicated personnel and new O&M procedures. Additionally, cost of installation and periodic testing impact operating budgets.

RSCP-204 (2) 10.1 Cost Estimates for PM and Hg CEMS. EPA's cost estimate for the CEMS are much lower than Fina's experience indicates. We suspect that EPA's cost estimate may just confuse the cost of the analyzer with the cost of the entire system including data processing, sample transport and conditioning, installation and frequent maintenance. Table 5 contains a summary of cost that DRE believes will be more realistic for PM and mercury CEMS.

Table 5 - Cost Estimates for PM & Hg CEMS

Capital Cost Estimate	**PM CEMS**	**Hg CEMS**
Analyzer	$70,000 $	$130,000
Installation	30,000	15,000
Data Management System	30,000	30,000
QA Manual	10,000	10,000
RATA Testing	20,000	20,000
Training	10,000	10,000
Capital Total Cost Estimate	**$170,000 $**	**$ 215,000**

Annual O & M Cost Estimate	**PM CEMS**	**Hg CEMS**
Maintenance Labor	30,000	30,000
Maintenance Parts	9,000	15,000
Quarterly CE Test	20,000	20,000
RATA Test (3 yr Cycle)	7,000	10,000
Training	5,000	5,000
Data Management	15,000	15,000
Total Annual O & M Cost Estimate	**$86,000**	**$95,000**

CS6A-001 (2) No daily checks are required for the optical monitors. This cost should be removed from the analysis. For the Beta monitors, ½ hour per day is not an adequate time period to gather necessary equipment, climb the stack, and perform a manual system calibration. We believe this period is more realistically l hour/day, with the appropriate cost increases as predicted by the EMTIC model.

CS6A-001 (2) A large fraction (approximately 50%) of the HWI has "wet" stacks, which, given the requirements of the revised PS11 draft, will almost certainly dictate use of the Beta-gauge instruments. The cost burden of two or more additional calibration tests, with the resultant effect on other plant operational costs, would, in all probability, force the rest of the industry to adopt Beta-gauge technology as well. The lack of competition, especially considering the foreign origin of the Beta-gauge instruments, will likely result in significantly increased instrument prices, as well as high spare parts and maintenance costs.

1. We do not understand the logic behind the stakeholder request to provide table 1b (cost of using redundant in-situ light scattering instruments). These instruments demonstrated data availability well in excess of 99% during the tests, as they have done in many applications worldwide. Therefore, there is no need for redundant light scattering instruments.

2. On the other hand, the Beta type instruments were available less than 75% of the time during the monthly tests (see table 1 in my comments on data availability). Even with the very generous assumptions made in the draft report, section 2.7.2, these devices show only 75 - 85% data availability. This supports the conclusion that redundant Beta PM-CEMS are not only desirable but <u>necessary</u> to meet the continuous monitoring requirements, and therefore suggest that the cost estimates include redundant PM CEMS for the Beta-gauges.

3. CPMS backup. As was learned during the test program, the usefulness of continuous parametric monitoring systems to predict particulate emissions is, at best, questionable. Given the high reliability of the in-situ light scattering instruments, CPMS should not be required. Instead, a simplified version of the EPA acid rain program SO_2 “missing data algorithm” could

be used to account for missing data periods.

CS6A-001 (2) 1. Cost Estimates - The cost estimates show the Beta-gauge instruments with only slightly higher (less than 10%) annual costs than the in-situ LS instruments. This near equality results from inaccurate estimates of Beta-gauge O&M costs, lack of provision for missing data costs (to accommodate the higher downtime of the instruments) and the additional calibration requirements for the LS instruments.

CS6A-002 (2) In 40 CFR, Part 60, Appendix B, Performance Specification 6, the specifications do not distinguish between different measuring technologies. There was a great deal of concern before the requirements for flow monitoring were promulgated that there were no devices available that could perform as desired. The flow monitors have performed better than most expected regardless of the technology used (ultrasonic, thermal, differential pressure). Even though certain technologies were not appropriate for all applications they were not forced out of the market by excessive RATAs. Differential pressure and thermal flow monitors are not as well suited for wet stack applications as ultrasonic devices. Their devices are however, performing well in other applications. If differential pressure and thermal sensors had been placed under a requirement of performing a RATA every three months it is unlikely that many would have been sold. The limited number of vendors of ultrasonic flow sensors would have had less competition and this probably would have created higher prices in the marketplace.

As the above example demonstrates, fair competition in industry has advanced technology and reduced prices. Any action which would disrupt the marketplace in favor of a broad ruling against one particular technology group runs contrary to the principles upon which this economy is based.

CS6A-007 (5) Combustion devices, particularly cement kilns, play a key role in Safety-Kleen's waste management services. Safety-Kleen relies on both kilns and incinerators to safely dispose of wastes that cannot be recycled. Most of the wastes that are not amenable to recycling are sent to cement kilns. The valuable energy recovery benefits from managing wastes in cement kilns results in lower costs for this management choice. Safety-Kleen also relies on incinerators to manage a small percentage of waste, primarily wastes that cannot be sent to cement kilns because of high metal content or low Btu value.

CS6A-011 (2) First, as discussed more fully in subsection IVA, CKRC believes the proposed PM CEMS implementation scheme is too complex, and would significantly increase the cost and resource burdens of an already overly-burdensome rulemaking (See CKRC August 19, 1996 Comments, p. 434). CKRC believes it is essential to incorporate options within the proposed scheme that would provide facilities a reasonable alternative to the 12-month operating parameter limit-setting exercise altogether.

CS6A-011 (2) As proposed in the NODA, six months after the compliance date, facilities will be required to have completed their MACT "Performance Tests", including their initial PM CEMS calibration. Assuming "Performance Test" is supposed to mean the trial burn or CoC, it is likely that the facility will have to extend the average CoC 2-day test period to approximately 5 days in order to accommodate both the spiking requirements and the acquisition of dual-train particulate data. This will significantly increase both the cost and resource burden on these facilities.

Also, six months after the compliance date, facilities will be required to demonstrate compliance with the manual method-based MACT PM standards using the modified Method 5i. Assuming that M5i is applicable to the source, it is crucial that facilities hire high-quality stack test companies to perform the modified manual method tests. CKRC is unable to find any information in the Cost-Time Table distributed to stakeholders, that demonstrates EPA has adequately accounted for the increased costs to regulated facilities that will result from needed training of testers to perform the new procedures; acquisition of new stack test and lab equipment; and potential equipment and tester availability limitations. Other enhancements to Method 5 likely to increase the testing costs include: addition of a level to the probe, use of residue grade acetone, static charge reduction, teflon beaker liners, and available labs set up to run gravimetric analysis under the specified humidity controls.

After conducting the CoC test, completing the first calibration, and submitting the CoC, facilities using light-scattering PM CEMS will be required to perform another calibration three months later. Then, another three months later, these same facilities will be required to perform yet a third calibration and submit a Certification of PM CEMS compliance (CoP). Then, just three months later, and after facilities already will have been required to be complying with the PM CEMS standard, facilities will be required to revise their calibration curves and update both their PM CEMS OPLs (using only three more months of data) as well as their PM control device operating parameters for use during CEMS malfunctions. At this same juncture, facilities will be required to turn in another, revised CoP.

CS3A-012 (2) (3) The only method for PM measurement in a flue gas currently recognized by EPA is the gravimetric Method 5. Section 7.3 of DPS-11 calls for 3 or more sets of measurements at each PM level with a minimum of 15 individual measurements obtained. A normal Method 5 run takes a minimum of 3 hours on a normal stack and can take up to 8 hours or longer if any sampling difficulties are encountered. A single Method 5 sample run consists of 3 individual runs which could conceivably take 3 eight-hour periods to complete. Completion of the DPS 11 suggested 15 individual runs could take 15 eight-hour time periods. Completion of these individual runs does automatically yield numerical results that can be immediately used to calibrate a PM CEM. The samples collected must be weighted and results calculated before any meaningful data is available. This type of sample analysis and calculation is usually completed at the laboratory and office of the sampling contractor. Results are communicated to the operating plant weeks after test completion. Comparison of these data to a plant operation that probably has changed in both flue gas rate and PM loading is very difficult after the fact - and is most likely unsatisfactory. The use of Method 5 sampling to provide a means of PM CEM calibration would require an on-site laboratory and office for the sampling contractor to provide timely data. The cost of this type of sampling would be extremely high.

CS6A-016 (2) Any CEM criteria in the HWC-MACT rule should also correlate with other MACT rules. For example, in the HON MACT rule, section 63.152(c)(2)(ii)(A)(1)-(3) require a 75% reliability. Specifically, 63.153(c)(2)(ii)(A)(2) describes an excursion "When the period of control device or recovery device operation is 4 hours or greater in an operating day and monitoring data are insufficient to constitute a valid hour of data for at least 75 percent of the operating hours." The HON MACT does not require a "back-up compliance system" when the CEM does not operate. Requiring additional controls such as operating limits goes beyond the intent and basis for the

standard. This adds greater confusion with a facility that does not need an APCD, since requiring operating limits to these sites are inappropriate. A facility should have the option of using the manual method or the PM CEMS.

CS6A-020 (2) Essroc is very concerned about the Agency's proposed compliance and implementation scheme. We believe the proposed PM CEMs implementation scheme is too complex, and would significantly increase the cost and resource burdens of an already overly-burdensome rulemaking. We also believe it is essential to incorporate options within the proposed scheme that would enable facilities to by-pass the 12-month operating parameter limit-setting exercise altogether. While the following paragraphs highlight some of the cost and resource burdens associated with the proposed implementation of PM CEMs, these highlights are in no way comprehensive.

...At face value, it appears the Agency has added yet another testing requirement for HWC cement kilns. If the phrase "Performance Test" is supposed to represent the Trial Burn or CoC, cement kiln facilities will be performing their calibration tests during this test period. Due to the nature of CoC testing, it is likely that the facility will have to extend the average CoC 2-day test period to approximately 5 days in order to accommodate both the spiking as well as the calibration and performance test requirements. This will significantly increase both the cost and resource burden on cement kilns.

...Also, six months after the compliance date, facilities are required to demonstrate compliance with the manual method-based PM MACT standards using the modified Method 5i. Assuming that M5i is applicable to cement kilns, it is crucial that facilities hire high quality stack test companies to perform the modified manual method tests. Essroc is concerned that the EPA failed to adequately account for the increased costs to regulated facilities in their Cost Analysis.

CS6A-021 (2) Also, six months after the compliance date, facilities are required to demonstrate compliance with the manual method-based PM MACT standards using the modified Method 5i. Assuming that M5i is applicable to cement kilns, it is crucial that facilities hire high quality stack test companies to perform the modified manual method tests. Essroc is concerned that the EPA failed to adequately account for the increased costs to regulated facilities in their Cost Analysis.

<u>Summary</u>

Several key cost issues appear to be overlooked in the EPA cost model. Factors include: reference method improvements, redundant analyzers, and the high degree of CEMS maintenance. With the increased cost of operating commercial and on-site incinerators due to monitoring and enhanced performance testing requirements, the cost of off-site incineration could easily be expected to double. All these costs should be factored into any benefit assessment.

<u>Response</u>

EPA does not believe it overlooked these costs nor does it believe the costs for particulate matter CEMS are overly burdensome, given the societal benefits of having continuous data on particulate matter emissions. These particulate matter CEMS costs have been accounted for in today’s final

rule. EPA agrees that feedrate and operating parameter monitoring is less expensive than using a CEMS, but believes there is significant societal benefits to requiring CEMS. EPA believes use of a PM CEMS is a significant improvement over current modes of compliance for PM standards. Comments on Hg CEMS are no longer relevant since a Hg CEMS requirement is no longer being contemplated.

c. Drift Requirements Will Increase Cost and Size of PM CEMS

Comment

CS6A-001 (3) 12.1 & 13.0 Calibration Drift: For stack gas CEMS, where the analyzers are typically housed in a temperature controlled environment, the allowable calibration drift is 2.5% of the span value. As we understand the formula in section 12.1, the allowable calibration drift is 1-2% of the span value, depending on the choice of reference value. We do not believe that this specification for PM CEMS should be 1.25-2.5 times more restrictive than for gas analyzers. This is especially true when considering the repeatability of the reference method measurement! Furthermore, we do not believe this specification can be realistically achieved. Considering that PM CEMS are typically exposed to the full range of ambient temperatures, and that electronic drift is a function of temperature, meeting this specification will likely require a more sophisticated control of analyzer electronics temperature, with a corresponding increase in both cost and size of the analyzer.

Summary

We do not believe that this specification for PM CEMS should be 1.25-2.5 times more restrictive than for gas analyzers. Meeting this specification will likely require a more sophisticated control of analyzer electronics temperature, with a corresponding increase in both cost and size of the analyzer.

Response

Meeting this specification was taken into account when costs were estimated.

d. Clean Room Represent Increased Manual Method Costs

Comments

CS6A-005-030 (3) The description of the potential interferences with PM leads one to believe that a field "clean room" is required. Few HWCs have such a clean room unless the reference is describing the laboratory; however, the potential contamination exists in the field. If the sensitivity of the PM instrument is as described, then work on the instrument should be done in a clean room. The cost of a clean room should be reflected in the economic analysis.

Summary

Potential instrument contamination exists in the field during routine maintenance. The cost of a clean room should be reflected in the economic analysis.

Response

Meeting this specification was taken into account when costs were estimated, though EPA does not believe a “clean room” is necessary.

e. *"De-tuning" of APCD Increases "Wear and Tear" on Facility Equipment at Potentially Significant Costs*

Comment

CS6A-019 (6) Solite is particularly concerned with the procedures proposed to establish site specific operating parameter limits. Specifically, the procedures set forth by EPA would effectively require facilities to "de-tune" their pollution control devices to achieve maximum, worst case operating conditions. As discussed at length in the CKRC comments, facilities may experience significant difficulties attempting to operate under these conditions. In addition, facilities would be required to operate under these de-tuned, "worst case" operating conditions for significant time periods, causing increased "wear and tear" on facility equipment at potentially significant costs. In addition, to undertake an effective "de-tuning" project for the purpose of establishing site specific limits, approvals from other government agencies may be necessary (e.g. State Air Boards) since the "de-tuning" may meet the definition of a "bypass" under many State issued air permits. In addition, even with State agency approvals, no specific protection from citizens suits is presently provided.

Summary

Procedures set forth by EPA would effectively require facilities to “de-tune” their pollution control devices to achieve maximum, worst case operating conditions. Facilities would be required to operate under these de-tuned, "worst case" operating conditions for significant time periods, causing increased "wear and tear" on facility equipment at potentially significant costs.

Response

EPA does not believe it would be necessary for facilities to operate under “detuned” conditions for long periods of time. We also do not believe there is a significant increased cost associated with this effort since what is being used in lieu of PM CEMS at this time is “worst case” performance testing where operating the facility under “detuned” conditions is also required.

9. Correlating Emissions Higher than the Standard

a. No Action Assurance

Comments

CEM5.017(114)(b)CRWI's underlying concern is that while the methods used to determine performance specifications in Germany may be appropriate to German regulatory practices, they may not be consistent with EPA enforcement practices and/or the US legal system. Due to the lack of available information, CRWI believes that EPA cannot have adequately addressed many important issues regarding the use of PM CEM's and the associated costs.

Specific issues of concern include:

1. Particulate emission levels which are near or above the established limits may only be produced by disabling the air pollution control equipment. Will combustion facilities be exempt from enforcement action or third party legal action during performance testing if EPA specifically requires the permittee to elevate emissions at levels which are near or above the regulated limit? It is CWRI's understanding that this may be the case in European operations.

CEM5.017(114)(g) Potential Solutions 2. Facilities should be exempt from enforcement or third party legal action if they are required to operate their processes under abnormal conditions during tests specified for instrument calibration.

CEM5.028(125)(b) UARG is especially concerned about the establishment of the calibration line (or curve), which, to achieve EPA's recommendation, would require the source to intentionally violate the applicable emission limit. [Footnote 6: See proposed PS I 1, section 7.3. While EPA does not require that the emission limit be exceeded in order to conduct the calibration, failure to do so will result in the highest mass loading being tested at or slightly below the emission limit level. As EPA recognizes in proposed PS 11, this will result in less confidence concerning the accuracy of the calibration at the point at which one is most concerned about accuracy near the emission limit level.] While EPA would presumably exercise its enforcement discretion not to take civil or criminal action in this situation, there would be a possibility of civil liability from citizen suits. This is an unacceptable risk for most owners/operators of industrial sources.

CEM5.036(125) COMPLIANCE AND PRACTICAL PROBLEMS WITH PS 11 With respect to conducting PM monitor calibrations, Section 7.3 of PS 11 states, *[i]t is recommended that the CEMS be calibrated over PM levels ranging from a minimum normal level to a level roughly twice the emission limit. as this will provide the smallest confidence interval bounds on the calibration relation at the emission limit level.* [Footnote 6: 61 Fed. Reg. 17504, col. 2 (emphasis added) (April 19, 1996).] There are several problems with this statement. First, PS 11 does not explain how the Agency has the authority not only to allow but to direct a source to deliberately exceed its emission limitation -- not by a small amount but by a factor of 2. Second, even if EPA wishes to use the "ends justifies the means" rationale, what is to protect a source from legal action that could easily be initiated by any citizen?

CEM5.044(129) PARTICULATE MATTER (PM) CALIBRATION PROCEDURES Problem EPA has proposed the use of PM CEMs for all hazardous waste combustion facilities. This requirement is based on the commercial availability of these devices and their demonstration and use for compliance purposes in Germany. An international standard (ISO 10155) describes performance characteristics, test methods, and specifications for these systems and a technical inspection agency (TUV) has been charged by the German government with the environmental testing and certification of CEMS. In evaluating the assessments of these technologies, there are a number of issues which are not clear. Much or all of the information that has been generated during the development of performance specifications is proprietary and many performance issues cannot be adequately evaluated.

An underlying concern is that while the methods used to determine performance specifications in Germany may be appropriate to German regulatory practices, they may not be consistent with EPA enforcement practices and/or the U.S. legal system. Due to the lack of available information, it is not understood how EPA adequately addressed many important issues regarding the use of PM CEMs and the associated costs. Specific issues of concern include:

1. Particulate emission levels which are near or above the established limits may only be produced by disabling the air pollution control equipment. Will combustion facilities be exempt from third party legal action during performance testing if EPA specifically requires the permittee to elevate emissions at levels which are near or above the regulated limit?

...

Possible Solutions

1. Facilities should be exempt from enforcement or third party legal action if they are required to operate their processes under abnormal conditions.

CEM5.061(163)(b) Also, the required calibration procedures can potentially cause the facility to exceed its emission limit.

CEM5.077(208) 2. Performance Specification 11, Section 7.3 (p.17504): EPA recommends varying the range of PM emissions from a minimum normal level to "a level roughly twice the emission limit..." Medusa-Citadel, Inc. questions this statement. Is EPA requiring the operators of combustion devices to exceed an emission standard? As with the statement above, Medusa-Citadel, Inc. views the requirement to artificially increase solely for the purposes of calibrating a monitor to contradict the goal of minimizing emissions. Medusa-Citadel, Inc. believes EPA should identify realistic methods of calibrating emission monitors that it proposes as requirements.

CS6A-003 (1) The final rule should have an explicit exemption from the PM standard and all uses of PM as a surrogate during calibration. Since EPA is encouraging facilities to run above the PM standard for calibration, they should be shielded from any enforcement for doing as requested. A verbal assurance that no enforcement will occur may not be adequate to encourage facilities to test above the standard.

CS6A-020 (1) The USEPA is requiring the HWCs to use calibration procedures which test the

optical PM CEM at emission rates higher than the standard and require the source to operate the air pollution control device (APCD) in a manner which is inconsistent with good air pollution practices for minimizing emissions. Both federal and state agencies have regulations which prohibit such actions; however, the USEPA has not provided a waiver for regulated sources to perform the required calibrations without fear of penalty. In fact, the EPA has not been able to convince the states in which it wants to conduct PM CEM demonstrations on cement kilns to waive these regulations because the states fear citizens suits. If the EPA cannot provide a waiver to conduct the calibrations, it cannot require regulated sources to perform calibrations while operating its APCD in a manner which is inconsistent with good air pollution practices for minimizing emissions.

CS6A-021 (1) The US EPA is requiring HWCs to use calibration procedures which test the optical PM CEM at emission rates higher than the standard and require the source to operate the air pollution control device (APCD) in a manner which is inconsistent with good air pollution practices for minimizing emissions. Both federal and state regulations have regulations which prohibit such actions; however the US EPA has not provided a waiver for regulated sources to perform the required calibrations without fear of penalty. In fact, the US EPA has not been able to convince the states in which it wants to conduct PM CEM demonstrations on cement kilns to waive these regulations because the states fear of possible citizens suits. If the US EPA cannot provide a waiver to conduct the calibrations, it cannot require regulated sources to perform calibrations while operating its APCD in a manner which is inconsistent with good air pollution practices for minimizing emissions. Furthermore, it is a well known fact that optical PM CEMs can only accurately correlate to mass emissions if the optical characteristics of the dust particles (particle size distribution, shape of particles, complex refractive index, and the dust charge) remains constant. The US EPA has not demonstrated that purposely operating APCDs in a manner inconsistent with good air pollution practices for minimizing emissions will maintain the consistency of the optical characteristics of the particulate matter. In fact, we all know that it is unlikely that the optical characteristics will remain constant under these conditions.

CS6A-008 (1) The final rule should categorically exempt sources from liability for exceeding the PM limit during calibration.

CS6A-009 (1) The report states that the CEMs be calibrated to twice the proposed standard (page 2-3). This is different from the "full operating range" criterion in the NODA. CRWI suggests that the draft report be modified to reflect the discussions in the NODA. Even at full operating range, CRWI has two concerns. First, this may require operating above the manual PM MACT standard. This cannot be done unless the regulating agency suspends any enforcement action during the calibration. CRWI suggests that the Agency make it clear in the rule and in the preamble that data collected during calibration may not be used to demonstrate a violation of the PM MACT standard. This should also extend to the relative calibration audit (RCA) process as well, since it has the same range criterion. This would allow facilities to develop calibrations without having to walk a tightrope between compliance and a robust calibration.

CS6A-030 (1) EPA does not agree, however, that this approach could cause facilities to violate the manual method MACT PM standard. The PM standard would be defined as the average of three manual method measurements. Any single run above the standard would not be a violation by itself. Average emissions over the calibration would be below the standard for a source equipped with

MACT controls. Therefore, we expect that sources would be able to calibrate PM CEMS at levels higher than the PM emissions standard and still remain in compliance with the standard. If this is not practical, however, EPA may consider a waiver of the manual method PM standard during periods of calibrating (and performing RCA tests of) the PM CEMS. The need to obtain and audit an accurate calibration at and above the PM standard may override any concerns about high short-term PM emissions. EPA would want to limit the frequency and duration of calibration runs that exceed the standard, however. We request comments regarding how such limits could be implemented. One way this could occur is to require that sources request in the performance test plan approval to exceed the standard during calibration. (62 FR 67802, col. 2)

For sources having widely variable and batch feeds, it will be virtually impossible to predict in advance whether the average of all calibration runs will or will not exceed the PM standard when there is no acceptable mathematical predictor of PM emissions. It would be better to state that during calibration runs the standard will not apply or the standard would be increased 30% during calibration runs to allow calibration at higher levels than the standard.

Summary

Facilities understand the need to obtain PM emissions data at and above any PM standard and say they need protection against Federal, state, and citizen suits to accomplish this.

Response

EPA agrees with the need to develop the PM CEMS correlation test over the full range of operations at the facility, including operations exceeding the numerical value of the PM standard. EPA also agrees that no single manual method run constitutes a violation of a standard, but a regulatory mechanism must be in place to allow facilities to obtain a broad range of PM emissions without fear of being in violation of the PM standard. This problem is further exacerbated by the fact that a facility may need to be in compliance with more than one limit at any given time, say Part 60 NSPS and today's Part 63 standards. Therefore, EPA agrees there is a need to state that PM or opacity standards do not exist, and feedstream or operating parameters used to ensure compliance with PM or opacity standards are not in effect during periods of time when PM CEMS correlation tests are being performed. This will provide adequate protection from a violation since no standard would exist during these time periods.

b. Consistent Treatment From Permit Writers

Comments

CS6A-007 (3) We continue to be concerned that EPA will not only require CEMS before the technology has been adequately demonstrated for various combustion applications, but is also constructing a compliance method that is unnecessarily restrictive. Given the limited use of CEMS at combustion facilities in the United States, it is imperative that EPA provide flexibility in the regulation to account for both known and unknown differences in technology and operations. Failure to do so will force facilities to install and operate CEMS (and calculate average emissions from CEMS monitoring) in such a way as to be unnecessarily costly and restrictive on operations without

a resulting environmental benefit. As with other aspects of the rule, EPA should provide appropriate flexibility and guidance to permit writers to consider the most appropriate CEMS approach for different facilities. EPA should also allow for site-specific deviations from reference methods, performance specifications, and compliance calculations when it can be demonstrated that there is no affect on the ability of the system to monitor compliance with the emissions standards.

CS6A-008 (3) CMA agrees with EPA that the data resulting from the additional testing programs will be of value for evaluating PM CEMS. However, we are concerned that the results of the study could be misused by permit writers. It has been the experience of CMA members that many of their facility permit writers use guidance documents as if they were promulgated rules. This could be problematic, as regulated sources could lose flexibility in the interpretation of data generated through the process of Certification of Performance. Therefore, CMA urges that the final rule explicitly state that results of the demonstration projects should not be used to define maximum OPLs. If the results of the demonstration program are issued in any guidance documents, such documents should describe in detail how the information in the guidance document is to be used. EPA should also make the draft guidance document available to the public and regulated community for notice and comment. This would allow EPA the opportunity to obtain feedback from all stakeholders and at the same time assure the proper use of the guidance document.

CMA is also concerned that demonstration project data might be used to establish a national CEM-based PM limit. In Part II.A of these comments above, CMA supported EPA's creation of a national CEM-based limit if EPA insists on requiring PM CEMS. However, this OPL would be the national manual method limit, measured by use of CEMS and with a long enough averaging time to avoid increased stringency. CMA cautions that any campaign of demonstration projects would be inadequate to create a sufficiently robust data set for establishment of a MACT PM CEMS-based limit. The only defensible way to do that would be to require all hazardous waste incinerators to install and use PM CEMS, and then to compile the national data into a new MACT database. Such an option would obviously be very costly for sources and EPA and would take several years for the data to be collected and analyzed and for a rule to be proposed and finalized. CMA's proposal would be quicker, cheaper and completely adequate.

CS6A-009 (3) CRWI has concerns about the testing program to set an "upper bound" on the site-specific operating limit. CRWI is concerned that, even though the Agency states that this will only be guidance, for all practical purposes, it will become the new PM MACT standard without the benefits of the rule-making process. While CRWI supports additional testing of PM CEMs, we question whether the cost and efforts required to conduct additional demonstration projects for the primary purpose of developing an "upper bound" is justified. CRWI believes that any further demonstration projects should be aimed at resolving broader issues like the applicability of PM CEMs to a variety of combustion units, whether reliability and accuracy are sufficient, how to modify the implementation scheme, etc. CRWI believes that EPA must be careful not to set a default limit that may be applied generically by the Regions and the states. Should EPA go forward with future demonstration projects, CRWI suggests that any test protocols, testing results, and guidance document be subject to the "notice and comment" process as would any other rule-making. This includes noticing the demonstration work plans, the data generated, and a preliminary draft of the guidance.

CS6A-012 (3) When the PM CEM OPL Is Higher Than the PM MACT Standard: While the MIP members do not disagree with these statements, we are concerned that there is no consensus among state and regional permit writers on how to implement these rules and thus, the permit writers will not implement them as OSW intends, particularly at a site where the PM CEM OPL is higher than the PM MACT standard and the combustion unit is controversial and the opportunities to stir up misinformation would be great. For over a decade, the Agency has been telling the public that the permit limits established during a "Trial Burn" or "Performance Test" result from "worst-case" operating conditions and that compliance is assured by establishing limitations based upon the operating extremes demonstrated during the test. The Agency apparently now expects permitting officials to face the public and inform them that PM CEMs OPL which are higher than the PM MACT standard is really the same number. The MIP members do not believe this is realistic. In fact, in many cases, the MIP members believe that the regulators will find such an argument nonsensical and extremely difficult to explain to the public; and instead inform the combustion owner/operator that they must achieve a site-specific PM CEMs OPL that is the same as or lower than the PM MACT standard in order for the permitting official to be in a position to accept the level.

CS6A-015 (3) Of more concern to the MIP members is that the information may be misused by permitting officials, such that it will be used as a *de facto* rule, even though the testing results would not have gone through an Administrative Procedures process. More specifically, by defining the testing results in guidance "as a PM CEMs benchmark." permitting officials will have little choice but to rely solely on what the results indicate, and, for all practical purposes, will be used as the new PM MACT standard without the benefits of the rulemaking process (and, in particular, the rigorous MACT analytical process). During a recent meeting, an EPA official indicated that most permit writers have limited or no experience with PM CEMs and that the guidance will allow them to better assess the experience with such devices, it is more likely the permit writers will use the testing results in the guidance document "like a rule" and may not consider whether the results are truly reflective of the situation.

Therefore, the MIP members would urge that if EPA proceeds with its testing program and prepares guidance that discusses the testing results, that the Agency: (1) properly design the testing program to better reflect the types of emissions expected from different combustion units and air pollution control devices; (2) properly describe the information in the guidance and what it represents and how it is to be used; and (3) make any guidance that is developed available for notice and comment, as would any other rulemaking. In this way, the regulated community, the permitting authority, and the public can be somewhat assured that the guidance document puts the information into the proper perspective.

<u>Summary</u>

Many commenters agree with EPA that the data resulting from the additional testing programs will be of value for evaluating PM CEMS. However, there is concern that the results of the study could be misused by permit writers. Many permit writers use guidance documents as if they were promulgated rules. This could be problematic, as regulated sources could lose flexibility in the interpretation of data generated through the process of Certification of Performance.

Response

EPA will be developing guidance documents for permit writers to assist in the implementation of all aspects of this rule, including these monitoring devices.

c. MACT Manual Methods Enforced with CEM Methods

Comments

CS6A-012 (4) Designation of Site-Specific PM CEMs Operating Parameter Limits (OPL): The CEMs NODA indicates that the PM MACT standard will be based on manual methods testing. Because of this, the Agency cannot require a combustion facility owner/operator to measure compliance with the PM MACT standard using a CEM. Therefore, the Agency is requiring each combustion owner/operator to establish a site-specific PM CEMs OPL, which as the Agency indicates, will be used as a surrogate to demonstrate compliance with the PM MACT standard. That is, PM emissions from a CEM will be used to demonstrate that the emissions from a combustion unit meets the PM MACT standard. In doing this, the Agency states that the site-specific PM MACT OPL is likely to be different than the PM MACT standard, and could be higher than the PM MACT standard. See, for example, 62 FR 67800, where it states, "As discussed in section 1, above, it is likely that due to several factors, the PM CEMs operating parameter would have a different numerical value than the MACT PM standard" and "Additionally, different averaging periods stated for manual methods-based PM standard and the PM CEMs operating parameter limit. See section 4, above for a discussion of the interrelationship between a numerical value of a limit or standard and the averaging period. Having a PM CEMs operating parameter limit with a different, possibly higher, numerical limit is permissible and does not negate the value of the PM CEMs operating parameter, provided there is reasonable correlation between the operating parameter and the MACT PM standard."

CS6A-029 (4) Because the PM CEMS operating parameter limits would not be set at the actual PM emission standards, but rather would reflect sources' individual parameter measurements, compliance with the PM CEMS operating parameter limits would not always constitute compliance with emissions standards. This problem would undermine the effectiveness of PM standards as well as the standards for SVM, LVM, D/F or Hg.

For example, assume that a cement kiln subject to a PM MACT standard .03 gr/dscf followed what appears to be EPA's procedure for setting an individual PM CEMS operating parameter limit.

For the same reasons, EPA's proposal would also violate section 112 of the Act. As a practical matter, sources would not have to comply with MACT standards for PM (or any pollutant for which PM was used as a surrogate). Instead sources would only have to comply with their PM CEMS operating parameter limit. As demonstrated above, however, compliance with the PM CEMS operating parameter limit could not guarantee compliance with the underlying emission standards. Thus, EPA's proposal would effectively abrogate the underlying emission standards.

Summary

The December 1997 NODA indicates that the PM MACT standard will be based on manual methods testing. Because of this, the Agency cannot require a combustion facility owner/ operator to measure compliance with the PM MACT standard using a CEM. PM emissions from a CEM will be used to demonstrate that the emissions from a combustion unit meets the PM MACT standard. In doing this, the Agency states that the site-specific PM MACT OPL is likely to be different than the PM MACT standard, and could be higher (or lower) than the PM MACT standard.

Response

EPA will pursue additional testing to ascertain what PM CEMS-based emissions level is equally stringent to the PM standard promulgated in today's rule.

d. Requirements for Lower Than MACT Standard

Comments

CS6A-015 (5) The MIP members are not aware of any other MACT rule promulgated by EPA where the Agency has required a facility to meet a level lower than the MACT standard. In fact, we question the Agency's legal authority to require a permittee to meet a level below the MACT standard under the CAA. If such authority existed, it is likely that EPA would have used such authority in one of the many MACT rules it has already promulgated.

Summary

Commenters question the legal authority for requiring emission limits more stringent than the MACT standards.

Response

The need to control PM emissions to what was demonstrated to be "in-compliance" with metals standards is status quo for these sources.

d. Evaluation of PM Monitors Must Be Independent of Other Auxiliary Monitors

Comments

CS6A-011 (6) CKRC believes that EPA should allow the evaluation and testing of the PM monitor independent of other auxiliary devices (i.e., diluent monitors, flow monitors, moisture corrections, etc.) used to determine emissions in units of the standard. An unacceptable level of uncertainty in the particulate calibration relation may occur due to variability in the auxiliary devices; or offsetting errors may yield misleading or inconsistent results if all the monitors used to determine emissions in units of the standard were evaluated only as a single system. The combined uncertainty of the PM CEMS and all other measurement components must be considered in establishing the emission limit and in enforcement of the standard.

Summary

Moisture monitors and other devices should be considered in the development of the emission standard. Each system contributes to the overall precision of the PM CEMS reported values.

Response

All monitoring components are required to be maintained and operated in a manner that will yield valid and representative data.

f. Violates Section 112 of the Clean Air Act

Comments

CS6A-029 (7) EPA's proposal would also violate section 112 of the Clean Air Act because compliance with the PM CEMS operating parameter limit would not guarantee compliance with SVM, LVM, Hg or D/F emission standards. Under EPA's proposal, sources would have no enforceable obligation to comply directly with those emission limitations, but only with their individualized PM operating parameter limits. Because compliance with the PM CEMS operating parameter limit would not guarantee compliance with emission standards for SVM, LVM, D/F or Hg. EPA's proposal would effectively abrogate emission standards for SVM, LVM, D/F and Hg.

Finally, the absence of metals feedrate monitoring requirements would adversely affect EPA's ability to enforce the LDR dilution prohibition under the Resource conservation and Recovery Act of 1976 (RCRA), and work in direct conflict with proposals discussed in a previous NODA to reduce metals feedrates over time, consistent with EPA's waste minimization and pollution prevention policies.

Even if PM did provide an adequate surrogate for SVM, LVM, D/F or Hg, EPA's proposal still would violate sections 114 and 503 with respect to all of those HAPs and particulate matter as well. As discussed above, EPA's proposal would allow sources to use parameter monitoring to establish their own individualized PM CEMS parameter operating limits. These would become the only limits with which sources' compliance with PM standards could be measured on a continuous basis.

Summary

EPA's proposal would violate section 112 of the Clean Air Act because compliance with the PM CEMS operating parameter limit would not guarantee compliance with SVM, LVM, Hg or D/F emission standards. Under EPA's proposal, sources would have no enforceable obligation to comply directly with those emission limitations, but only with their individualized PM operating parameter limits.

Response

The use of PM CEMS as a surrogate for the metals of interest is a conservative estimate of the metals emissions. The use of surrogate measurements is a reasonably accurate and cost effective manner for measuring pollutants when a direct measurement technology has not been demonstrated as viable.

10. PM CEMS Operating Parameter Limit Option

Comments

CS6A-003 (1) Kodak believes that the site-specific standard setting process is fraught with problems. Therefore, if EPA sets a PM CEMS compliance standard, it should be a national standard with the same emission limit as the MACT standard and at least a 168 hour averaging time. Kodak is concerned that the site-specific standard setting process is likely to produce more confusion than assurance that all facilities are in compliance. As discussed in the previous comment, PM is a poor surrogate for metals, and a less direct means of showing continued good metal removal efficiency than APCD parameters, so there is no justification for using PM CEMS as an OPL. Since PM CEMS cannot be justified as an OPL, there is no justification for making the standard site-specific. A site-specific standard would create inconsistent enforcement by requiring facilities with lower emissions during the CPT and data collection periods to meet lower standards than other facilities. Its effect would be to set a PM standard for some facilities that would be lower than the MACT standard.

CS6A-003 (1) 5. Site Specific Standard (SSS) Demonstration data should not be used to overrule the site-specific data. If a SSS is set, it should only consider site-specific data, otherwise it is not a SSS. EPA has proposed collecting demonstration data to be used to see if each SSS is reasonable. It is important that the final regulation explicitly state that this data can only be used to flag potential errors in the SSS process, and cannot be used to overrule the SSS setting process.

CS6A-005 (2)(b) Further, developing emission standards on a site specific basis does not improve the marketplace for PM instruments. Currently, there is one national standard that any manufacturer can use to develop a product whether it be calibration gases where the national standard is 0-200 ppm and 0-3000 for CO and 0-25% for oxygen. A site specific standard lends itself to develop a calibration gas for each site which is an expensive proposition. For the instrument manufacturer, a standard instrument range is preferred to spur mass production of a PM monitor. The existing stack instruments, such as CO and oxygen, are off-the-shelf at reasonable prices given their standardization.

CS6A-008 (1) A. EPA Should Set a National CEM-Based Limit Equivalent in Stringency to the Manual Method Limit. CMA is concerned that the site-specific standard setting process is likely to produce more confusion than assurance regarding compliance. As discussed in Part I.A above, PM is a poor surrogate for metals, and a less direct means of showing continued good metals removal efficiency than APCD parameters. Accordingly, there is no justification for using PM CEMS as an OPL. Since it is an inferior OPL, there is no justification for making the standard site-specific.

Moreover, a site-specific approach would force facilities with low emissions during the test and data collection periods to meet lower standards than other facilities. For some low-emitting or less variable facilities, the site-specific standard would be lower than the manual PM standard. Conversely, a site-specific standard for facilities with more variable emissions is likely to be higher than the MACT standard – a proper result, but one that is certain to create confusion among members of the public. The solution to these unfairness problems would be to make the PM CEMS limit a national limit, set at the same emission level as the MACT standard, but with a long enough

averaging time that normal variability would not lead to more than one predicted exceedance per year.

This national approach would be consistent with other EPA air emission standards that require CEMS for compliance determinations – to CMA's knowledge, none of them *require* site-specific limits to be established. It also is consistent with Clean Air Act Section 112, which speaks throughout of "emissions standards . . . for sources in a category or subcategory" – i.e., for any given pollutant, a *single, national* limit for all similar sources. 42 USC § 7412(d)(3).

CS6A-008 (1) B. Sources Should At Least Have the Option of Using CEMS to Comply with Either a Site-Specific OPL or with the National PM Emission Limit. As discussed above, using CEMS to comply with the national manual method-based limit would have the effect of making the limit more stringent -- i.e., lead to more statistically predicted exceedances – unless the averaging times were extended to between 24 and 168 hours. With such a lengthened averaging time, however, facilities could use CEMS and feel reasonably confident that they were not being held to a more stringent standard than the manual method standard. Put another way, regulators and the public could also be confident that such sources were complying with the manual method limit, as demonstrated on a continuous basis. Such an approach would also dramatically simplify facilities' compliance obligations and the MACT implementation process. Therefore, if EPA does not promulgate a national CEM-based limit as discussed above, EPA should at least allow sources the option of complying with the national limit using CEMS and a 168-hour averaging time as a permissible alternative to having to develop a site-specific OPL.

CS6A-008 (1) Worse, the more stringent site-specific limit would be equivalent to going beyond the MACT "floor" without justification. Section 112(d) requires the Agency to set emission levels that reflect "the *maximum* degree of reduction in emissions . . . *achievable*." 42 U.S.C. § 7412(d)(2) (emphasis added). To the extent the Agency wants to go beyond the MACT floor established in Section 112(d)(3), the Agency must demonstrate that such additional reduction is *achievable.* This is not just a technical feasibility issue, but also involves consideration of costs and other factors. *Id*. When it reevaluated the floor standard for PM emissions from incinerators, the Agency concluded that while 0.015 grains per dry standard cubic foot (dscf) was an achievable floor standard, going any lower raised "significant cost considerations . . . suggest[ing] that a B.F. [beyond the floor] standard may not ultimately prove to be appropriate." 62 Fed. Reg. 24222 (May 2, 1997). EPA cannot create a mechanism that will set a wide variety of more stringent B.F. standards without demonstrating that those lower limits are technically achievable and cost-effective – which has not yet done.

CS6A-008 (1) E. The Final Rule Should Reiterate that Properly-Derived Site-Specific OPLs May Be Above Manual Method Limits and Should Not Be Improperly Challenged by Permit Writers and/or the Public. CMA agrees with the Agency that, when the proposed procedures for setting site-specific OPLs are followed, the OPL will likely be different than the manual method standard, and in some cases higher. The Agency has stated that having an OPL higher than the MACT standard is acceptable, and CMA supports this position.

As evidenced by the considerable discussion of this subject in the January 8, 1998 public meeting, it will be difficult for some members of the public, and possibly even some regulators, to understand

and accept site-specific OPLs higher than the national PM MACT standard (or higher than the levels demonstrated with Method 5 testing). The danger of this misunderstanding is that some sources, while technically in complete compliance with the MACT standard and having properly calculated a site-specific OPL, may yet be forced to lower their OPLs artificially to the Method 5 based limit, in order to eliminate the need to explain the statistical justification of the higher CEMS-based OPL.

Therefore, CMA strongly urges the Agency to repeat this point clearly and in detail in the final rule, so that the public, permitting officials, and source owners/operators all have the same understanding of this concept. The final regulations should include clear examples (including detailed mathematical basis) illustrating how a site-specific OPL could exceed the MACT standard without calling into question the facility's compliance with the MACT standard.

CS6A-009 (1) 4. CRWI agrees with the Agency that a number of facilities will find it difficult to operate at elevated PM levels for the duration of the comprehensive performance test and for the CEMs phase-in period. This could result in OPLs that are significantly below the MACT standard. It is CRWI's opinion that this could be considered as punishing facilities that install APCDs to reduce their PM emissions significantly below the MACT standard. It does not appear logical for one facility to be in violation of PM emissions if it exceeds an OPL of 0.01 gr/dscf and another to be able to continuously operate at 0.02 gr/dscf because that is its OPL. As a threshold matter, CRWI questions the Agency's legal authority to mandate site-specific OPLs more stringent than the MACT standards without making the proper risk determinations under RCRA and/or the Clean Air Act. Should EPA proceed with lower OPLs, CRWI supports the Agency's process to allow facilities with low OPLs to extrapolate upward to some limit. However, CRWI suggests that the wording be changed from "variance" to "high-performer offset allowance." In addition, CRWI supports the self-implementation of this provision and suggests that this process should be a part of the certificate of performance rather than a separate document

CS6A-011 (1) Conduct proper PM CEMS demonstrations on HWC cement kilns in accordance with an appropriate protocol and technically correct methods, procedures, and performance specifications; Ensure that the demonstrations are conducted for the purpose of fully assessing the viability and performance of PM CEMS for measuring compliance in each specific application, not merely to set a "benchmark;" and, Upon completion of the preceding two steps, follow proper regulatory procedure and develop national PM CEMS-based MACT emissions standards. If EPA decides against properly establishing national PM CEMS-based standards and proceeds with an approach similar to the one identified in the December 30, 1997 NODA, then EPA should; Prevent any illegal downward "ratcheting" of established MACT standards (PM or metals) that would penalize low PM emitters by arbitrarily narrowing their allowable operating envelope;

CS6A-011 (1) Furthermore, a methodology that results in facility-specific OPLs varying in terms of stringency violates the requirement in CAA §112(d)(1) that "[t]he Administrator shall promulgate regulations establishing emission standards for each category or subcategory..." Such a methodology would result in standards that are set by states or EPA Regional offices on a site-specific basis, based on the performance of individual facilities during the data-gathering period. It would also effectively deprive companies of their rights to (1) participate meaningfully in the setting of national MACT standards through the notice-and-comment rulemaking process, and (2) obtain judicial review of the standards in the U.S. Court of Appeals for the D.C. Circuit. (CAA §307(b)(1) and (d).)

CS6A-011 (1) IV. EPA's currently proposed compliance and implementation scheme effectively creates new and more stringent facility-specific standards. The scheme is significantly flawed, too complex, and based upon questionable or non-existent legal authority.

CS6A-011 (1) Thus, in translating a manual method-based PM standard to facility-specific OPLs, a complete accounting of the effect of the greatly increased number of compliance determinations made each year and other monitoring variables are needed. In addition, the OPLs would need to be equivalent to the original standards, *not to the actual performance of the facility during any historical period*. Unfortunately, the NODA uses actual performance of individual HWCs, not the proposed MACT PM standards, as the "benchmark" for setting the OPLs. Because cement kilns will operate below the proposed 0.03 gr/dscf PM standard following the MACT compliance date, they would be unfairly penalized if performance data during normal operations were used as the benchmark for establishing OPLs.

CS6A-011 (1) Unfortunately, EPA has not ensured that site-specific PM OPLs derived under the NODA's implementation provisions would be truly equivalent to the national MACT standards that it has determined are "achievable" -- a requirement of CAA §112(d)(2). In fact, as we discuss in part F of this section**,** the OPLs almost always will be more stringent than the national PM standards despite EPA's claim that the OPLs merely represent different ways of expressing the same standard.

As CKRC has pointed out in previous comments during this rulemaking, an emission standard is not simply a numerical limit expressed on a mass or concentration basis. (See CKRC August 19, 1996 comments, at pp. 169-172). In addition to its numerical level, the stringency of an emission limit is affected by the associated monitoring or performance test conditions, the frequency of the testing, and the number and duration of runs -- total sampling time -- used to measure emissions and determine compliance. As the U.S. Court of Appeals for the D.C. Circuit has held, "a significant difference between techniques used by the agency in arriving at standards, and requirements presently prescribed for determining compliance with standards, raises serious questions about the validity of the standard." Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 396 (D.C. Cir. 1973), cert. denied, 417 U.S. 921 (1974)). See also Donner Hanna Coke Corp. v. Costle, 464 F. Supp. 1295, 1304 (W.D.N.Y. 1979)). ("It is undisputed that the method of determining compliance with an emission standard can affect the level of performance required by the standard, even though the standard itself has not changed").

CS6A-011 (1) An EPA procedure that produces an OPL which could lead to more frequent noncompliance than under the national PM standard violates the CAA for several reasons. First, as noted briefly above, CAA §112(d)(2) requires EPA to "determine[ ]" that MACT standards are "achievable" for sources in the applicable category. If EPA determines that a 0.03 gr/dscf @ 7% O_2 standard is achievable for sources, it cannot impose an OPL that effectively is more stringent than that level; *i.e.*, that leads to more frequent violations. In doing so, the Agency would not have determined that meeting the tighter OPL is achievable on a continuous basis.

In addition, EPA may not set MACT standards more stringent than the "floor" levels specified in §112(d)(3) without first taking into consideration the cost of achieving such emission reductions and any non-air quality health and environmental impacts and energy requirements. CAA §112(d)(2). Prescribing a methodology that results in more stringent limits than the manual method-based

national PM standards represents an end-run around this requirement to consider costs and other factors before going beyond the MACT floor.

CS6A-012 (1) Therefore, the MIP members strongly encourage EPA to allow facilities to demonstrate that they meet the PM MACT standard using a PM CEM and not "be lower than the standard," if that is what is achieved in conducting the testing of the PM CEM. Such an approach is still protective and would make implementation of the regulations much simpler and less confusing to all concerned.

CS6A-018 (1) CWM continues to be concerned with setting site specific PM limits (this concern was expressed in our comments dated August 19, 1996, Docket No. F-96-RCSP-FFFFF) as an operating parameter to ensure compliance with the SVM and LVM standards. First of all, setting PM site specific limits based on normal operations penalizes those facilities that have extremely efficient fabric filter systems and demonstrate extremely low PM concentrations.

CS6A-020 (1) Essroc also opposes the use of PM CEMS for determining compliance with and enforcing HAP limits for several reasons. First, as stated above, PM is a poor surrogate for metal HAPs. At least for the cement industry, there is no data that demonstrates a sufficient correlation between PM and metal HAPs to support an enforcement action. Second, to the extent enforceable operational parameters are set on the basis of site-specific PM tests, Essroc believes this is not permitted under § 112. Such an action departs from the requirement that EPA set MACT standards for categories and subcategories. In contrast, EPA's proposal effectively sets source-specific MACT standards. Finally, the range of assumptions and estimations, as well as the degree of speculation about PM/HAP correlations involved in using PM CEMS for establishing enforceable parameter monitoring, makes the NODA appear a complex contrivance to create additional penalty opportunities without contributing to compliance assurance.

CS6A-026 (1) Ash Grove believes the EPA's overall scheme to require the establishment of PM-CEMS Operating Parameter Limits (OPLs) is based on questionable or non-existent legal authority. EPA's PM CEMS implementation scheme for site-specific monitoring and establishment of site-specific operational limits based on PM CEMS data effectively establishes source-specific MACT limits. Such an action departs from the requirements under § 112 of the CAA that EPA set MACT standards for categories or subcategories. If each plant is to be a subcategory for this purpose, it must be a subcategory for all purposes.

CS6A-030 (1) A site-specific particulate standard is not good public policy. When interested parties decide to construct an incinerator, safety, operations and production designs are conceptualized, and then an additional design factor is used. This results in an "over-design" of a facility. Then, when the facility is operational, owners/operators set waste feed cutoffs at less than permit limits, design basis, etc. How much buffer is installed at a facility depends on the management philosophy. The purpose of "over-design" and a protective buffer is to allow for unanticipated excursions or spikes to occur without causing a facility to be out of compliance.

CS6A-030 (1) Also, the site-specific particulate matter concept is not consistent with the MACT concept of the floor and beyond-the-floor. If a facility can meet the published standard of 34 mg/dscm, then it has met the standard protective of human health and the environment. To go

beyond the standard must be justified on a cost versus performance basis. For example, at the DOE incinerator at SRS, the worst-case particulate emission from the 1997 Trial Burn was 5 mg/dscm. Given that the particulate emissions cannot be manipulated for radiological reasons, one year of non-trial burn emissions would result in emissions in the range of 3-4 mg/dscm (the best measured during the Trial Burn) or lower. How much more protective of human health and the environment is an emission rate of 3-4 mg/dscm when the protective level is 34 mg/dscm? No justification of the protectiveness of human health and the environment when emissions are so much lower than the standard has been offered.

CS6A-030 (1) Also, DOE believes that developing emission standards on a site-specific basis does not improve the marketplace for PM instruments. Currently, there is one national standard that any manufacturer can use to develop a product such as calibration gases where the national standard is 0-200 ppm and 0-3000 for carbon monoxide (CO) and 0-25% for oxygen. A site-specific standard lends itself to developing a calibration gas for each site which is an expensive proposition. For the instrument manufacturer, a standard instrument range is preferred to spur mass production of a PM monitor. The existing stack instruments, such as CO and oxygen, are off-the-shelf at reasonable prices given their standardization. In summary, the commercial availability and the maintenance support structure does not appear to be ready to support this rule making.

CS6A-030 (1) From DOE s perspective, a site-specific particulate matter (PM) standard would not be a good public policy. When interested parties decide to construct an incinerator, safety, operations and production designs are conceptualized, and then an additional design factor is used. This results in an over-design of a facility. When the facility becomes operational, owners/operators further reduce emission levels by setting waste feed cutoffs below permitted limits, design capacities, etc. The amount of buffer installed at a facility is dependent on the management philosophy. The purpose of over-design and a protective buffer is to allow for unanticipated excursions or spikes that may occur but will not cause a facility to be out of compliance.

CS6A-009 (2) CRWI understands why the Agency is proposing the use of site-specific operating limits (OPL) in this rule. While their use may solve some problems, others may be created. CRWI is concerned that the use of “what you demonstrate is what you get” will punish the good performers and reward the poor performers. A site-specific operating limit would create inconsistent enforcement by requiring facilities with lower emissions during the comprehensive performance test and data collection periods to meet more stringent limits than other facilities. The effect would be to set a PM standard for some facilities that would be more stringent than the MACT standard. As a legal matter, CRWI questions the Agency’s authority to require permittees to meet operating limits which are more stringent than the MACT standards without a risk-based justification under RCRA or the Clean Air Act. EPA has addressed these concerns by allowing upward extrapolation for good performers and additional testing to set “upper bounds” for poor performers. Should EPA proceed with mandating lower, site-specific limits, CRWI supports the concept of upward extrapolation of the site-specific operating limit to the PM MACT standard (see additional discussion in the attachment). However, CRWI believes that the need to apply for a “variance” is cumbersome. CRWI suggests that this process would be best handled as a part of the certificate of performance rather than as a separate document.

CS6A-012 (2) When The PM CEM OPL is Lower Than The PM MACT Standard: The MIP

members are also very concerned that the Agency will require combustion unit owners/operators to meet a lower limit than the PM MACT standard (if that is demonstrated during the testing of the PM CEM), unless a variance is requested and granted. This particular requirement, the MIP members believe, will create a perverse effect and could actually increase emissions to the environment, as opposed to lower them. More specifically, those combustion facility owners/operators that would consider installing additional air pollution control equipment to lower PM emissions to ensure an ample margin of safety in meeting the standard will not do so, because the lower the emissions the lower their limit. This would have the effect of punishing the good performers. In fact, the MIP members believe that many combustion facility owner/operators will attempt to operate their combustion units under stressed conditions during the entire one-year PM CEMs implementation period in order to achieve maximum flexibility in establishing a site-specific PM CEM OPL. We hope this is not EPA's intent.

CS6A-015 (2) WTI has demonstrated very low emissions for all groups of pollutants the agency seeks to regulate with the proposed MACT rule and we are very proud of this. If we were asked to demonstrate for one year what our typical PM emissions are as measured by a continuous PM monitoring device, with the understanding that this number would then become an enforceable limit, we would be compelled to preferentially process waste streams that cause the highest possible particulate emissions. This is a very difficult task and would not be in the public interest. Why subject an area to higher than necessary emissions if only to establish a limit that should have been introduced through the rule making process? WTI would have to explain to the public why its emission limit is lower than that of other facilities. The public would be alarmed and confused by this.

CS6A-030 (2) EPAs proposed approach to establishing a site-specific standard appears to reward facilities that can increase their particulate emissions for one year to establish a higher PM limit. In the case of DOE s mixed waste incinerators, the option to manipulate for higher PM emissions is not available because of the radiological National Emission Standards for Hazardous Air Pollutants (NESHAP) permits. To increase the amount of particulate being emitted is not even fathomable from a responsible care perspective, yet this rulemaking appears to inadvertently promote that behavior. For example, at the DOE mixed-waste incinerator at Savannah River Site (SRS), the worst-case particulate emission from the 1997 Trial Burn was 5 mg/dscm. Given that the particulate emissions cannot be manipulated for radiological reasons, DOE estimates that one year of non-trial burn emissions would result in emissions in the 3-4 mg/dscm range (the best that was measured during the Trial Burn) or lower. DOE believes that a standard at such a level could adversely affect future DOE burn activities, because of our highly variable feed. Also, the site-specific particulate matter concept may be inconsistent with the CAA statutory language for developing maximum achievable control technology (MACT) "floor" and "beyond-the-floor"standards. If a facility can meet the proposed "floor" standard of 34 mg/dscm (0.015 gr/dscf), then it has met the level achievable by state-of-the-art air pollution control devices (APCDs). Section 112(d)(2) of the CAA states that to establish a standard beyond-the-floor, EPA needs to consider cost-effectiveness, any non-air quality impacts, and energy requirements. DOE requests that EPA revisit the concept of establishing site-specific PM limits.

CS6A-030 (2) A site-specific standard rewards facilities that can increase particulate emissions for one year to establish a higher PM limit. In the case of mixed waste incinerators, the option to

manipulate for higher PM emissions is not available because of the radiological NESHAP permits. To increase the amount of particulate being emitted is irresponsible, yet this rule making rewards that behavior.

CS6A-003 (3) Kodak supports the one-year phase-in of PM CEMS, because time will be needed to work out problems with the installation at a variety of new sources. However we are concerned that some facilities may have still have problems. Therefore we suggest that flexibility be built into the rule to allow variances in cases where problems are unresolvable or cannot be resolved within a year. The General Provisions of Part 63 have adequate flexibility as long as this rule does not supercede these Part 63 General Provisions.

CS6A-008 (3) G. EPA Should Clarify the Transition from Pre-existing Permit Limits to OPLs. As suggested in CMA's earlier comments, and for this rule to be truly self-implementing, a source's designated OPLs should become immediately effective upon submittal of the Pre-Certification of Compliance (CoC) or CoC to the appropriate permitting authority. This is especially important since incinerators will likely have pre-existing RCRA and Title V permit conditions. In order to avoid substantial confusion over what regulatory program and permit limits apply, the final rule needs to clarify explicitly that once the Pre-CoC is submitted, the OPLs in it supersede all relevant provisions in any existing RCRA and Title V permits for the incinerator. Likewise, the rule should confirm that the OPLs in the CoC, once submitted, supersede those in the Pre-CoC.

CS6A-008 (3) CMA supports EPA's recognition of need for a phase-in period. The large amounts of data that were discarded for the DuPont site as not meeting the quality assurance objectives reinforces the need to establish a long phase-in period for the field application and use of CEMS. CMA supports an extended phase-in of PM CEMS, because time will be needed to work out problems with the installation at a variety of new sources. However, we are concerned that some facilities may have still have problems. The one-year period proposed may not be adequate for all sources to work out the problems encountered during CEM phase-in. Therefore we suggest that flexibility be built into the rule to allow variances in cases where problems are unresolvable or cannot be resolved within a year. The General Provisions of Part 63 have adequate flexibility to address this provided the final rule does not supersede the Part 63 General Provisions.

CS6A-009 (3) e. CRWI is concerned that with a new instrument being incorporated into the system, it may not be possible to anticipate all the problems that will be encountered in calibration. For example, it took eight months during the DuPont test until a single calibration run was made that met PS 11 specifications (for 4 of 5 instruments). This NODA does not appear to address what may happen if a facility is making a "good faith" effort to calibrate their instrument and have gathered multiple sets of calibration data but even with combining the data, the PS 11 specifications cannot be met. CRWI believes that there are adequate provisions in the General Provisions of Part 63 (Part A) to address this issue. However, during the initial proposed rule, a number of the General Provisions of Part 63 were superceded by the new Part EEE provisions. CRWI suggests that the Agency make sure that the parts of the General Provisions that allow for extensions are not superceded in this rule.

CS6A-011 (3) Also, EPA states that, 15 months after the compliance date, the facility will use the revised operating parameters reported in the final CoP during periods when the PM CEMS is

unavailable *unless* those alternatives have been *disapproved* by the permitting authority. CKRC is concerned as EPA has not provided any information describing the criteria that will be used to "disapprove" a submittal. This could result in subjective and arbitrary disapprovals by permit writers. In addition, the Agency has not established a standard procedure or course of action that a facility can take in order to resolve any disapprovals. These omissions are a significant problem which must be remedied by EPA. CKRC requests an opportunity to comment on the Agency's proposed solution(s).

Finally, the Agency states that during the 12-month phase-in period a facility would maintain compliance with both its current operating limits and the PM CEMS OPLs (62 FR 67794). CKRC believes this could cause severe compliance difficulties. As long as both monitoring methods indicate the same compliance status, there is no problem. A problem arises, however, if one approach indicates compliance and the other does not. For example, this would preclude acquisition of information concerning the real range of operating parameters the Agency wants facilities to establish and submit as part of the CoC if the PM CEMS indicated compliance, but the parameters did not. Furthermore, if the PM CEMS indicates a violation, but the parameter emissions monitoring system (PEMS) indicates satisfactory operation -- or vice versa -- the facility could be in jeopardy of falsely being found in violation of a permit condition.

CS6A-030 (3) Should carbon injection be mandated for dioxin/furan (D/F) control, then owners/operators of mixed waste incinerators equipped with high efficiency particulate air (HEPA) filters will need to decide if the carbon injection system will be inserted into the HWC s air pollution control system (APCS) configuration before HEPAs (probably not since the life of the HEPA will be shortened considerably) or will carbon injection occur after HEPAs (thus creating nonradioactive carbon), and an additional filter, such as a baghouse, may be required. If this scenario occurs, then the PM emissions will increase because a baghouse is not as efficient as HEPA filtration at removing particulate matter. Because of these additional mixed waste incinerator design and configuration considerations, DOE believes (and requests EPA consider that) the installation of the PM CEMS and the one year of data collection should be delayed until the carbon injection system is operable. After the installation, then the incremental increase in particulate emissions can be measured.

CS6A-003 (1) 12. There should be no additional category of APCS upsets that result in discarding operating data. EPA has proposed that operating data collected during an air pollution control system (APCS) upset be discarded before calculating site specific operating parameters. While this concept sounds reasonable, Kodak believes that if all the operating parameters from the test burn are in compliance, then the data is "good." There should not be a further attempt to see if the APCS is "upset". By definition the APCS is upset only if it does not meet the operating limits. Therefore, there should be no additional category of APCS upsets that are loosely defined and may result in discarding data that is otherwise consistent with test burn data.

CS6A-003 (1) 3. If EPA chooses to implement a Site-Specific Standard (SSS), the SSS Setting Process should not cause facilities to be out of compliance solely due to the standard setting methodology. If EPA sets an SSS as an OPL, the SSS should be set in such a way that if a unit that is in compliance with all directly applicable standards is not determined to be out of compliance based on an indirect OPL (PM SSS) which is merely a surrogate for directly measured standards. Since the SSS is just documenting that conditions are within the bounds defined by the operating

conditions that were established during the performance test, the SSS should only identify when conditions deteriorate from those established conditions. EPA proposed two options for setting the SSS: 1. Set it at the 95% data level; 2. Set it at the level giving one exceedence per year. If the standard is set at 95%, then the facility will be out of compliance 5% of the time simply due to the way the standard is set, even though it continues to operate in a manner that is in compliance with all the directly applicable limits for which the PM CEMS reading serves as an OPL. This would result in 26,000 false non-compliances per year, which is clearly unacceptable. The second option of setting the standard at a level that is designed to give one exceedence per year is much more acceptable. This limit defines the upper bound of normal operation, so a facility could feasiblely stay under this upper bound. This one-exceedence-per-year approach is the procedure that was specified in the Municipal Waste Combustor MACT rule and there is no reason to change this precedent. Since the site-specific standard is based on data that is in compliance with all OPLs set by the CPT, there should be no enforcement unless the PM CEMS data is significantly higher than the upper range seen during the nine-month data collection period.

CS6A-005 (1) 8) 67797 For simplicity, EPA proposes to exclude data from all periods in which the facility operated outside of the operating envelope defined in the CoC irrespective of whether the parameter in question affects PM control. These two statements are philosophically inconsistent. The latter statement indicates that the facility will need to be in compliance with its latest permit on all parameters; thus, the rule is "business as usual" with no incentive for the HWC facility to better understand what operating parameters correspond to PM emissions. If all existing operating parameters remain in the permit, the PM CEMS is, pure and simple, a compliance device. To understand cause and effect, as the first statement implies, then some attempt should be made to reduce the number of operating parameters in operating permits to allow for some manipulation of variables to understand interrelationships of waste feed to operating parameters to stack emissions.

CS6A-005 (1) The proposed removal of data involving upset conditions will require the definition of "upset". A better approach would be to have the facility report any instantaneous reading over 34 mg/dscm and what set of parameters led to the instantaneous reading. Such an approach would also eliminate the request to assist EPA on how to objectively distinguish between high PM emissions attributable to PM control device upset conditions and normal emissions variability. The reporting of any batch over the instantaneous 34 mg/dscm would document cause, but it would not necessarily be a noncompliance given the averaging period.

CS6A-007 (1) Specifically, EPA should allow for the site-specific development of requirements covering: 1) the location of monitoring devices; 2) averaging periods; 3) allowable downtime for the system; 4) system calibrations; and 5) the treatment of excursions.

CS6A-008 (1) E. The final rule should have an explicit exemption from the PM standard and all uses of PM as a surrogate during calibration. EPA is encouraging facilities to operate at maximum PM emission levels for calibration, facilities should be shielded from any enforcement for high PM emissions during calibration efforts. The most important portion of the calibration range is the upper end, where compliance is the point of interest for facilities, regulators, and the public. In order to maximize the accuracy of the calibration at that range, calibration data are required approaching (and perhaps occasionally exceeding) regulatory limits. The final rule should include clear language exempting the facility from the PM standard and all uses of PM as a surrogate during calibration.

This will encourage facilities to improve the most critical portion of their calibration by operating at higher PM levels during calibration.

CS6A-009 (1) f. CRWI suggests that the discussion for determining the normality of the data [IV(B)(3)] be clarified to point out that this step is only necessary if the facility uses the "traditional" method of calculating the OPL.

CS6A-011 (1) CKRC is concerned that most normality tests do not apply to the large body of PM CEMS data that will be tested to comply with the standard statistical approach to setting equivalent limits. During the course of operating the PM CEMS for nine months, up to 394,200 one-minute updates can accumulate. The critical values needed to determine normalcy using the Agency's recommended Shapiro-Wilk statistic have only been determined for data sets with less than 50 entries. Shapiro-Fancia developed extended tables for a similar method that can determine the normalcy of up to 99 data points. Larger samples can be tested for normalcy using the Kolmogorov-Smirnov test with Lillifores correction. Unfortunately, for this test the mechanics of finding the largest deviation between the measured and expected normally-distributed values for about 400,000 measurements presses the capability of all but the largest computer systems.

CS6A-011 (1) Based on the concerns discussed in this section, CKRC believes that the Agency needs to change the PM CEMS OPL limit-setting process to ensure that:

- the OPL is calculated using no less than one year's worth of data;
- the data collected is representative of the full range of operations;
- the unscaled OPL is equivalent to the manual method-based PM MACT standard;
- the scaling ratios do not "ratchet" the PM CEMS OPL below the PM MACT standard; and,
- any alternative "variance" procedures should enable the PM CEMS OPL to be 100 percent equivalent to the PM MACT standard.

CS6A-019 (1) 3.Data Excluded From Calculating the PM CEMS Operating Parameter Limit: EPA states on page 67797 of the December 30, 1997 NODA that "The facility must also remove any data collected during periods of PM APCS upset irrespective of whether the operating parameter limits were exceeded." Solite is concerned that EPA has yet to define what it considers to be "PM APCS upset" during periods that operating parameter limits are not exceeded. Without appropriate guidelines to determine what is considered an upset during time periods when the facility is still operating within the operating parameter limits, periods of higher emissions would have to be included in the day-to-day CEMS monitoring data. Therefore, the periods of higher emissions (when the facility is still operating under the operating parameter limits) that may be solely due to emissions variability, must be included in the data set used to establish the CEMS operating parameter limits, provided all other data quality objectives are met.

CS6A-030 (1) These two statements appear to be philosophically inconsistent. The latter statement indicates that the facility will need to be in compliance with its latest permit on all parameters; thus, the rule is business as usual with no incentive for the HWC facility to better understand what operating parameters correspond to PM emissions. If all existing operating parameters remain in the permit, the PM CEMS is, pure and simple, a compliance device. To understand cause and effect, as the first statement implies, then some attempt should be made to reduce the number of operating parameters that are in operating permits to allow for some

manipulation of variables to understand interrelationships of waste feed to operating parameters to stack emissions.

CS6A-030 (1) In determining the operating parameter limit, there is no justification for removal of data collected during periods of PM APCS upset irrespective of whether the traditional operating parameter limits were exceeded. There is no reliable method to do this. 3. Episodes of high PM emissions caused by periodic, routine maintenance cycles (e.g., ESP rapping; soot-blowing for waste heat boiler equipped incinerators, etc.) would not be considered upset conditions. We request information on how to objectively distinguish between high PM emissions attributable to PM control device upset conditions versus normal emissions variability.

CS6A-030 (1) Option 2 does not appear to be consistent with the methodology for setting the initial CEMS operating parameter limit (before adjusting for low emissions). That method uses data from the entire allowed data accumulation period (i.e., the phase-in period) to set the operating parameter limit but excludes data obtained during certain periods (for example periods of non-compliant conditions). Therefore, infrequent episodes of high PM not encountered during the performance test will still be normal occurrences for the facility, perhaps because of wide variability of waste feed and the current inability to predict PM well enough so that the full normal condition envelope can be assured to be included in the performance testing. Therefore, use of data from the full data accumulation period should be allowed to be used to represent the data variability during normal operation of the facility. If high PM emissions occur, but the CEMS are operational and no non-compliant condition exists (as determined from the non-CEMS operating parameters) and the emissions are lower than the standard, these emissions should be accepted as normal.

CS6A-003 (2) 6. Kodak continues to support a longer averaging times of at least 168 hours, as discussed in previously submitted comments. If the SSS is set by one of the procedures suggested, the limit will be lower at higher averaging times and vice versa, but the stringency of the combined limit and averaging time will be the same regardless of the averaging time used; however, a lower PM limit offers several advantages. Since the average PM emission can never be higher than the SSS standard, if the limit is lower, the guaranteed average PM level is lower. While average emissions should be the same, regardless of the averaging time if the PM limit is set by the proposed method, the future distribution could be different from the initial data gathering period, so the lower limit with a higher averaging time is a better guarantee of the lower average PM emissions. It also is a better description to the public of what is being emitted and will provide better reassurance for the public.

Longer averaging times also provide more reassurance that the monitor inaccuracy will not cause false exceedances. The rationale for a minimum of a 24-168 hour averaging time to combat monitor inaccuracy was submitted to Scott Rauenzahn Oct. 13 and is attached to these comments. Additionally, translation of a Method 5 one-time test to a PM CEMS standard needs to incorporate process variability into the standard and the averaging time determination.

CS6A-003 (2) 7. PM CEMS should be a block average and not a rolling average. A rolling average would increase the amount of data that would have to be collected. It would also inappropriately elevate the number of exceedances that occur due to a single high period of emissions. Longer averaging blocks are capable of protecting against chronic impacts from HWCs.

As discussed in the August 19, 1996 Kodak comments, it is very unlikely that HWCs will cause acute health effects and these can still be avoided through compliance over weekly to monthly averaging times. Block averages are also consistent with the use of continuous samplers that are recommended in the next comment. Therefore a block average is more appropriate than a rolling average.

CS6A-003 (2) 8. The specifications for CEMS should be modified so that continuous samplers with later analysis can be used in addition to the real time monitors tested. Continuous samplers, as used by 3M in St. Paul, MN, give representative emissions determinations for both PM and metals. Continuous samplers are direct measurements of PM emissions and give good long-term average emissions levels. Continuous samplers have been reliable in 3M's application. The reliability of the PM CEMS was marginal during the EPA test and could be significantly worse for certain types of facilities. Therefore to ensure that some PM CEMS will work on all applications, it is important to write the rule in a way that allows continuous samplers to be a PM CEMS option.

CS6A-008 (2) EPA should allow use of weekly (168 hour) averaging times. Such averaging times are fully protective of public health and will ensure that CEM limits are equivalent to the manual method limits. EPA should also require block averages, rather than rolling averages, to be used.

CS6A-008 (2) The importance of an adequately long averaging time cannot be overstated. It is well-understood that the stringency of a standard is a function of the magnitude of the numerical limit, the averaging time of the standard and the frequency with which compliance is assessed. Varying any one of these will affect stringency – i.e., predicted exceedances. *See* R. Ajax, "The Effect of Compliance Test Frequency on the Stringency of Technology Based Standards" (Mar. 9,1995) (Attachment B) at 11-14. Use of continuous emissions monitors obviously increases the frequency of testing dramatically – from once a year or less to as often as every minute. Variability of emissions ensures, as a matter of statistics, that more frequent monitoring will result in more exceedances. *See* Attachment B at 5-8, 13-14. If PM CEMS are used to determine compliance with the manual method MACT limit, by definition the magnitude of the limit will be held constant and the frequency of testing increased. Therefore, the averaging period must be lengthened – to substantially longer than the averaging period of the manual method – in order to avoid increasing 'exceedances' caused by normal variability being detected by more frequent testing.

CMA's proposed approach is consistent with the one EPA took in proposing to convert the Subpart D sulfur dioxide standard for electric utility boilers from a manual method to a CEMS standard. After much careful review and analysis, the Agency concluded that extending the averaging period to 30 hours would result in a CEM standard being equivalent in stringency to the 3-hour Method 6 stack test. *See* 48 Fed. Reg. 48961 (Oct. 1, 1983) ("The proposed revision would make Subpart D consistent with the intent and the anticipated effect at the time it was adopted and does not make it a more stringent regulation with which to comply."). The Agency has established similarly long averaging periods in several other rulemakings in which it has switched from a manual compliance method to a continuous one.

CS6A-008 (2) CMA's August 19, 1996 comments attached two scientific papers explaining that the only health risks posed by PM are chronic ones – HWCs simply could not emit enough PM to pose an acute risk to anyone. The text from the August, 19, 1996 comments and papers cited are

resubmitted as Attachments C, D, and E to these comments. Accordingly, short averaging times are not needed to protect human health and the environment. We also believe that no acute threats could arise from short term emissions of dioxin/furans, given the extremely low levels emitted by incinerators. CMA's August 1996 comments also explain in detail the rationale for setting MACT emission limit averaging times at levels that make technical sense, up to a year in length. As discussed in Part VI of these comments, continuous samplers can be used if weekly or longer averaging times are used, thereby expanding the potential CEMS applications.

CS6A-008 (2) B. The averaging period should be block, rather than rolling. A one-week block averaging period should be used rather than a rolling average. A rolling average would increase the amount of data that would have to be collected by a factor of approximately 10,000. It would also inappropriately multiply the number of exceedances that occur due to a single high period of emissions. A rolling average updated each minute results in up to 525,600 (60 x 24 x 365) discrete rolling averages per year for which a facility would have data. A block average, updated weekly, would result in 52 periods per year, a much more reasonable number of compliance periods. We believe that block averages will provide sufficient information to determine if the unit is in compliance and would be protective of human health and the environment.

The use of a block average would also reduce recordkeeping and paperwork requirements -- issues that the Agency must consider in the rulemaking in accordance with the Unfunded Mandates Reform Act of 1995 requiring federal agencies to identify and consider a reasonable number of regulatory alternatives and select the *least costly, most cost-effective, or least burdensome alternative (emphasis added).* 2 USC 1535 §205. Consequently, for both practical and legal reasons, we urge EPA to select block, rather than rolling, averages.

CS6A-008 (2) C. Method 5i may require long sampling times, further strengthening the need for longer averaging period. The anticipated improved precision of the Method 5i source test method for low concentrations of PM will likely require longer sampling times. As noted in the NODA, industry experience with traditional Method 5 (used on higher PM concentrations) indicates that up to 8 hours of sampling time may be required. The low PM concentrations of MACT sources will almost certainly require longer sampling times due to the small amount of PM that will be collected and weighed. Short sampling times would likely result in an inadequate mass of PM from which to base the estimate of the concentration in the stack gas. We urge EPA to assess the realistic sampling times required for Method 5i, and include this information when determining an appropriate averaging time for CEMS.

CS6A-009 (2) 3. CRWI suggests that EPA consider a 24-hour averaging period for PM emissions compliance calculations. A longer average period has several advantages. First, a longer averaging period would keep OPLs at or near the PM MACT standard. This would aid both the Agency and the facility when explaining higher OPLs to the public. Second, longer averaging times would provide more reassurance that the monitor inaccuracy will not cause false exceedances. The rationale for this was submitted to EPA on October 14, 1997. Third, neither PM, SVM, nor LVM are acute health risks at the low levels emitted by hazardous waste incinerators. CRWI's comments on August 19, 1996, had an extensive discussion of this. CRWI asks EPA to review those comments in conjunction with this issue.

CS6A-009 (2) CRWI also suggests that EPA consider using block averages instead of rolling averages. The use of block averages would significantly reduce the amount of record keeping without any loss in the compliance record.

CS6A-011 (2) Since the objective is to determine a PM CEMS operating limit for 1-minute updated data averages that matches the stringency of manual method testing once every 5 years, the difference in the number of comparisons between a manual test and continuous measurement must be recognized. Instead of 1 exceedance opportunity every five years, there are 2,628,000 opportunities with the PM CEMS. To be equivalent to the manual-method limit, the appropriate PM CEMS limit must include 99.999961948 percent of the expected results. If the largest recorded value is to be the PM CEMS operating parameter, nonparametric statistics can show that at least 7,872,783 rolling averages are needed. This is roughly 15 years worth of data. Conversely, if the highest value in one year's data set is used, this corresponds to a statistical confidence level of roughly 63 percent that an exceedance will not occur. Using the 95th percentile reduces the statistical confidence level to 61 percent.

CS6A-011 (2) CKRC does not necessarily oppose a fixed averaging period. However, CKRC is very concerned that the Agency plans to establish an averaging period, applicable to all HWC sources, without having collected sufficient data to support its decision. Averaging periods may vary by HWC type or even APCD type. Until the data from a PM CEMS demonstration at a cement plant is collected and analyzed, EPA cannot establish an appropriate averaging time for HWC cement kilns.

EPA indicates that it is considering an averaging time between 3 and 24 hours. The Agency supports its preference for the 3-hour average based on the claim that an appropriate averaging period for PM CEMS would be the length of time it takes to make three Method 5 runs. (62 FR 67797). Without conceding that EPA's theoretical approach represents an appropriate methodology for determining the averaging period, CKRC points out that the averaging time calculated based on this claim would actually be 18 hours (multiply by three the sampling time ultra-low emitters require to collect a sample with ±5 percent weighing uncertainty). CKRC strongly opposes the establishment of a three-hour averaging period based on EPA's flawed underlying basis for the proposal and the lack of data to support that three hours is an appropriate averaging period for cement kilns.

CS6A-011 (2) In general, CKRC believes that longer averaging periods are better as they provide significant operational advantages without compromising the protection of human health or the environment. As discussed in CKRC's August 19, 1996 Comments on the HWC MACT proposal (See p. 530-31) and supported by the ASME Research Committee on Industrial and Municipal Waste's position papers on the environmental impacts of averaging it is practically impossible for a HWC to emit enough pollutant to create an acute hazard. That being the case, longer averaging times are protective of human health and the environment because they guard against long-term, chronic effects. They are beneficial to sources and regulators because they help prevent environmentally inconsequential short-term deviations (termed "unknown or unquantifiable intangibles" in the discussion of paired-train outliers in the Dupont report) from affecting facility compliance status.

CS6A-025 (2) The averaging period for the PM CEMS should be in the 3 to 6 hour range, which

is adequate to cover three Method 5i sampling runs. Longer averaging periods increase the potential for hiding excessive short-term particulate emission levels in the rolling average, or diluting large levels of emissions with time to obtain an overly inflated OPL. Limiting the averaging period to 6 hours will prevent such gaming of the emission events to inflate the allowable OPL.

CS6A-029 (2) There is no valid reason to provide averaging times for compliance with MACT standards based on CEMS. As noted above, EPA declined to use CEMS directly for compliance because of concern that CEMS measurements and manual tests might measure compliance over different averaging periods. This concern is unfounded because EPA already has proposed MACT standards based on the worst (or nearly worst) performance by any source using a designated technology, and then increased by a variability factor. In addition, the tests in which these performances were recorded were conducted with "spiked" feedrates so that emission levels of the relevant pollutant were particularly high. As a result, the proposed standards do not represent the normal performance for a HWC (far less the performance of the best HWC, as required by Clean Air Act section 112(d). Consequently there is no reason to establish any averaging period at all; EPA should require compliance based on source's emissions during the smallest unit of time that a CEMS can record. Even if averaging times were appropriate, EPA would have no valid reason to set individual PM CEMS operating parameter limits.

CS6A-030 (2) Compliance with the fixed MACT PM standard will be demonstrated by manual testing over a site-specific averaging period equal to the time necessary to perform three manual sampling runs for PM testing. The PM CEMS operating parameter limit for that facility should be set to prevent the facility from exceeding its permitted MACT PM emissions limit set by performance testing. So long as compliance and primary CEMS calibration are based on the manual method (and therefore on the site-specific averaging period), for simplicity, consistency, avoidance of confusion, and scientific defensibility, the site-specific manual method based averaging period should be used for all emissions measurements, unless EPA sets a uniform fixed averaging period (e.g., such as 24 hours) that encompasses the range of site-specific, manual method-based averaging periods required for HWCs. Historically, this is similar to the approach used by EPA when the proposed Municipal Waste Combustor CO emissions limit was not achievable by certain classes of combustors using refuse derived fuel (RDF) using a proposed averaging period of 4 hours. This problem was due to the variability of RDF. That averaging period was therefore changed to 24 hours (56 FR, p 5488, Section VIII. C. 3). Longer manual sample collection times are necessary for facilities that have low emissions. At the lowest levels (requiring 24 hours total manual method sampling time for three runs), the CEMs will be operating near its detection limit, therefore, allowing more averaging time for the CEMS at these PM levels seems appropriate. Alternatively, a set of averaging periods ranging from 1 to 24 hours, with corresponding values of the MACT PM standard, could be developed to allow a predetermined site specific averaging period (and corresponding standard) to be selected for each facility.

CS6A-003 (3) If the standard is set at 95%, then the facility will be out of compliance 5% of the time simply due to the way the standard is set, even though it continues to operate in a manner that is in compliance with all the directly applicable limits for which the PM CEMS reading serves as an OPL. This would result in 26,000 false non-compliances per year, which is clearly unacceptable.

CS6A-009 (3) g. CRWI has examined the two methods (rank statistics and traditional) that were

suggested to calculate the OPL. A 95% rank statistic will give 26,280 individual minute rolling averages that are in violation per year (60 X 24 X 365 X 0.05) even though the unit is operating under conditions that has already been demonstrated to meet the PM MACT standard. CRWI believes that this option is unacceptable.

CS6A-011 (3) Fourth, as described in subsection IVD, CKRC is concerned that the Agency's preferred rank statistics method to select an equivalent PM CEMS OPL produces limits that will be frequently exceeded by sources that are in compliance with the national manual method-based PM standard. Although it appears, based on achievability, that the standard statistic option discussed by EPA may be preferable, CKRC believes that even this option must be clarified to ensure that the stated objective is achieved.

CS6A-011 (3) D. CKRC is concerned that there will be too little data to use the Agency's preferred rank statistics option to select manual method equivalent PM CEMS operating limits, and suggests the Agency pursue a valid standard statistics approach. The amount of data produced by a PM CEMS with 1-minute updates is enormous. But, as large as that number is, it is not adequate to establish manual method equivalent PM CEMS operating limits without resorting to conventional statistics. Using data ranks takes advantage of nonparametric statistics which do not require the underlying data distribution to be known. In exchange for not making the distribution assumption, higher emissions limitations result.

CS6A-003 (4) The second option of setting the standard at a level that is designed to give one exceedence per year is much more acceptable. This limit defines the upper bound of normal operation, so a facility could feasiblely stay under this upper bound. This one-exceedence-per-year approach is the procedure that was specified in the Municipal Waste Combustor MACT rule and there is no reason to change this precedent. Since the site-specific standard is based on data that is in compliance with all OPLs set by the CPT, there should be no enforcement unless the PM CEMS data is significantly higher than the upper range seen during the nine-month data collection period.

CS6A-003 (4) EPA's second option for computing the variance using the CPT PM data to set the initial limit instead of using nine months of PM CEMS operating data is not acceptable. EPA should use the same method to calculate the baseline PM CEMS limit before applying the correction as is used when a variance is not being requested. EPA's option 2 would eliminate all the normal variability from the data and give an unrealistically low number. As EPA has discussed, the variance procedure is already conservative, so it does not need to be made more conservative than the normal site-specific standard setting process.

CS6A-008 (4) Option 2, setting the standard at a level designed to give one exceedance per year, is much more acceptable. This limit defines the upper bound of normal operation, and a facility should be required to stay under this upper bound. This approach is also more consistent with prior Agency practice in setting emissions limits; for example, it was followed in the Municipal Waste Combustor MACT rule. Contrary to the NODA, moreover, the statistics involved are not particularly complicated and there is no reason why the Agency would have a qualitatively more difficult time overseeing application of this approach compared to Option 1.

CS6A-009 (4) CRWI prefers the traditional method. While this method may take more effort in

the beginning, it will give an OPL that is more representative of the "normal" PM emission levels than will the rank statistics method. CRWI suggests that if the rank statistical method is considered, either as the preferred method or as one of the choices, EPA should develop the percentile level that would give the same OPL as does the traditional method.

CS6A-025 (4) With regard to the refined options for increasing the PM CEM OPL discussed on page 67799, the ETC supports Option 2. This option is directly linked to the actual compliance test data, and therefore represents a more appropriate variance factor.

CS6A-025 (4) The "rank statistics" approach and the "traditional standard setting" approach do not yield the same result when applied to a common data set. The approach that allows the minimum number of exceedances per year should be specified. The ETC believes the "traditional standard setting" approach will minimize exceedances, and believes that this analysis technique yields an OPL more representative of normal emissions. The ETC does not agree that the statistics are more complicated than the "rank statistics" approach. The traditional approach is preferable because it is based on a common averaging period, which should be standardized for all combustion sources. The traditional approach also limits exceedances to 1 per year, by nature of the statistics, whereas the "rank statistics" would allow for 26,280 exceedances per year (see CRWI comments to this docket).

CS6A-030 (4) The referenced traditional statistical approach could be used on an individual facility basis for site-specific averaging periods rather than only for a fixed uniform averaging period for all facilities. (See accompanying comments for additional discussion of site-specific versus uniform averaging period (IV.B.4)). Tracking and enforcing a site-specific limit will presumably include comparing measured site-specific emissions with the applicable limit, whether it be site specific or not, and checking operational records and calculations. It does not seem readily apparent that the tracking and enforcement will be more difficult if a site-specific averaging period is used for the operating parameter limit setting, since the measured data in the calculations will all be site specific anyway.

CS6A-003 (1) 4. EPA's proposed variance procedure is a good beginning, but it does not make PM CEMS a good metals surrogate. More factors should be included in the calculation. For facilities that are well below the PM, SVM, and LVM limits, EPA proposes a variance procedure. Kodak supports a procedure that allows the site-specific PM limit to rise if all of these parameters are well below the limits based on the performance test. This adjustment should simply be part of calculating the limit and not termed a "variance," since facilities will still be meeting all the MACT standards after the PM CEMS adjustment. Since EPA has already argued that when extrapolating upwards to higher PM levels, PM is a conservative indicator of SVMs and LVMs, a complete 100% adjustment should be allowed, not a 75% adjustment as the Agency proposed.

CS6A-003 (1) EPA's second option for computing the variance using the CPT PM data to set the initial limit instead of using nine months of PM CEMS operating data is not acceptable. EPA should use the same method to calculate the baseline PM CEMS limit before applying the correction as is used when a variance is not being requested. EPA's option 2 would eliminate all the normal variability from the data and give an unrealistically low number. As EPA has discussed, the variance procedure is already conservative, so it does not need to be made more conservative than the normal

site-specific standard setting process. Kodak agrees with EPA, that to maintain conservatism, the adjustment ratio should be multiplied by the average emissions and added onto the SSS calculated from the actual data rather than multiplying the calculated SSS directly by the adjustment ratio.

CS6A-005 (1) 9) 67799 The Agency is considering a variance procedure to establish a higher projected PM CEMS operating parameter limit. The method of extrapolating beyond a demonstrated point is counter to past EPA guidance and might have difficulty meeting good science, particularly when the Agency is considering using 75% of the proposed rule to develop the extrapolation formula. The EPA should determine that 34 mg/dscm is the standard protective of health and the environment and require every facility to meet that standard. If 75% of the standard is more protective, then the particulate standard should be set at 25 mg/dscm. EPA should establish a defensible emission rate which, presumably, is 34 mg/dscm. If site specific PM emissions are not proposed, then there is no need to develop a defensible extrapolation basis.

CS6A-008 (1) EPA has presented options in the NODA without adequately explaining their ramifications. The best example of this is EPA's decision to not calculate a CEMS-based OPL for the DuPont Experimental Station. EPA should have taken the data from the DuPont site, calculated CEMS-based OPLs for each of the OPL options, evaluated the effect of significant variables (e.g. averaging time, rolling average vs. block averages) and presented the findings as part of the NODA. EPA's decision not to do so because the site does not (in EPA's view) use MACT technology conceals the complexity of the methodologies and the benefits of providing clear examples of how they apply to real data. As a result, CMA and others have had to employ outside consultants to perform such work in a very short time-frame, and without the benefit of first-hand experience with the project and associated data. Other options identified in the NODA without sufficient examples include averaging times and the appropriate period on which to base a variance.

CMA believes that EPA and all affected groups would benefit from additional evaluation of the CEMS-based OPL methodologies. This work could be accomplished through the application of methodology options on data from the DuPont site, industry demonstration tests such as the CMA/CRWI/Eli Lilly project, and additional EPA-lead demonstration projects. The requested evaluations could be performed without risk of delaying the date that sources would be required to have PM CEMS installed and operational. CMA believes that required work, including public comment, could be accomplished within one year. This would still allow adequate time for regulators, the public, and industry to prepare for implementation of PM CEMS.

CS6A-008 (1) C. Methodologies for Calculating CEMS-based OPLs Need Additional Development and Explanation. Considerable confusion remains concerning the methodologies for developing CEMS-based OPLs. The methodologies first presented in the December 30, 1997 NODA represent a significant change in the types of limits to which sources would be subject. The comments from regulated industry, environmental groups, and EPA staff at the January 8, 1998 NODA meeting - only 6 working days after the NODA was issued - demonstrated a common lack of understanding of the details of the methodologies. Although we appreciate the opportunities we have had for follow-up discussions with Agency staff, and have found staff very willing to provide information, there remain areas where we are uncertain of the ramifications of the issues in the NODA.

CS6A-008 (1) A. CMA Supports the "Variance" Rationale. This Concept Should Be Embodied in the OPL Calculation Itself. As noted earlier, EPA cannot legally set site-specific OPLs at levels below the national manual method limit. The Agency's proposed "variance" procedure for facilities that are well below the PM, semivolatile metal (SVM), and low volatile metal (LVM) limits are a good beginning at eliminating the increased stringency inherent in the OPL-setting process. The Agency should not term it a "variance," however, since facilities will still be meeting all the MACT standards even after the PM CEMS OPL adjustment. Instead, the Agency should build the procedure into the process by which it sets OPLs. Moreover, EPA has already recognized that, when extrapolating upwards to higher PM levels, PM is a conservative indicator of SVMs and LVMs, since metals partition preferentially to smaller particles. January 8, 1998 public meeting overheads ##15-16. Thus, a complete 100% adjustment should be allowed, rather than the 75% adjustment proposed.

CS6A-009 (1) As an alternative to using EPA's proposed variance procedure, CRWI believes that a facility should be allowed to choose to meet the MACT standard using a CEM and allow upward extrapolation of the SVM and LVM to insure that these standards are not being violated. In the Standards NODA (May 2, 1997), upward extrapolation of metals emissions was considered to be a conservative estimate. CRWI supported that concept and suggests that it can be applied in this case as well.

CRWI had problems understanding the basis for the other two methods mentioned in the NODA. They appear to be overly complicated, add additional levels of conservatism, and are difficult to understand. The calculation of an OPL based only on the time of the comprehensive performance test (potentially a time period of 15 hours) appears to defeat the whole concept of an OPL. CRWI believes that these concepts should be dropped from consideration.

CS6A-011 (1) Existing proof of these conservative relationships between metals feed and metals emissions and metals emissions and PM emissions, demonstrates the unnecessarily conservative nature of EPA's ratio calculation approach. Restricting the extrapolation to some arbitrary fraction of the MACT floor PM emission standard would simply be an unnecessary layer of conservatism on top of the inherently conservative nature of the known relationships among metals feedrates, PM emissions, and metals emissions. CKRC strongly believes that prescribing any ratio less than the full amount (100%) required to reach the MACT floor for any pollutant would be arbitrary and illegal.

CS6A-011 (1) Finally, the Agency is using improper criteria to establish site-specific PM CEMS "variance" limits. Although the Agency's stated purpose for the establishment of a so-called variance procedure is to avoid penalizing the low PM emitters, several flaws preclude its effectiveness. First of all, the procedure has been improperly termed a variance. The purpose of the procedure is not to allow a facility to set a limit *less* stringent than the MACT PM standard. The purpose should be to enable a facility that operates well below the MACT PM standard to establish a PM CEMS OPL equivalent to the PM MACT standard.

The Agency has needlessly complicated what should be a conceptually simple process for setting a PM CEMS OPL at low emission facilities, with the result that the OPLs rarely would be equivalent to the national PM standard. In one case, the Agency has arbitrarily limited the OPL to 75% of the

MACT PM standard *(based on a calculation using the lowest ratio of the PM, SVM or LVM standard to the performance test level of each of these parameters)* -- which would arbitrarily preclude the establishment of an equivalent PM CEMS OPL. CKRC is also concerned that the NODA does not state clearly enough that, as the Agency has verbally explained, the ratio calculation procedure applies only to the PM CEMS OPL. Without a precise qualification in the regulatory language, one could conservatively interpret the NODA to reflect an EPA intention to require the application of the ratio limitation not only to the PM CEMS OPL, but to the SVM and LVM MACT standards also. Of course, such a perverse requirement would have the effect of ratcheting down the established MACT standards which, as explained below, would be illegal.

A. EPA should modify the proposed implementation and compliance scheme to incorporate options that would enable facilities to bypass the complex and burdensome site-specific OPL limit-setting process.

CS6A-016 (1) If the Agency requires all facilities to have PM CEMS, it should not penalize sites that operate with emissions lower than the standard. We support CMA comments on the variance to extrapolate upwards to higher PM levels with a complete 100% adjustment, and that facilities with low emissions should not have a lower site-specific CEM limit than the MACT standard.

CS6A-030 (1) DOE agrees that the proposed variance method might address some concerns that overly conservative operating parameter limits would otherwise be applied for PM control at sources with low PM and low HAPs that require PM control to ensure compliance. The method of extrapolating beyond a demonstrated point, however, is counter to past EPA guidance and might have difficulty meeting good science, particularly when the Agency is considering using 75% of the proposed rule to develop the extrapolation formula.

CS6A-005 (2) The final rule needs to clarify that: 1) if the operator has to measure for non-enumerated metal HAPs in the waste feed to ensure compliance when the PM CEMS is non-operable; 2) when facilities should begin monitoring for cobalt and manganese in the waste stream; and 3) when facilities can stop analyzing for barium, silver, and thallium.

CS6A-011 (2) EPA provides no basis for the 75% cap placed upon low PM emitters applying the proposed variance procedure. EPA appears to have plucked the 75% figure out of thin air. The NODA contains no justification for it or for the 50% to 100% "range of reasonable values" (p. 67799) from which it was selected. EPA's claimed justification for some type of cap on the upward adjustment is that this measure may be necessary to ensure that the non-existent standards for the unmeasured pollutants for which PM serves as a surrogate might be exceeded. This rationale is flawed.

To the extent that EPA thinks the cap would serve to ensure that emissions of the non-enumerated metal HAPs (Co, Mn, Si, and Se) do not increase too much, CKRC disputes this rationale. Because these metals emissions are not measured, and there is no standard to compare them to, it is impossible to determine the significance of any increase in PM with respect to emissions of those metals. Given the data available to CKRC and provided to the Agency, as well as the allowable ambient limitations in the BIF rule, we believe that emissions of these metals are well below any level of human health or environmental concern. Consequently, for HWC cement kilns, there is no

technical basis for this unsubstantiated concern.

As EPA noted in the April 19, 1996 proposal, the Agency will not directly regulate these four metal HAPs due to "(1) [i]nadequate emissions data for Co, Mg, Ni, and Se; and (2) relatively low toxicity of Co and Mn." (61 FR 17375) Without adequate emissions data, EPA may not regulate these pollutants either directly or by using PM as a compliance parameter. There simply is no basis for setting emissions limitations for them. Thus, there is no accompanying basis for limiting the upward adjustment of PM performance data to set an OPL that is equivalent to the proposed 0.03 gr/dscm @ 7% O_2 PM standard. If EPA requires PM CEMS-based OPLs, those limits must be fully equivalent to the national PM standard.

CS6A-012 (2) With respect to the other metals, the MIP members are not convinced that these metals need to be controlled to the same extent as the other metals; in fact, in the Agency's original MACT hazardous waste combustion proposal, the Agency indicated that is was not proposing to regulate emissions of four specific hazardous air pollutant (HAP) metals – cobalt, manganese, nickel, and selenium – based upon inadequate emissions data and the relatively low toxicity of cobalt and manganese. In addition, the Agency acknowledged that three of the metals currently regulated under the boiler and industrial furnace rule would not be regulated under the MACT hazardous waste regulations since these metals are not defined as HAPs. See 61 *FR* 17374/5, April 19, 1996. Furthermore, the MIP members remind EPA that any of these metals that present a risk on an individual site can be controlled using RCRA's Omnibus Permitting Authority under section 3005(c)(3), where it can be demonstrated that one or more of these metals actually presents a significant risk to human health and the environment.

CS6A-030 (2) Given that all RCRA permit parameters that are deemed necessary to protect human health and the environment will remain in full force and effect, DOE requests EPA clarify whether the specification of these non-enumerated metal HAPs require the operator to commence measuring for these metals in the waste feed to ensure compliance when the PM CEMS is non-operable. Furthermore, clarification is requested as to (1) when, if at all, facilities should commence monitoring for cobalt and manganese in the waste stream and (2) when can facilities cease analyzing for barium, silver, and thallium.

CS6A-003 (3) In addition to an adjustment based on the CPT data, an adjustment should be allowed based on the ratio of metals fed during the CPT to the ratio of metals fed during the PM CEMS nine month data collection. For example, if during the nine-month data collection period, metals are fed at half the rate tested during the CPT, then the allowable PM CEMS limit should be twice as high as that measured during the nine months of data collection, because anticipated normal emissions should be only half as much as emissions during the CPT. For a detailed example, suppose that during the CPT burn, PM is 0.003 grains/DSCF, LVM is 27.5ug/m3 and SVM is 50 ug/m3 with an LVM feed rate of 100 lb./hr. and an SVM feedrate of 200 lb./hr. The ratios proposed by EPA for correcting the PM CEMS site-specific limit is the least of PM, .015/0.003=5, SVM, 55/27.5=2, and LVM, 100/50=2, or 2. If the metals feedrates determined by the same technique as that used to determine PM CEMS are 40 lb./hr. for SVM and 100 lb./hr. for LVM, additional correction would be needed to make PM CEMS serve as a more appropriate surrogate. Since during PM CEMS data collection, metals emissions were less than during the CPT, the metals PM correlation must be adjusted accordingly. Therefore the proposed corrections for the PM CEMS site-specific limit would

be the least of PM, .015/0.003=5, SVM, 5/27.5*100/40=5, and LVM, 100/50*200/100=4, or 4. Without these corrections, we believe PM CEMS could not be used to establish non-compliance with metals emissions limits since it would be such a poor surrogate, but could only serve as an indication that metals emissions could have increased and may require additional evaluation or testing.

CS6A-008 (3) B. EPA Should Create an Additional Feedrate Adjustment. Metals emissions are a function of two variables, metals feedrates and removal efficiency. As discussed earlier, the PM CEMS OPL is really being used by the Agency as a surrogate for the latter (even though monitoring APCD parameters is both more direct and more accurate.) The adjustment discussed in the NODA takes the latter into account, but does not reflect that metals feedrates during normal operations may also be quite a bit lower than during the performance test. Accordingly, the proposed adjustment based on performance test data should be modified to also reflect the ratio of metals fed during the performance test to metals fed during the PM CEMS nine-month data collection period. For example, assume that during the nine-month data collection period the average metals feed rate is one-half the rate used during the performance test. In that case, the allowable PM CEMS limit should be twice as high as that measured during the nine-months of data collection, because anticipated normal metals emissions should be only half as high as emissions during the performance test.

For a more detailed example, suppose that during the performance test burn, PM is 0.003 grains per dry standard cubic foot (dscf), LVM is 27.5 micrograms per cubic meter (ug/m^3) and SVM is 50 ug/m^3 with an LVM feed rate of 100 pounds per hour (lb/hr) and an SVM feedrate of 200 lb/hr. The ratios proposed by EPA for correcting the PM CEMS site-specific limit is the least of the ratios of the standard to the measured level: PM (0.015/0.003=5), SVM (55/27.5=2), and LVM (100/50=2), or 2.

If the average metals feedrates during the nine-month period, determined by the same technique as during the performance test, are 40 lb/hr for SVM and 100 lb/hr for LVM, an additional correction would be needed to make PM CEMS serve as a more appropriate surrogate. Since, during PM CEMS data collection, metals emissions were less than during the performance test, the metals PM correlation described in the NODA must be adjusted by the ratio of the metals feed rates during data collection to the performance test metals feed rates. Therefore, the proposed corrections for the PM CEMS site-specific limit would be the least of PM (0.015/0.003=5), SVM [(55/27.5)x(100/40)=5], and LVM [(100/50)x(200/100)=4], or 4.

Without these corrections, we believe PM CEMS should not be used to establish non-compliance with metals emissions limits since it would be such a poor surrogate. At best, it could only serve as an indication that metals emissions could have increased and may require additional evaluation or testing.

CS6A-011 (3) The Agency has previously shown that particulate emissions are a conservative indicator of metals emissions. Increased metals feed produces a less-than-proportional emissions increase for that pollutant (See EPA's May 2, 1997 NODA Attachments). Likewise, EPA believes "...that, as PM emissions increase, the ratio of emissions of each HAP for which PM is an operating parameter limit...[including SVM and LVM]...to PM emissions either is constant or decreases." 62 FR 67799. Existing proof of these conservative relationships between metals feed and metals

emissions and metals emissions and PM emissions, demonstrates the unnecessarily conservative nature of EPA's ratio calculation approach. Restricting the extrapolation to some arbitrary fraction of the MACT floor PM emission standard would simply be an unnecessary layer of conservatism on top of the inherently conservative nature of the known relationships among metals feedrates, PM emissions, and metals emissions. CKRC strongly believes that prescribing any ratio less than the full amount (100%) required to reach the MACT floor for any pollutant would be arbitrary and illegal.

CS6A-015 (3) The "rationale" for site specific PM standards builds on an alleged correlation between PM emissions and heavy metal as well as dioxin/furan emissions. An argument can certainly be made that in order to minimize (non-volatile or refractory) metal emissions one should reduce total particulate matter emissions (a qualitative correlation only: cutting PM output in half will not necessarily reduce metal emissions by half). This is where the multi metals CEM can prove especially beneficial to all interested parties. If metal emissions are measured continuously there is no need to rely on other operating limits.

CS6A-018 (3) As detailed in our previous comments, SVM and LVM concentrations out the stack are related to feedrates and feed composition not PM. CWM believes that the Agency should not set site specific limits for PM, rather rely on feedrate limits for SVM and LVM and the MACT limit for PM. The variance procedure discussed in this NODA to address these concerns, lacks scientific rationale to make a determination on how this would effect the operations of our facilities.

CS6A-029 (3) Finally, the absence of metals feedrate monitoring requirements would adversely affect EPA's ability to enforce the LDR dilution prohibition under the Resource conservation and Recovery Act of 1976 (RCRA), and work in direct conflict with proposals discussed in a previous NODA to reduce metals feedrates over time, consistent with EPA's waste minimization and pollution prevention policies.

CS6A-003 (4) 10. The final rule needs to provide flexibility in case PM CEMS do not work on certain processes. Kodak does not believe the available data support the ability of PM CEMS to measure PM on wet stacks. Kodak is supporting an effort to collect data which will help determine if the application of PM CEMS to wet stacks is practical. Additionally, we believe there are still insufficient data to conclude that PM CEMS will work on all other applications, particularly very low PM emitting stacks. This is particularly important since some facilities could have extremely low PM CEMS limits due to the site-specific standard setting process. Therefore the final rule needs to provide some flexibility in case PM CEMS do not work on certain stacks.

CS6A-007 (4) We note that our comment here is consistent with the proposal put forth by Safety-Kleen, Holnam, and CKRC to include an equivalency determination procedure in the final rule. Both proposals recognize that EPA's approach should be to reach a specified environmental objective (i.e., a specified level of emission reduction and a monitoring method that ensures that this reduction is met). The Agency should allow sufficient flexibility for facilities to reach this objective in the most efficient manner. The flexibility inherent in the equivalency determination proposal and our comment here on CEMS monitoring allows facilities to do this without sacrificing environmental quality.

CS6A-012 (4) Provision That Would Allow A Combustion Unit Not to Monitor Using PM CEMs If Not Technically Achievable: As we discussed earlier, the MIP members question whether the Agency has established an adequate "technical record" to support a PM CEMs requirement in the MACT hazardous waste combustion rule. In fact, the Agency itself questions whether the Agency is ready to require PM CEMs on incinerators with waste heat boilers and appears inclined to grant a waiver for such machines, and address them as part of the Phase II hazardous waste combustion rulemaking. (We would also suggest that based on the Agency's "technical record" for requiring PM CEMs on incinerators with wet stacks, a waiver should also be granted for these units, until adequate information is presented in the record and made available for comment.) Because of this uncertainty, the MIP members want to know what happens if, after installation of the PM CEMs on their combustion units and after the one-year trial period, the data indicates either on a particular unit or on a class of units that the PM CEM, through no fault of the combustion facility owner/operator, does not work. The NODA does not appear to address such a situation. While the Agency may expect PM CEMs to work on all hazardous waste combustion units, the MIP members are less convinced. Therefore, the MIP members would urge the Agency to include a provision in the regulations that would allow a particular combustion unit (or class of units) to be excused from the requirement to monitor PM using a CEM, if after conducting the requisite testing, the PM CEM just does not work. The MIP members would not object if specific criteria were included in the regulations that would define these circumstances. Without such a provision, the MIP members would be concerned about the potential consequences they may face.

CS6A-016 (4) The EPA should have an alternative procedure to determine compliance for waste combustors with feeds containing only organic constituents. As stated in our comments to the revised technical standards for Hazardous Waste Combustors that EPA announced in the May 2, 1997, Federal Register (62 FR 85 at 24212-24254), facilities that feed non-metal bearing streams should neither have requirements of the proposed PM standards nor require PM CEMS. We believe, as stated in previous comments, that the MACT standards should regulate hazardous air pollutants (HAPs), which does not include PM. This latest notice of data availability (NODA) in section IV 6, now states that by controlling PM this controls the semi-volatile and low volatile metals. It also states that by controlling PM the standard will control dioxin and furan (D/F) and Hg only when using carbon injection as a control. As shown in the previous CMA comments, PM does not correlate proportionately to any HAP and should not be used as a surrogate.

CS6A-030 (4) Revising PM control device operating parameter limits to correspond with a higher projected PM CEMS operating parameter limit should be allowed but not required. For example revising the PM control device operating parameter limit(s) may not be feasible for some PM control systems such as HEPAs. To use this type of methodology, there must be a known continuous and smooth relationship between the emissions levels resulting from the control device and the control device operating parameter level, under all off-gas conditions expected for normal operations. For HEPAs, there is usually only some Yes/No indicator that indicates that the HEPA is functional or not, such as abrupt decrease in pressure differential, exceeding the manufacturer s rated pressure differential limit, radionuclide activity detection indicating a breach of the filter, or temperature increase beyond the manufacturer's specified limit. There are no operating parameters for HEPAs that correlate with efficiency (i.e., emissions) in normal operation. The rated efficiency or better is attained for all conditions within the manufacturer s specification. There is concern that requiring the use of this control device operation parameter adjustment methodology for sources using HEPA

filters will unnecessarily complicate an already complicated CEMS compliance methodology. EPA should allow the methodology by which revised operating parameter limits are achieved (based on revised PM CEMS operating parameter limits) to be negotiated between the applicable regulatory agency and the regulated source and used at the discretion of the owner/operator. In any case, the source owner/operator should be required to demonstrate through revised performance testing, that the revised control device operating parameters will not cause an exceedance of the standards (or operating parameter limit).

CS6A-030 (4) To provide flexibility, if possible, the rank statistics method used to determine the operating parameter limits should be available to owners/operators. Some of DOE's mixed waste incinerators are expected to have very low PM emissions but high PM variability, both because of high feed variability and batch feeding modes. This may also make it difficult to set a reasonable operating parameter limit by the rank statistics or traditional standard setting methods alone. These concerns particularly apply to DOE sources, which control PM emissions to very low levels as part of its strategy to control radionuclide emissions as well as the emissions of pollutants covered by this proposed rulemaking.

Summary

Comments concern EPA's proposed use of the particulate matter CEMS as an operating parameter limit for the particulate matter, SVM, and LVM standards.

Response

EPA has since abandoned this approach, largely due to the concerns commenters expressed.

11. PM CEMS Final Report

a. Outlier Identification is Unclear

Comments

CS3A-006 (1)
III. Data Set is Suspect or Unrealistic. Continental questions the usefulness of the data collected at the DuPont incinerator for several reasons. First, and foremost, numerous runs were removed from the data without explanation. Other data was considered outlier (approximately 20%) and was similarly removed without adequate explanation. Continental notes that this data may, in fact, be representative of actual operating conditions at incinerators. EPA must provide a clear, cogent explanation for its data quality management prior to imposing the results of that data on any combustor.

CS3A-012 (3)(c) Cyanamid is similarly very concerned that the PM CEMS tested only meet the specifications of Draft Performance Standard No. 11 (DPS-11) with a significant amount data deleted as outliers". This approach is only acceptable if the same data screening/deletion is available for our use in routine regulatory compliance.

CS3A-012 (3)(c) Without significant data outlier removal these CEMS did not fully meet the required Draft Performance Standard No. 11 in a dry gas stream.

CS6A-008 (1) The rate of occurrence of "Outlier Data" seems excessively high. For the first calibration test, 7 of the 37 paired runs (or 19 percent) of the data were discarded as "Outlier." For the second calibration test, 2 of the 17 paired runs (or 12 percent) of the data were discarded as "Outlier." Some explanation based on comparable data sets should be provided to justify this rate of "Outlier Data."

CS6A-009 (1) If EPA is going to include September, October, and November data in the RCA analysis, the outlier data for these three months should be included in the list on Page 2-10. September has 2 of 10, October has 1 of 11, and November has 2 of 9. The report should also refer to Table 2-3, where the data are to support this list. Also, the report of 2 of 10 outliers for January is misleading since there were only 5 paired trains. The rest were single trains. Thus, the report should indicate that 2 of 5 were outliers and the totals should be reported as 9 of 67. This is a much different (40% versus 20%) percentage removed based on RSD differences. In addition, CRWI finds it interesting that the September-October-November data was not used in the calibration. These three months had similar numbers of RSD outliers as the total. Thus, the number of outliers does not appear to justify removing this data for the initial calibration. The justification used on Page 2-1 cites variability and questionable credibility of the Method 5i data. If there are problems in developing the techniques for Method 5i, perhaps this method should undergo a Method 301 validation procedure before this method is required. Moreover, if EPA's contractor had problems with the new method, how many problems are expected while other stack samplers learn the new techniques. This may further complicate an already complicated calibration procedure.

CRWI realizes that the September-October-November data are suspect. However, there is little in

the initial analysis of the data to suggest problems (the number of RSD outliers were "normal," etc.). Only after analyzing the data and comparing it to later data, did the Agency discover problems. CRWI realizes that this was the first time that PM monitors have been installed on stacks in the U.S. and there was a substantial learning curve. CRWI suggests that the same learning curve will occur at each facility when they install these instruments. CRWI suggests that facilities be allowed the option of discarding entire data sets during their initial calibration, based on similar criteria that the Agency used to discard the September-October-November data. This could allow for a learning curve without forcing the facility to use all data collected for calibration. CRWI suggests that if entire data sets need to be discarded, the Agency build in flexibility to allow additional time to gather replacement data. In addition, CRWI suggests that the Agency clarify the criteria that can be used to discard data.

Summary

CRWI realizes that the September-October-November data are suspect. However, there is little in the initial analysis of the data to suggest problems (the number of RSD outliers were "normal," etc.). Only after analyzing the data and comparing it to later data, did the Agency discover problems. CRWI realizes that this was the first time that PM monitors have been installed on stacks in the U.S. and there was a substantial learning curve. CRWI suggests that the same learning curve will occur at each facility when they install these instruments.

Response

EPA has identified new criteria for identifying outliers. These procedures have been identified in Method 5i and will be incorporated into the revision to the DuPont report. These errors are attributed to the developmental (trial-and-error) nature of the demonstration tests and EPA does not believe users of PM CEMS will experience similar problems.

b. Drift Check Data is Missing

Comments

CS3A-010 (1) Section 1.1, page 4 of 12. The six-month endurance test includes the daily calibration drift (CD) or zero drift (ZD) required by the regulation (Appendix to Subpart EEE, FR17526). However in Section 3.3, page 5 of 7, where the elements of the CEMS endurance testing are listed and discussed, the daily CD and ZD testing is not included. Without successfully conducting this daily testing the instruments will not have been demonstrated to comply with the performance specification.

CS6A-009 (2) CRWI also has concerns about certain PS 11 requirements that were not discussed in the DuPont report that may alter the conclusions of the report. In particular, the Agency stated that monthly Actual Calibration Audits (ACA) were performed, but these data were not included in the reports. Without the data, it is difficult to determine if all instruments passed ACA requirements. In addition, Appendix III – Procedure 2 requires daily zero drift checks, calibration drift checks, and other procedures to determine if a monitor is "out-of-control." These data were not included in the report either. CRWI suggests there is a wealth of data from the DuPont study that has not been made

available to the public for review and analysis. In fact, CRWI does not know if the Agency has analyzed this data and compared it to PS 11 requirements. Such analysis must be conducted and made available to the public for comment before PM CEMs are required as a part of this rule.

On page 1-14, the report states that actual calibration audits (ACA) were performed monthly. None of these data are included in the report or the appendices. How were the ACAs performed for each instrument? Did any unit fail an ACA? Without these data, it is not possible to determine if the units were "out-of-control" as defined in Appendix III – Procedure 2 and, thus, met PS 11 criteria. These results could have a significant impact on the on-line time. CRWI suggests that the Agency make this data available for comment and include any new analysis on how this may impact on-line time.

CS6A-025 (2) In general, the ETC supports requiring additional data quality objectives related to calibration drift for a proposed new "Procedure 2" of Appendix F to 40 CFR Part 60. The ETC, however, urges EPA to publish for comment the calibration drift criteria. Our comments above regarding PS11 are also applicable here, in that EPA needs to make certain that these data quality objectives are demonstrated and achievable. We also note that EPA does not appear to have used these drift criteria in the demonstration tests performed to date. EPA needs to make certain that the demonstration test data supports the achievability of the drift criteria.

Summary

Drift data was missing or could not be easily located.

Response

The drift data was provided in the hard copies of the Appendices. The revised report will summarize the calculated drift for each applicable monitor.

c. Correlations are Based on Limited Data

Comment

CS6A-001 (3) A careful analysis of the December 96 - April 97 data shows that the difference in correlation slopes for the initial and second calibrations (Fig. 2-4) is the result of only one day's data (March 19). Apparently, the conclusion was made that the high instrument response was due to a significant change in particle characteristics and/or size distribution. While we have heard various theories to support this contention (some of which are contrary to our understanding of control devices), we can find no real data in the report. Were particle size distributions and other characteristics actually measured on this day? If not, we suggest there may have been some other explanation for this anomaly. We cannot accept the conclusion that this instrument requires logarithmic correlations or multiple calibrations based on one day's tests (4 data points out of a total of 102). Had the instrument simply been inoperational on this day (as was the case with half of the other instruments), then the initial and second calibrations would be as shown in the attached sheet labeled "ESC Cal 1 Cal 2, less March 19 Data, 1/23/98." As can be seen from the graph and accompanying data, the instrument clearly meets the PS-11 correlation coefficient, confidence and

tolerance intervals, with very similar slopes and intercepts.

Summary

A careful analysis of the December 96 - April 97 data shows that the difference in correlation slopes for the initial and second calibrations (Fig. 2-4) is the result of only one day's data (March 19).

Response

This assessment is correct.

d. Clarify Selection of Data Used for Correlations

Comment

CS3A-004 (4) At this time, CRWI supports the Agency's efforts to base calibration and RCA demonstrations on actual conditions (acm). This more closely matches what the sensors see. Correcting actual conditions to standard conditions (temperature, pressure, moisture, and oxygen) can be made after calibration. However, as stated earlier, CRWI has reservations about calibrating to different units of a standard than will be used for compliance. CRWI will continue to examine this issue and may provide comments at a later date. CRWI believes that EPA should correct the database and recalculate the initial calibration curves using the September, October, and November data as appropriate discarding only the RSD data. Then EPA should use the November, December, January, etc., data to evaluate the RCA concept as developed in the proposed rule. EPA should attempt, wherever possible, to follow the proposed guidelines (based on the April 19, 1996, proposed rule) for all ACA and RCA tests. By following this path, EPA should have a better understanding of the accuracy of these CEM's by the end of the demonstration project. In addition, CRWI encourages EPA to explore alternative calibration techniques for these CEM'S.

CS6A-009 (4) To simulate the calibration guidance as outlined in the NODA, the first 15 data points of the "clean" data set were chosen as our first calibration (the one due in the first six months of operation). A regression analysis was performed and confidence intervals (CI) and tolerance intervals (TI) were calculated. CRWI did not feel it was fair to subject these data in this analysis to the "three levels of PM emissions" requirements of PS 11 because the demonstration project was not designed to accomplish this. The second 15 data points were selected and the second calibration relationship was developed. The first two sets of 15 were combined and a third analysis was performed on the first 30 data points. The third 15 data points were selected and a fourth analysis run. Finally, all 45 data points were included in the analysis. This simulation was designed to follow the three calibration requirements for light scattering instruments as defined in the NODA.

Summary

EPA should provide better clarification of which runs were used for which monitor to calculate the correlation statistics.

Response

EPA will provide a revised report that follows the requirements in PS-11 for calculating the necessary statistics.

e. *The Term "Quadratic" is Used Erroneously*

Comment

CS6A-008 (5) On page 2-29, last sentence of the first paragraph, it appears that "quadratic" should be replaced by "logarithmic" as the latter method was employed on the light-scattering monitor data.

Summary

See brief comment.

Response

This will be revised in the final report.

f. *Suggestions that Would Enhance Review*

Comments

CS3A-010 (6) In addition, inspection of the equations for calculating the calibration curve and related statistics in proposed PS-11 indicates that these are simply the results of multiple linear regressions with an intercept against either the measured concentration alone or with its square; the correlation coefficients and standard deviations are the correlation coefficients and standard error (of the regression) calculated by standard spreadsheets. CKRC has validated a few commercially available spreadsheet regression algorithms and suggests that EPA provide a worked example to be used in validating a commercial spreadsheet. It is generally preferred to use an internal algorithm because of rounding errors. As the equations are currently formulated, CKRC expects that the calculation process is needlessly complicated and fraught with significant error.

CS3A-010 (6) At Section 4, page 17 of 20, CKRC is concerned that "spot checks of reduced raw data" do not provide adequate evidence that all the data has been properly reduced and that transcription errors between the spreadsheets and other programs that use the results have not been made. In addition, the verification should involve confirmation that the PM CEMS averages correspond to the actual manual method sampling time and not the entire run start and stop times. While the probe port and leak check times are relatively inconsequential over the course of a 4-hour test, some of the runs in this analysis are as short at 18 minutes with a 12 minute turn time shown on the field sheets. If a single 30 minute PM CEMS average is compared with an 18 minute manual method sample that is actually comprised of the first and last 9 minutes of the overall run time, significant error could be introduced. Analysis of PM CEMS graphics provided in the report appendices reveals a pronounced periodicity to the PM CEMS data, so there could be significant error introduced if the PM CEMS data selection has not been properly done. CKRC requests that EPA add to the report a description of how the PM CEMS data was reduced and analyzed. CKRC also suggests EPA prepare comparisons of the various PM CEMS outputs. Even though each PM

CEMS has its own output characteristics, they must be related since they are all supposed to be measuring particulates. Verifying whether the relative response characteristics of each PM CEMS are the same would identify any differences which could be researched to improve future validation work.

REPT .CS6A-001 (6) One further comment on the test data is in order. As a small company which has already invested significant resources in time and equipment to this program, we do not have the additional resources to transform all the data from the format provided (numbers only) to spreadsheets from which detailed analyses can be performed. We see no reason why the data could not have been delivered in the original spreadsheet format, complete with formulas, etc, and we request that future test results be provided in this form.

CS6A-004 (6) EPA should ensure that data are widely available to the public. The Notice of Data Availability claimed that documents cited in the Notice were available on the Internet (at http://www.epa.gov/epaoswer/hazwaste/combust/cems). Unfortunately, none of these documents were available at the indicated site until shortly before the comment deadline. While we recognize that EPA met its statutory responsibility by placing the documents in the docket for this rulemaking, prompt electronic posting would have enhanced the ability of interested stakeholders throughout the U.S. to study and comment on the monitoring data.

Summary

The report should provide a description of how the PM CEMS data was reduced and analyzed. The data delivered in the original spreadsheet format or a commercially available spreadsheet, complete with formulas, etc. would enhance review.

Commenters also suggests EPA prepare comparisons of the various CEMS raw outputs.

Response

EPA will try to meet these requests in the future.

g. There are Errors, Omissions, Inconsistencies in the Report

Comments

CS3A-004 (7) April 7, 1997 Jim Berlow USEPA Waterside Mall Mail Code (5302W) 401 M Street, SW Washington, DC 20460 Dear Mr. Berlow: The Coalition for Responsible Waste Incineration (CRWI) would like to thank EPA and its contractors for the openness and willingness to work with us on the CEM's demonstration projects. As you know, EPA's contractor (EER) for this project has been a part of two conference calls with industry representatives and EPA personnel have met with CRWI once to discuss specific discrepancies in the data base. We think most of the concerns in the Method 5 data base have been identified, but the raw output data from the CEM's has yet to be examined in detail. Thus there could be additional problems that have not yet been identified. Given that some of the data problems were associated with the handling of the raw data, while others were associated wit h data transcriptions, it becomes difficult to determine what part of the data set is

accurate without completely redoing all calculations. CRWI suggestions that for an issue as important as CEM's, the Agency and the public must be able to trust the data from which a regulatory decision is made. To this end, CRWI suggests that EPA withdraw the report (Particulate Matter CEMS Demonstrations: DuPont Inc., Experimental Station On-site Incinerator, Wilmington, DE), correct the data, and reissue the report with a new comment period. With a corrected report, both the Agency and the public will be able to judge whether the CEM's tested are accurate and reliable on the facilities tested. If EPA is unwilling to withdraw the report, CRWI suggests that EPA extend the comment period to give reviewers the full 30 days after the correct data has been provided. Thank you for considering this request. If you have questions, please contact me. Sincerely yours, Melvin Keener Executive Director cc: CRWI members

CS6A-008 (7) The text state that the first calibration covered PM concentrations from 5 to 75 milligrams per dry standard cubic meter (mg/dscm) and the second covered concentrations from 5 to 55 mg/dscm (corrected to 7% oxygen). However, on Table 2-3, the highest average run value reported for PM concentration is 49 mg/dscm during the first calibration. Similarly, the range for the second calibration in April was 7 to 35 mg/dscm. The inconsistency between the text and Table 2-3 needs to be resolved. Table 2-3 does not indicate whether the data is corrected for oxygen concentration; the oxygen concentration values should be shown on this table and the results should be footnoted as to whether the data have been corrected for the oxygen concentration.

CS6A-009 (7) Table 2-13 does not appear to match the text (page 2-35). ...The text on page 2-38 and the caption of Figure 2-29 needs to include wording that the RSD outliers have been removed from the data set before plotting and any statistics were calculated.

...<u>The detailed particle size distribution data mentioned on page 2-40 does not appear to be in the appendices on the CD-ROM provided</u>. This data should be included in the next version of the report. It should also be provided to Region IV and the risk assessment group for possible inclusion in wet-dry deposition modeling for site-specific risk assessments. The data in the tables appear to confirm the limited data submitted to the Agency by CRWI members on an earlier occasion.

CS6A-030 (7) Equation 24 and Equation 25 (62 FR 67812). The equations are incorrect or missing.

<u>Summary</u>

There are apparent minor inconsistencies in the report.

<u>Response</u>

These minor inconsistencies will be addressed in the final report. Data in the final report will be presented in a consistent, complete, and less ambiguous manner.

h. *<u>Testing Did Not Completely Cover Four Seasons</u>*

<u>Comment</u>

CS6A-009 (8) The testing at DuPont did not cover four seasons (page 1-11). It covered fall,

winter and spring. This is a minor point but the report should not state that it covers four seasons when it fact it did not.

Summary

The demonstration test did not completely cover four seasons, as indicated in the report.

Response

EPA does not agree that seasonal changes will effect the PM CEMS measurements and therefore does not understand the need for testing PM CEMS during all four seasons.

i. Report Discrepancies Make it Impossible to Understand EPA Conclusions, Reissue The March 1997 NODA

Comments

CS3A-001 (9) The Cement Kiln Recycling Coalition (CKRC) has played an active role and provided significant comment at the various stages of the HWC MACT Rulemaking process. On March 21, 1997, EPA published in the Federal Register (62 FR 13776) a Notice of Data Availability (NODA) on the HWC Continuous Emissions Monitoring Systems (CEMs), which includes several volumes of data and information, with only a thirty (30) day comment period. Simply attaining and reviewing the information was itself a time-consuming activity. However, as we have attempted to analyze and understand the data volumes corresponding to the published status report, CKRC has found numerous errors, discrepancies, and deficiencies in the reports that make it impossible to adequately understand the information provided or ascertain the accuracy of the Agency's conclusions. Some of these problems include: * Data presented for individual CEM system summary sheets, master sheets, calibration sheets, and raw data sheets are not consistent, leaving the public unable to know which data set is the correct one to comment on; * The start and stop times of individual runs are not clearly delineated on the summary sheets, making it impossible to determine the sampling time or check the data reduction time expressed on the CEMs output graphs in volume (appendices part 2 of 2); and, * The NODA does not provide CEMs readings for particulate runs that were eliminated, leaving the public with only partial information on which to develop comments. These errors and deficiencies make it very difficult to conduct a thorough review of the NODA information or provide meaningful comment. Forcing the public to submit comments based on inadequate information regarding an issue as important the accuracy and reliability of CEMs is a clear violation of the Administrative Procedure Act (APA). Furthermore, this problem is exacerbated by the "rushed" manner in which this public comment period is being conducted. There is no court-ordered deadline to promulgate the hazardous waste combustion MACT standard, or a specific portion of the rule, by a certain date, and thus, no legitimate reason to establish an insufficient thirty (30) day comment period. Because of the errors/deficiencies in the NODA and the inadequacy of the comment period to work through these errors, CKRC respectfully requests that the Agency withdraw the pending CEMs NODA, carefully review the information, correct the data errors, and reissue a more complete NODA once the Agency is able to provide the public with adequate, complete and correct information to facilitate the 'generation of meaningful comment. If the Agency is unwilling to withdraw the notice, CKRC suggests the Agency make the needed

changes and republish the NODA, giving the public a full thirty (30) day comment period on the correct and complete information. As the comment deadline is fast-approaching, I would appreciate any advance notice on a decision regarding this request. Thank you for your consideration. If you have questions, please contact me or Michelle Lusk of my staff.

CS3A-004 (1)(a) Data Repeatability Apparent from the tests at DuPont is the fact that MM5 conducted under similar conditions would not yield similar results. One example is the December runs. The December runs were all done with similar feed and constant APC conditions (low EDV voltage). Yet the individual MM5 train readings varied from -3.36 to 235.45 (mg/dscm, uncorrected for oxygen). Four of the nine runs were not included due to RSD (Relative Standard Deviation) differences above 30%. In fact, even under identical conditions, i.e. paired runs, EPA was forced to discard 20 percent of the data in order to satisfy the requirement that matched data points should be within 30 percent of each other. The repeatability of results from the modified method 5 is thus in question. CRWI suggests that a proper validation of MM5 could address the question of repeatability.

CS3A-004 (9) The following list is designed to provide those differences for the record.

1) Table 2-2. The MM5 values for Runs 2 and 11-Rerun do not-match the data reduction sheets provided in the appendix. From an initial glance, it appears that these two columns were switched. EER stated that when they examined the data, it appeared that the MM5 sample numbers were reversed. This was based on the output from the CEM'S. EER decided to switch the samples to stay consistent with the CEM's data. EER and EPA should not switch data between calibration runs bas ed on the output of the instrument that is being calibrated. Perhaps a sample labeling error was made, but that is extremely difficult to determine. For a demonstration project designed to show that PM CEM's will work on HWC stacks, switching data on the initial calibration does not follow good scientific method. CRWI suggests that the data either be initially discarded or discarded as part of the statistical outlier discussion. However, data should not be rearranged to so that the initial calibration is more accurate.

2) Table 2-3. The results from MM5 Train 'A' for Runs 6-Rerun2, 16, 17, and 18 do not match the values from the data reduction sheets in the appendix. It appears that the values have been shifted one column. Once EER places corrected data in the table, the averages for MM5, may need to be recalculated.

3) Tables 2-1 4, 2-1 5, and 2-1 6. The last three rows of data on these tables do not match the data from Table 2-3. It appears that the "y" column has been shifted to the "x" column. The derivation of the data in the "y" column is unknown. EER verbally provided the correct data for these last three rows of these tables. However, the regression analysis for these three tables may not be correct and should be rerun.

4) Table 2-22. The values for MM5 in this table do not match the data reduction sheets in the appendix. EER stated that the data in this table is correct and the data on the data reduction sheets in the appendix are incorrect.

5) Table 2-30. The data for some of the ESA CEM readings, all of the Verewa CEM readings, and

some of the Durag, ESC, and Sigrist CEM readings do not match the data found in previous tables. EER recalculated the readings from the beta units. This was due to a failure to properly match the timing of the sampling time of the beta units (batch samplers) with the MM5 probe traverses. It is unclear why the CEM readings from the light scattering units change from one part of the document to another. EER and EPA should reconcile these differences to determine the correct data before attempting to develop initial calibrations or relative calibration audits.

6) Tables 2-31 and 2-32. None of the MM5 values match the data reduction sheet. This is because EER used a 1.5 multiplier for all values to correct the readings to 7% oxygen. All previous tables have been in mg/dscm, uncorrected for oxygen. Oxygen concentrations were available for each run. If the data is to be corrected to 7% oxygen, then the oxygen concentration for each run should be used instead of a scaling factor that only changes the magnitude. Using the same values does not correct the data for oxygen. In conversations with EER, they suggested that a better way to calibrate the instrument would be to use mg PM/acm against MM5. CRWI agrees that this approach should be examined. However, CRWI is concerned about calibrating in one set of units (mg/acm) and measuring compliance in another set of units (mg/dscm at 7 % oxygen). CRWI will continue to work with the Agency to make sure the two processes are compatible.

7) There are also numerous differences between the CEM readings in Tables 2-2 and 2-3 and the average CEM readings calculated from the data in the appendix. CRWI believes that the data in Tables 2-2 and 2-3 represent earlier work that was not corrected in the later stages of the report but were not changed in these tables. However, without having the correct data and having that referenced to data in the appendix, it makes it impossible to follow the data flow and determine the validity of the data taken.

8) Data from the Sigrist unit was on a different scale in the September calibrations than it was for all other calibration runs. After the September calibrations, the Sigrist technician adjusted the scale. However, this put the Sigrist readings on two different scales during the initial calibration. To solve this problem, EER multiplied the September readings by 28.5 to correct the scales. CRWI believes that this correction is rational, given our own analysis which shows that all three light scattering units track very closely, except for scale. These data inconsistencies make it difficult to determine which data is correct and which is suspect. EER has indicated that the data in the last tables are their best data. CRWI believes that for a decision as important as mandating CEM' S, EPA and EER should develop a data base that is accurate and defendable. Otherwise, any regulatory decision is subject to challenge.

CS3A-007 (9) Accordingly, affected parties were unable to evaluate any test data when providing comments on the April 19, 1996 rulemaking. For PM, the NODA provides preliminary, draft results from the ongoing demonstration project. The Agency states in the notice that: "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 represent EPA's final views." (p. 13776) By presenting this draft report and emphasizing its preliminary nature and the fact that it does "not represent EPA's final views," EPA is essentially providing only the opportunity for the public to comment on the methodology used during the demonstration project approach and the preliminary data collected to date. Even commenting on this information is difficult due to the

numerous data errors as documented by CKRC in their errors, no conclusions can be drawn as to the ultimate viability of PM CEMS and it is insufficient as a basis for requiring PM CEMS in a final rulemaking. It is further insufficient for reaching a regulatory conclusion, regardless of the outcome of the demonstration project, because it is based on the experience at a single facility. We also continue to be concerned about using a demonstration test at an incinerator to reach conclusions about the viability of PM CEMS at cement kilns. Examples of these differences include differences in aerosol chemistry and particle size distribution and are described in more detail in CKRC's comments.

CS3A-009 (3)(b) The NODA does not provide sufficient information to support the mandatory use of PM or mercury CEMs in the final rule. The information provided in the March 21, 1997 NODA does little to change the conclusion reached by Holnam (and reflected in our comments) that EPA does not have sufficient information to require CEMS monitoring for PM and mercury. Both PM and mercury CEMS are untested monitoring methods for cement kilns in the United States in long-term operating conditions. To test their reliability and accuracy, EPA justifiably initiated A demonstration project for PM and mercury CEMS (61 FR 7232, February 27, 1996). Yet EPA proposed to require the use of this monitoring method as part of its proposed rulemaking (61 FR 17358, April 19, 1996) well before any preliminary results would be available from the demonstration projects. Accordingly, affected parties were unable to evaluate any test data when providing comments on the April 19, 1996 rulemaking.

CS3A-010 (1)(a) Third, a facility would not be allowed to make modifications without conducting a full field validation, and the Agency should be subject to the same requirement. [FN7: CKRC located the document entitled "Evaluation and Demonstration of a Modified Method 5 Filter and Handling Procedures, "however, this document is inadequate to fully understand the basis of EPA's analysis.

CS3A-010 (9) IV. Errors, deficiencies, and discrepancies in the data reported by the Draft Status Report make it impossible to fully assess the accuracy and meaning of the DuPont demonstration data and calculations. In section V, CKRC provides detailed comments and discussion on issues raised in the March 21, 1997 Federal Register Notice and supporting documentation, focusing on the Agency's demonstration approach as outlined in the "Status Report No. IV:, Particulate Matter CEMS Demonstration." Finally, CKRC provides concluding remarks.

CS3A-010 (9) IV. ERRORS, DEFICIENCIES, AND DISCREPANCIES IN THE DATA REPORTED BY THE DRAFT STATUS REPORT MAKE IT IMPOSSIBLE TO FULLY COMMENT ON THE AGENCY'S DEMONSTRATION APPROACH OR FULLY ASSESS THE ACCURACY AND MEANING OF THE DUPONT DEMONSTRATION DATA.

The following is a list of errors, deficiencies, and discrepancies identified in the NODA's Status Report and supporting appendices to date. Also, where applicable, CKRC provides comment and discussion on these issues in the next section. CKRC understands from EPA that it is aware of many of the inconsistencies, but did not believe it essential to correct these problems prior to receiving public comment on this NODA. This is a source of concern to CKRC as the number and types of problems identified cause us to question the accuracy of all the information provided. It also raises serious questions regarding the sufficiency of the QA/QC practiced throughout this demonstration.

Finally, these errors made it extremely difficult to fully assess the methodology or approach of the PM CEMS demonstration at DuPont.

1. Data presented for individual CEM system summary sheets, master sheets, calibration sheets, and raw data sheets are not consistent, leaving the public unable to know which data set is the correct one to comment on. A few examples include:

* Table 2-2 -- Method 5 values for Runs 2 and 11 do not match the data reduction sheets provided in the Appendix.

* Tables 2-2 and 2-3 -- Several differences between the CEMS readings and the average CEMS readings calculated from the data in the Appendix.

* Table 2-3 -- Several Method 5 Train A Runs do not match the values from the data reduction sheets in the Appendix.

* Table 2-3 -- Data in Tables 2-14 thru 16 does not match.

* Table 2-22 -- Method 5 values do not match the data reduction sheets in the Appendix.

* Table 30 -- Much of the data does not match data found in previous tables.

* Table 2-31 and 2-32 -- None of the Method 5 values match the data reduction sheets.

2. The start and stop times of individual runs are not clearly delineated on the summary sheets, making it impossible to determine the sampling time or check the data reduction time expressed on the CEMS output graphs in volume 3 (appendices part 2 of 2).

3. The NODA does not provide CEMS readings for particulate runs that were eliminated, leaving the public with only partial information on which to develop comments.

4. EPA's basis for concluding that during the Lafarge, Fredonia testing "much of the [particulate measurement] error comes from sample recovery analysis" should be published for comment.

5. Complete data needed to recalculate the compliance percentages reported in Table 2 (62 FR 13782) were not provided in the report.

6. CKRC is unable to locate the HCl data the report indicates was taken at Section 1, page 3 of 11.

7. Only one particle size distribution (PSD) was reported for the DuPont facility. The Agency should provide a reasonable basis for the Agency's assumption that this particle size distribution is representative and remained unchanged throughout testing.

8. CKRC could not locate the daily calibration and zero checks that were reportedly documented. Thus, we are unable to provide comment on the suitability of these findings.

9. EPA has not identified which filters were improperly identified and whether or not the runs could be salvaged. The recovery method should be described (Section 2, page 11 of 37).

10. EPA does not provide support for the assertion that the Scanning Electron Microscope (SEM) data demonstrate that even in upset conditions, the PM characteristics are not likely to differ enough to bias the PM results over the range of the CEMS calibrations.

11. Data needed to verify that the QA/QC objectives were met is not provided in the report.

12. EPA did not provide descriptions of how the PM CEMS data was reduced and analyzed.

13. Comparisons of the various CEMS output characteristics should be made and provided to the public.

CS3A-010 (9) On March 21, 1997, EPA published in the Federal Register (62 FR 13776) a Notice-of Data Availability (NODA) on the HWC Continuous Emissions Monitoring Systems (CEMS). CKRC herein provides comments on the NODA and the various documents published for comment

as part of this NODA. However, as stated in our April 10, 1997 letter to Jim Berlow, OSW, and subsequent 16, 1997 letter to Scott Rauenzahn, OSW, the numerous errors and deficiencies in the supporting documentation and the short thirty day comment period did not provide adequate opportunity for comment on the NODA[FN1]. As stated in our August 1996 Comments on the HWC MACT Proposal, CKRC is supportive of the development and implementation of CEMS to assist in keeping the public apprised of facility operations, provided the CEMS are proven reliable and accurate. CKRC believes that EPA's current PM CEMS demonstration program should be broadened to include long-term testing on one or more cement kilns. As is discussed in great detail in these comments, the operational, physical, and particulate characteristic differences between cement kilns and incinerators prevent the direct transfer of an incinerator PM CEMS demonstration to a cement kiln. [FN1: Publishing a regulatory proposal or notice, and failing to accompany it with sufficiently accurate and understandable technical information violates the Administrative Procedure Act (APA). Furthermore, this problem was exacerbated by the "rushed" manner in which this public comment period was conducted. There is no court-ordered deadline to promulgate the hazardous waste combustion MACT standard, or a specific portion of the rule, by a certain date. Thus, there exists no legitimate reason to establish an insufficient thirty day comment period.]

CS3A-010 (9) CKRC reminds the Agency of its continuing concern about the brevity of the comment period and the numerous errors identified in the NODA support information[FN1]. CKRC urges the Agency to correct the errors and deficiencies in the current NODA prior to its next publication. This step is important to ensure the public has an opportunity to adequately understand and comment on the data collected as part of the PM CEMS demonstration as it will serve as the basis for EPA's conclusions regarding the reliability and accuracy of PM CEMS. CKRC also encourages the Agency to consider the numerous issues and suggestions raised in these comments regarding technology transfer, the testing approach used, and data handling implemented during the PM CEMS demonstration. FN1. See CKRC April 10, 1997 and April 16, 1997 letters at Attachment 1.

CS3A-010 (11) D. Site-Specific Quality Assurance Test Plan Total Mercury CEMS Demonstration -- Holnam. Inc., Holly Hill, SC Facility, Volumes 1-2 EPA failed to give the public adequate notice to comment on both the Hg and PM test plans prior to conducting the demonstration projects, preventing any realistic possibility of augmenting or altering the testing parameters. The Agency only now formally published for comment the test plans for Hg and PM CEMS despite the fact that the demonstration projects began in September of 1996 and are scheduled to end this May 1997 (62 FR 13778). Based on our review of the test plan for Hg, CKRC strongly urges that the plan be revised to explicitly describe a process or mechanism for making field modifications to any and all aspects of the test, including the opportunity for public review and comment. As was apparent from the PM test program, numerous revisions were made in the field without receiving input which could have provided valuable insight into the impacts of these changes much earlier in the demonstration process. The PM plan also does not describe a rationale for these changes. The reports for both the Hg and PM CEMS test need to state where deviations from the test plan occur. Any impacts from these deviations need to be clearly described to ensure the public is able to understand these modifications. At Attachment 2 please find specific comments on the Hg test plan provided by a contractor to Holnam, Inc.

CS3A-011 (3) CMA's concerns are particularly heightened by the likely enforcement consequences

of the low levels of CEM performance experienced during the pilot study. Given this poor performance, units would be found in repeated noncompliance due entirely to inaccuracy and imprecision in the monitoring process. "Outliers" discarded in this evaluation process would be "violations" in the compliance setting. Such poor levels of performance raise serious questions also about why the Agency would want to require PM CEMS, rather than rely on superior existing methods. Certainly CEMS would not now add improved accuracy or reliability. More timely information is of no value if it is inaccurate or often unavailable. Finally, given that the hazardous air pollutants for which PM is being used as a surrogate pose only long-term, chronic health effects, this study raises anew the question of why such prompt, moment-by-moment knowledge of PM emissions is even relevant. CMA believes that this pilot study has provided valuable experience with PM CEMS. However, we believe that a great deal of work remains before PM CEMs are developed to the point of being ready for commercial use. CMA has, and continues, to suggest that EPA make the use of PM CEMs optional and that it promote the further development of CEMs by providing incentives to the regulated community sufficient to solicit their involvement in such development. EPA should work to develop a simpler, more straight forward regulatory system for owners and operators who choose to install CEMS. This would not only promote CEM development but would eventually result in benefits to the Agency, regulated community and public.

CS3A-011 (9) VIII. CONCLUSIONS EPA has provided a very short period for the public to review and comment on its CEMs NODA. While CMA has made a concerted effort to review and prepare comments on the data EPA has provided, a meaningful assessment of the performance of the CEMs has been precluded by the inadequacy and inaccuracy of the report that EPA has provided for comment. EPA should carefully examine all of the data and calculations presented in the report, prepare a corrected report, and provide for a minimum of thirty days for public comment on the corrected report. CMA believes using CEMs to demonstrate compliance will be feasible when the monitors are shown to be accurate and reliable, and when the value of specific monitoring data justifies the cost of CEMS. Based on the data in this notice, CMA believes that particulate matter (PM) CEMs have unacceptably poor accuracy and questionable reliability. We also question the need for mandatory use. Additionally, we are concerned that CEMs performance will be different on different HWCs and that the tests at the DuPont facility may not--despite EPA's claim--represent the worst case performance. Therefore, we oppose the proposed mandatory requirement for PM CEMs and instead propose that the use of the monitors be as a voluntary compliance tool. PM CEMs should only be used for compliance when a specific PM CEMs is shown to be accurate enough when used on a specific process. Should monitor technology improve and later tests show adequate accuracy and reliability on a range of HWCs, much wider use of PM CEMs could occur.

CS3A-011 (9) 1. EXECUTIVE SUMMARY CMA supports the goal of demonstrating compliance via accurate, reliable, and cost-effective methods. CMA recognizes that EPA is still in the early phases of evaluating the ability of various monitors to continuously evaluate stack particulate matter (PM) concentration in a hazardous waste incinerator. We appreciate the opportunity to comment on EPA's pilot test at this early time. The PM pilot study has provided information and experience upon which future tests, refinements, and developments can be based. As a first step, a corrected report and appendices are needed. CMA has thoroughly reviewed EPA's "Status Report - No. IV, Particulate Matter CEMs Demonstration" (February 12, 1997). CMA has attempted to verify the accuracy of data, calculations, and methodologies presented in the status report and associated appendices; however, CMA has been largely unsuccessful due to a number of data errors and

inconsistencies found in the report. In fact, CMA finds the data QA/QC in this report to be unacceptable, and believes that neither the Agency nor commenters can draw accurate conclusions from the data presented.

CS3A-011 (9) III. A CORRECTED REPORT AND APPENDICES ARE NEEDED
CMA has thoroughly reviewed EPA's "Status Report - No. IV, Particulate Matter CEMs Demonstration" (February 12, 1997). CMA has attempted to verify the accuracy of data, calculations, and methodologies presented in the status report and associated appendices. However, CMA has been largely unsuccessful in this effort due to a number of data errors and inconsistencies found in the report. In fact, CMA finds the data QA/QC in this report to be unacceptable, and believes that neither the Agency nor commenters can draw accurate conclusions from the data presented. CMA has participated in teleconferences on March 21, 25 and 26, 1997 with EPA's contractor, EER, to discuss the status report and appendices. While these have been constructive, EPA has yet to provide a corrected report and appendices. Examples of errors and inconsistencies found in the report are listed below: 1. Some of the data presented in Tables 2-2 through 2-44 appear to have been corrected for O2, while others have not. There are no annotations on the tables or discussion in the report to inform the reviewer which data is corrected and which is not. [FN1] [FN1: Calibration tests conducted prior to12/17/96 were not reported as corrected, whereas tests after that date were reportedly corrected. We do not understand the reason for the change. In principal, correcting to 7% oxygen should have no influence on the calibration as long as it is done consistently.

CS3A-011 (9) 2. The data for Runs 2 and 11-Rerun in Table 2-2 appear to be reversed, based upon data presented in the Appendix. It is unclear which data is correct. 3. The Train "A" data for Runs 6-Rerun 2,16,17, and 18 in Table 2-3 appear to be shifted one column to the right, based upon a comparison to the data presented for these runs in the appendix. 4. All of the September data for the Verewa instrument presented in Table 2-30 appear to be about one-half the values for the same runs presented in Table 2-2. Several data points for other instruments presented in Table 2-30 do not agree with the same runs presented in earlier Tables. 5. The Method 5 "A" data presented in Table 2-32 for Runs 45, 47, and 49 do not match the data presented in the Appendix. 6. The "A" and "B" data for Run 40 presented in Table 2-32 appear to be reversed. 7. None of the November Method 5 data presented in Table 2-22 seems to match the data on the data reduction sheets in the Appendix. 8. The data in the last three rows of Tables 2-14 through 2-16 appear to be incorrect. 9. In section 2.5.2 of the status report discussing the monitor, EPA states that "the sample dilution line was inadvertently disconnected during these calibration tests, rendering the results suspect and possibly invalid. Therefore, no data are presented in this subsection." However, EPA continued to use these data in its calibration calculations. These data should be treated as highly suspect and discarded. 10. The formulas for calculating standard deviation and relative standard deviation presented in section 2.2 of the report appear to be in error.

CS3A-011 (9) As an initial matter, CMA has not been provided adequate time to review the study data adequately. We have, however, already discovered sufficient QA/QC problems that we urge EPA to issue a corrected report for additional review.

CS3A-013 (9) Thank you for your voice mail and phone call yesterday responding to CKRC's April 10, 1997 letter. CKRC requested that EPA revise and republish the "Notice of Data Availability

(NODA) on the HWC Continuous Emissions Monitoring Systems (CEMS) (March 21, 1997, 62 FR 13776)" or at least extend the insufficient thirty day comment period. We are disappointed that EPA was not persuaded by our arguments and examples that the erroneous NODA information makes it difficult to develop comments in thirty days. This is particularly troubling considering that, as you stated, the Agency agrees that the published "NODA has errors and deficiencies." You explained that EPA does not think it is "necessary to revise the document at this time because EPA is not yet requesting comment on the accuracy and reliability of these CEMS, but on its demonstration approach." We disagree. CKRC believes if the Agency were only interested in receiving comment on their planned approach, publishing the test plans for public comment in advance of the testing program would have been the appropriate action. The inclusion of the PM CEMS Demonstration Status Report and supporting data appendices as part of the NODA demands that the public comment on this information, as additional opportunities are not guaranteed. Finally, we hope the Agency is sensitive to the highly limited resources available to comment on various Agency notices and proposals. Thank you again for your call. I appreciate your timely response to our request. If you have any questions, please contact me.

CS3A-015 (3)(b) A review of the Sept/Oct '96 data shows considerable variability in the data. If the CEM correlations do not vary similarly, then the feedstock issue could be written out of the standard altogether. In this case, a simple calibration audit could be the QA/QC tool for these instruments. However if this is not the case, RES is concerned that the proposed performance specification and data quality objective "to have one calibration for every given operating condition" is not practical for incineration systems such as those operated by RES. For these incineration systems a constantly changing combination of many waste feeds would make multiple PM CEMS calibration impractical, it not impossible. Obviously, a PM CEMS is required that properly measures PM without being overly sensitive to particle characteristics. This may force the rejection of the light-scattering devices for applications which have such variable particulate characteristics.

Summary

Errors, deficiencies, and discrepancies in the data report issued in response to the March 1997 NODA make it impossible to fully comment on the Agency's demonstration approach or fully assess the accuracy and meaning of the demonstration.

One commenter objected that EPA failed to give adequate notice to comment on the Hg and particulate matter CEMS test plans, since the March 1997 NODA was issued after the programs had started.

Response

The purpose of the March 1997 NODA was to obtain data relative to EPA's approach to demonstrating PM CEMS. An advanced draft report was issued so commenters could understand this approach. EPA agrees that it is impossible to fully comment on the accuracy and meaning of the demonstration results, but was useful in allowing commenters to understand the structure and approach being employed. Commenter's concerns regarding our approach were incorporated into the Demonstration Test program. A separate notice on the findings of the demonstration tests was published in December 1997.

EPA was not legally required to invite comment on our approach to demonstrating Hg and particulate matter CEMS. It did so only to enjoin the public in the process early. We believe the comments received were very valuable, largely because this process allowed the public to see how our approach was being applied. This could not have happened if we had issued the March 1997 NODA prior to the start of testing.

j. How EPA Calculated Data Availability

CS3A-003 (1)(a) One of the purposes of EPA's demonstration program is to assess the data availability achieved by the PM monitors. In the Federal Register notice, EPA explains that the amount of monitor downtime experienced has been greater than would be expected normally because of the difficulty of obtaining spare parts and the fact that EPA is not on-site at all times, and thus may not be able to service the monitors promptly. 62 Fed. Reg. at 13,779. To ensure that these factors do not result in overstatement of monitor downtime, EPA proposes to only count as downtime the amount of time actually spent servicing the monitors. Id. UARG believes this is reasonable, with two important caveats. First, EPA also must exclude the period during which a monitor was down and waiting for service from the total number of possible monitor operating hours when calculating the percent monitor downtime (i.e., EPA should not count that time as monitor up-time either). Second, when making statements regarding the length of the demonstration period, EPA should take into account those periods when the monitor was waiting for repairs (e.g., EPA should be careful not suggest that it has evaluated 9 months of PM monitor performance, if the monitors were actually inactive and waiting for repairs during some significant portion of that period). In its final report, EPA should also describe the impact of any significant periods of monitor downtime (due to waiting) on the Agency's ability to assess long term performance of the monitors.

CS3A-004 (1) CEM downtime. CRWI would like to comment on two issues associated with downtime. 1) In the NODA, EPA listed several limitations in this demonstration project that could contribute to developing inaccurate estimates of CEM downtime. The first is based on only visiting the site very two weeks to perform maintenance. EPA states that counting the entire two weeks as downtime if an instrument fails between visits would overstate downtime. CRWI agrees. However, CRWI does not agree with EPA's solution to estimate a fixed. repair time and assume the instrument is up for the rest of the time between visits. CRWI suggests that this method could underestimate downtime because the instrument, if repaired, could fail again during the rest of the two-week period. One method that would accurately estimate downtime would be simply ignore the rest of the two-week period after a failure. Perhaps this is best explained by an example. Instrument 1 is on-line for 120 hours after normal two weeks maintenance before it experiences a failure. Assuming this repair would normally take eight hours under normal plant operations, the instrument could be repaired and back on line for the rest of the two-week period, giving an on-line percentage of 98% (on line 328 of 336 hours). However, since the instrument was not repaired until the end of the two weeks, it was actually on line 36% (120 of 336 hours) of the time. Neither of these estimates is accurate since the former does not allow for possible subsequent failures and the latter does not allow for repair. Perhaps a more accurate method would be to only count the time the instrument was on-line plus the estimated repair time in calculating the downtime. In this example, the total time used would be the 120 hours it was operational plus the estimated eight hours it took to repair, giving an on-line percentage of 94% (120 of 128 hours). This solution does not represent a rigorous test of on-line time. It simply limits the calculation to actual data and does not introduce bias from the

assumptions. A more realistic solution is suggested in a later paragraph. The second point EPA discusses in the NODA refers to having a supply of spare parts from which to make minor repairs. While CRWI agrees that having spare parts on site to make minor repairs is a more realistic scenario, we caution EPA from assuming that all parts would be on-site and available to make repairs. Assuming that this would eliminate ordering of some parts is not realistic. The third point EPA mentions is the lack of US-based, trained service technicians to conduct major repairs. There are two issues: having to schedule service technicians involving international flights; and shipping parts from suppliers in other countries. Both of these activities will take more time than if technicians and parts were available in the United States. As instruments become more common, distributors will develop local factory-trained technicians and parts inventories to service these instruments. This will reduce downtime in the future but will do little in the early stages of deployment. Therefore, CRWI suggests this concern can be reduced with a phase in period where the unit is not used for compliance. The most accurate method to determine on-line time would be to remove the artificial constraints of a visit every two weeks to repair instruments. Local site technicians should be available to make minor repairs and a supply of spare parts should be stockpiled. When major repairs are needed, factory technicians should be called immediately and repairs performed as soon as possible. Only under conditions that mimic compliance can a realistic determination be made of CEM downtime. 2) The only CEM's data provided in the appendix that could be used to estimate downtime are the calibration runs. While this data is important to calculate CEM's response during MM5 sampling, it does not give a complete picture of on-line time. In analyzing the data available, CRWI calculated the on-line times for the five instruments as shown in the following table. Table 4. Minutes each unit is down based on the data provided in Volume II of Status Report No. IV. Each day is based on 1440 minutes unless otherwise noted in parentheses. [DATA NOT REPRODUCED HERE.] From this limited data, the light scattering units have the lowest downtime. This agrees with EPA's observations that the light scattering units have a higher on-line time than do the beta units. It is interesting that the Durag unit apparently has a self-calibration process that takes 7-8 minutes each time and is done seven times per day. This self-calibration alone reduces the on-line time by 3%. Since this data covers the time when the units were being calibrated, one would expect that significant efforts were made to ensure that all units were operating at peak performance. Less on-line time might be expected between calibration runs. From this data, it is obvious that the beta units are less reliable and will require more maintenance. CRWI suggests that EPA extend this type of analysis to determine online availability outside the calibration periods.

CS3A-010 (1)(b) At Page 13779, column 2, CKRC objects to EPA's assumption that regulated facilities would experience less downtime than EPA did during the demonstration project due to two-week travel intervals, lack of spare parts purchased and held on-site, and absence of U.S.-based, trained service technicians. Rather than the downtime being "overstated" by this fact, CKRC believes the actual downtime may be understated. For example, during the demonstration period, a system that went down the day after the Agency left the site remained down for two weeks until the Agency returned to repair the "minor" damage. However, the Agency only counted the amount of time it took to repair the system upon their return (e.g. 8 hours vs. two weeks) as downtime. It is inappropriate to assume that personnel on-site will automatically be able to make minor repairs more quickly than EPA representatives. More importantly, this practice does not take into consideration the impact of two-week respites for these devices after only minor malfunctions. Perhaps these "breaks" enable the system to come back on-line more quickly and operate longer until the next malfunction than they would if they were repaired immediately and truly forced to, remain on-line

continuously. EPA cannot affirmatively find that during the two-week respite no other malfunctions would have occurred. The only truly accurate estimate of the CEMS downtime is to compare the actual operating time of the process device to the on-line time of the CEMS. CKRC also objects to the fact that EPA did not purchase spare parts to enable the facility to "make minor repairs without incurring substantial downtime." If the practice of storing spare parts to ensure compliance is typical, EPA should have conducted a similar practice to truly measure its impact on downtime. How can the Agency be sure the spare parts stored on-site automatically will be sufficient to deal with these "minor problems" in both a cost and time effective manner once facilities are forced to comply with regulatory standards using these devices? In addition, the fact that technicians and major repair parts are not readily accessible in the U.S. is not just a demonstration project obstacle. It is very likely that regulated facilities will face similar challenges. Even if these manufacturing companies eventually set up U.S.-based parts and service centers, obtaining parts from overseas and providing enough trained technicians to all the facilities that will have installed these instruments will still be a demanding and time-consuming task. Thus, the increased demand for both parts and technicians by regulated facilities may increase over the downtime experienced by EPA during this limited demonstration project.

CS3A-011 (7) CEMS MUST BE TESTED IN COMPLIANCE SETTING Part 2 of the test was an "endurance test over six months to critically examine CEMs performance relative to stability of their calibration relation and reliability of their continuous operation." CMA does not believe EPA has shown in detail the "reliability of ... continuous operation." Indeed, EPA's report demonstrates the inability to achieve reliable operation during the test. EPA says "If the repair takes eight hours to perform, then EPA will count the downtime as 8 hours, not two weeks (62 FR 13779)." We agree that this method is reasonable, but EPA must consider the frequency of the needed repairs as well. In EPA's example, an instrument failed three days after start-up, and needed an 8 hour repair, but this failure was not detected for eleven days because EPA only inspected the equipment every two weeks. In this example, we think that EPA should assume the unit would have failed every three days, and so the downtime should be considered as 8 hours times 14 days divided by three (8 x (14÷3)), or a total of 37 hours. CMA feels that the original test was not well designed to ascertain the downtime factor. EPA should redesign the test using good statistical methods and truly operate the instruments in a "compliance" mode to see what the downtime effects would be. Downtime is an extremely important factor for CMA members because permits frequently do not allow operation without online CEMS. Therefore if an instrument is unreliable, it may be necessary to have an online spare to limit downtime. This doubles the capital and maintenance costs, which also should be noted in the Agency's final regulatory impact analysis. The fact that "there tends [sic] to be no US-based service technicians to conduct major repairs on many of these instrument[s]"(62 FR 13779) is an important problem! CMA members cannot afford to have their incinerator units "down" while awaiting a technician from another country. Many incinerators are an integral part of the overall chemical manufacturing process and products cannot be made and sold if the unit is down. EPA must ascertain a high degree of reliability before attempting to force the use of CEMS. Calibration is another area of concern from the perspective of downtime. The instruments were reported as being very difficult to reliably calibrate. Until a more suitable method of doing the initial calibration is found, CMA is concerned that calibration problems will cause extensive downtime, extra costs, and compliance questions.

<u>Summary</u>

The commenters took issue with EPA's approach to calculating data availability.

Response

We believe we did perform the tests in a "compliance setting." We believe the approach we used was the best we could do given we are not the facility and not on-site all the time. Overall, one commenter seems confused and gave no alternative approaches.

12. Other Issues

a. EPA Misrepresented the EPRI Performance Model

Comments

CS6A-006 (3) In the NODA preamble, EPA discusses understanding and refining the relationship between process operating parameters and emission rates. The first example concerns conducting numerous Method 5 tests on a scrubber-controlled lime kiln at a pulp and paper mill. The second example refers to the Electric Power Research Institute (EPRI). The NODA states:

The Electric Power Research Institute (EPRI) has already produced a means to characterize and correlate PM emissions with operating conditions at coal-fired utility boilers. PM emissions from utility boilers are similar to HWCs in that their emissions are affected by a complexity of variations from a number of fuel and feed characteristics, combustor operations, and electrostatic precipitator (ESP) operations.

RMB has several contracts with and works closely with a number of project managers at EPRI. However, RMB is at a loss to explain the above-quoted statements. First, EPA provides no reference or citation for the statements. Second, while the statements are very general and vague, RMB does not believe that EPRI is able to model or estimate PM emissions as a function of boiler operating parameters. However, EPRI (as well as other organizations including EPA) have ESP models. Generally, an ESP model predicts PM removal efficiency as a function of inlet loading, particle-size distribution, and ESP operating variables such as voltage and current. If these ESP models are what the NODA is referring to, then EPA's narrative surely is not accurate.

Summary

EPA misrepresented the EPRI coal-fired ESP Performance Model in NODA 2.

Response

The language used in the March 1997 NODA to generally describe the EPRI model was derived from available information issued by EPRI. The intent of this language was to illustrate by example a unique benefit of PM CEMS that being to produce prolific PM emission data cost effectively to promote understanding of the relationship among fuel feeds, operations, and emissions. Note that EPRI is currently sponsoring tests to correlate the relationship among fuels, operations, and emissions with PM CEMS, manual Reference Method tests, and their sophisticated ESP performance model.

b. The DuPont Site Does Not Represent a Worst-Case Facility

Comments

CS3A-003 (1)(b) Finally, UARG notes that EPA has characterized the Dupont facility as a "worst-case" facility for conducting tests of the PM CEMS. As RMB explains, this characterization

is incorrect, even if one considers only HWCs.

CS3A-003 (3)(b) Specific Criticisms of the Field Demonstration. Our most serious criticisms of EPA's field demonstration of continuous PM monitors deal with how the Agency has characterized and interpreted the results to date. For example, in the Federal Register notice, EPA characterizes the Dupont incinerator as "a worst-case facility for this demonstration test program[FN7]." Of course, EPA must recognize that the probability of selecting a single hazardous waste incinerator from a population approaching 100 units and having that incinerator be the true worst-case unit is very remote. Moreover, a number of other observations in the Federal Register notice contradict EPA's assertion of worst-case facility. [FN7] 62 Fed. Reg., 13782 Col. I (March 21, 1997).

CS3A-008 (4) Additionally, while the Experimental Station incinerator is an excellent location for this demonstration project, CEM demonstration on this incinerator is not a sufficient basis for determining the general appropriateness of PM CEMs across a wide variety of hazardous waste combustors. The Experimental Station incinerator is a similar to other incinerators in that it accepts a variety of waste feeds. However, it has been retrofitted with extensive gas-cleaning equipment including stack gas reheat and its scrubber water is recirculated to a spray dryer. The PM and other emission characteristics of the DuPont Experimental Station hazardous waste incinerator are not typical of other hazardous waste incinerators in DuPont nor the rest of the U.S. These emission characteristics are clearly different from those of boilers burning hazardous wastes. Therefore, EPA should not draw conclusions on the applicability of PM CEMs for other classes of hazardous waste combustors from this test program. DuPont looks forward to further work with EPA and other stakeholders to demonstrate CEMs as an option for showing compliance with hazardous waste incinerator emission standards. If you have any questions regarding these comments, please call me at (302) 774-8048.

CS3A-011 (4) Based on our review thus far, CMA believes that particulate matter (PM) CEMs currently have unacceptably poor accuracy and questionable reliability. Additionally, we are concerned that CEMs performance will be different on different HWCs and that the tests at the DuPont facility may not -- despite EPA's claim -- represent the worst case performance. Finally, we believe the Agency needs to simulate the requirements faced in a compliance setting. For all these reasons, we also urge the Agency to conduct additional testing on PM CEMS. Our comments provide numerous points to be considered in any subsequent testing. In the meantime, CMA continues to oppose the proposed mandatory requirement for PM CEMs and instead suggests the use of the monitors as a voluntary compliance tool.

CS3A-011 (4) EPA has asked for suggestions on how to proceed on CEM work beyond the pilot studies presented in the NODA. As stated at the outset, CMA supports the goal of demonstrating compliance via accurate, reliable, and cost-effective methods. We believe three key elements are necessary for CEMs to meet these criteria: * testing CEMs under the requirements faced in a compliance setting; * demonstrating CEMs on other types of HWCs; and * improving Method 5 calibration. CMA believes using CEMs to demonstrate compliance will be feasible when the monitors are shown to be accurate and reliable, and when the value of specific monitoring data justifies the cost of CEMS. Although CMA views this study as useful and a necessary part of developing continuous emissions monitors (CEMs), we believe that the results of this pilot study fail to demonstrate that PM CEMs operate acceptably at the one DuPont facility. Furthermore, any

extrapolation of "apparent" conclusions about these monitors to other combustion units is premature and unfounded. We would be extremely concerned if the Agency chose, based upon the limited experience it has gained and the questionable results achieved, now to proceed with a mandate to install these monitors on all hazardous waste combustors.

CS3A-011 (5)(a) CMA notes that the DuPont unit has a dry stack (due to reheat) and thus does not in fact represent worst-case conditions as defined by EPA.

CS6A-006 (4) In the NODA, EPA contends that the Dupont site represented ... a reasonable worst-case facility for performance relative to the proposed specifications. In responding to EPA's May 2, 1997 NODA, RMB challenged EPA's characterization of the Dupont incinerator as a "worst-case" facility for a continuous PM monitor demonstration. Surely EPA must realize that if the Dupont stack had contained condensed water droplets, then the continuous PM monitoring results would have been dramatically poorer. Indeed, this is implicitly recognized by EPA based on EPA's February 27, 1996 request for proposals (RFP), in which continuous PM monitoring vendors were requested to present a strategy that would be used for handling the problem of liquid aerosol if the site uses a low temperature, wet air pollution control system.

CS6A-011 (4) Throughout this rulemaking, CKRC has tirelessly informed the Agency about the vast technological differences between cement kilns and incinerators as we have implored EPA to respect these differences in its development of MACT standards for HWCs. Again in this case, the particulate matter emissions from cement kilns and incinerators are different with respect to each of the criteria identified in the PM CEMS NODAs. A comparison of those criteria clearly shows that the Dupont PM CEMS testing was decidedly not conducted under "reasonable worst-case conditions" for all HWCs. (See Table 2.) For example, wet process cement kilns' exhaust gas stream averages 34% moisture vs. 20% for the Dupont incinerator. Cement kilns' stack gas flowrates are several times greater than the typical hazardous waste incinerator (HWI) and those gases are more heavily laden with particulate matter at the APCD inlet due to the inherent nature of the cement manufacturing process. The particle size distribution and the basic chemistry and physical properties of the particulate matter itself are very different in cement kilns vs. HWIs.

<u>Summary</u>

Many commenters felt that the DuPont site did not adequately represent a "worst case" facility. The fact that the flue gas was not saturated with moisture was one of the major reasons this perception was maintained. Several commenters also questioned how well the DuPont site would compare to flue gas conditions at a cement kiln.

<u>Response</u>

The DuPont incinerator did not have entrained water droplets in the flue gas. However, the source did contain a moisture content that was significant enough to require sufficient treatment prior to analysis. This source also operated over a wide range of particulate concentrations and PM physical characteristics that affect PM CEMS outputs (particle size distribution, concentration, and color).

It is acknowledged that there are inherent differences between incinerators and cement kilns. However, it is unlikely that PM properties will change as dramatically at a cement kiln as it would at an incinerator burning many different wastes, like the DuPont incinerator. This point is substantiated in the Technical Support Document Volume IV Chapter 12 describing the nearly 30 years of experience TÜV has performing correlation tests, including those on cement kilns and incinerators. The fact that cement kilns have more moisture in their flue gas that at the DuPont incinerator is irrelevant since cement kilns do not have entrained water droplets in the flue gas. As CKRC has tirelessly informed us, cement kilns cannot have entrained water droplets in their stack, lest they would concrete the stack shut as wet cement lines the inner walls of the stack. Note that PM CEMS technologies have been used successfully in many industrial applications in Europe, especially cement kilns.

b. Preliminary Test Comments

Comments

CEM5.026(125)(c) • EPA refers to two field studies in the preamble to the rule as support for the proposed use of PM CEMS as a compliance method. The background information for the proposal contains substantive information from only the first field study undertaken to evaluate PM CEMS (a hazardous waste incinerator). That information reveals that EPA had numerous problems with the PM CEMS at that site. Following the proposal, EPA in an Air and Waste Management Association (AWMA) conference reported on the other of the two field studies (a cement kiln). As for the initial study, that AWMA paper reveals that EPA had numerous problems with the PM CEMS. Moreover, the AWMA paper shows quite clearly that two calibrations, done five weeks apart, changed significantly for the cement kiln PM CEMS, demonstrating that the calibration for the PM CEMS was not stable. See RMB Memo at p.3.

CEM5.026(f) Moreover, RMB's observations cast significant doubt on the basis for the preamble statement alleging that PM CEMS have been shown to maintain a stable calibration. 61 Fed. Reg. 17436, col. 2. As noted above, the cement kiln results reported by EPA to the AWMA do not support that statement. To the best of our knowledge, the other field study referenced in the preamble (for the hazardous waste incinerator) was a one time test that did not involve returning to the site to assess whether the calibration had changed. Indeed, perhaps because of doubts about the results of these two tests, EPA is currently undertaking a major research project to examine PM CEMS at another site. See 61 Fed. Reg. 7273 (February 27, 1996), announcing the project and soliciting vendor participation. UARG finds disturbing that the Agency does not even mention that research project in this proposal. At a minimum, EPA should await the conclusion of that project, and then repropose the PM CEMS requirement (or at least reopen the comment period) after the results have become publicly available.

CEM5.026(125)(h) The loose statistical criteria in PS 11 for establishing the calibration will result in data that are not sufficiently accurate compared to data that would be obtained using Reference Method 5. Moreover, the evidence from EPA's field studies indicates that calibrations may not be stable over time.

CEM5.033(125A) EPA FIELD DEMONSTRATION Since the April 19, 1996 proposal of the

hazardous waste combustor rule, a paper was presented at the annual meeting of the Air & Waste Management Association that describes the results of an EPA-sponsored field evaluation of two continuous PM monitors.[Footnote 4: Joklik, Richard G. and Rauenzahn, H. Scott, 'Evaluation of Particulate Matter and Total Mercury Continuous Emission Monitors for Compliance Monitoring at Hazardous Waste Combustion Facilities,' Proceedings of 89th Annual Air & Waste Management Association Meeting, Nashville, TN, 96-WA77.02, June 24-28, 1996.] Field testing of two continuous PM monitors was conducted on a cement kiln that co-fires pulverized coal and liquid hazardous waste. Manual reference method testing (i.e., PM calibration) was conducted over three different periods of time in 1995: Calibration 1, May 3-7; Calibration 2, June 12-14; and Calibration 3, June 18-19.

The A&WMA paper discusses a number of problems that were encountered during the field demonstration including, "erratic" results from one of two particulate sampling trains, believed to be the result of contamination; and "suspect" data points, perhaps the result of a change in field personnel. RMB agrees with the paper's authors that these types of problems "serves to illustrate the difficulty in making consistent Method 5 measurements at theses low PM levels (30 to 40 milligrams of particulate per filter). " Of course, as stated earlier, this is an intrinsic problem with the technology because the continuous PM monitors do not provide a direct measurement of mass. Rather, PM monitors must be calibrated against manual test results -- which are subject to operator error as well as sampling and analytical variability.

Test results presented in the paper provide technical support for another comment presented earlier in this memorandum -- stability of calibration curves. Figure 5 of the A&WMA paper shows two calibration curves for one of the continuous PM monitors: one curve is based on the data collected during Calibration 1, and a second curve is based on the combined data from Calibration 1 and Calibration 2. While RMB does not believe the data from Calibrations 1 and 2 should be combined to form a "master" calibration, Figure 5 does reflect two very distinct calibration curves. For a given continuous PM monitor reading, one certainly would not estimate (predict) the same particulate concentration from the first curve as from the second calibration curve. Given that the two calibration tests were no more than 5 weeks apart, RMB questions, at a minimum, the stability of either calibration curve. Perhaps more importantly, if the data from the Calibration 2 were analyzed independently, it does not appear, from looking at Figure 3, that the curve based on the second test would even lie within the confidence intervals computed from Calibration 1 data. This is very disturbing because a regression line based on new calibration data should fall outside the 95 percent confidence interval only 5 times out of every 100 additional calibrations. In this field demonstration, neither the regression based on Calibration 2 data nor the regression based on Calibration 3 data appear to be within the 95 percent confidence interval as determined from the initial calibration.

CEM5.048(130) <u>PM CEMs</u> EPA is currently conducting a demonstration project with respect to PM CEMs (page 17435/1). The EPA tested three PM CEMs in 1995 at the Rollins New Jersey plant. These tests revealed problems that indicated they are not completely reliable. Specifically, the calibration data did not meet performance requirements, particularly in the low range.[Footnote 14: R. Joklik, and H.S. Rauenzahn, "A Field Evaluation of PM CEMS", EPA 68-D2-0164.] The DOE is also conducting CEM tests in 1996. We urge EPA to consider not only the accuracy of these CEMS, but also the reliability and on-stream time. We request that EPA share with industry the results of their extended demonstration tests in great detail, including allowing industry to review

the actual data logger printouts, the maintenance and servicing records, and the on-stream time data.

At this point, the ETC must conclude that PM CEMs are not currently satisfactory for routine plant applications. This conclusion will be reconsidered based on the results of the EPA and DOE performance demonstrations.

CEM5.079 i. Particulate matter CEMS were not calibrated with the number of sampling runs proposed under EPA's Performance Specification 11. Three Method 5 samples were collected at 3 different grain-load conditions and used for PM CEMS calibration. This calibration procedure (nine total samples) falls well short of the 15 samples over three grain-loads required under Performance Specification 11 (40 CFR 60, Appendix B).

II. Poor PM CEMS durability demonstrates continuous sampling difficulties in wet process cement kilns. The PM CEMS' tests covered the longest time period (11 weeks), and even in that relatively short time period, the Sick RM200 failed from an obstruction typical of unconditioned sampling in a wet cement kiln. This very problem with obstructions has prevented Lafarge's successful installation of a heated THC CEMS that collects uninterrupted, unconditioned samples for more than several consecutive months on a wet process cement kiln.

CS3A-010 (3)(d) III. Testing at the Lafarge Cement Plant (Fredonia) provided evidence that PM CEMS currently are not capable of sustained compliance monitoring at a wet process cement kiln in accordance with the proposed specifications.

CS3A-010 (3) III. TESTING AT THE LAFARGE CEMENT PLANT (FREDONIA) PROVIDES EVIDENCE THAT PM CEMS CURRENTLY ARE NOT CAPABLE OF PROVIDING SUSTAINED COMPLIANCE MONITORING AT A WET PROCESS CEMENT KILN[FN5] IN ACCORDANCE WITH THE PROPOSED SPECIFICATIONS. [FN5] 67% of HWC cement kilns are wet process. EPA states that the purpose of the Lafarge tests conducted in May 1995 at the Lafarge cement kiln in Fredonia, KS was to conduct a full calibration of the PM instruments. EPA also states that the monitors successfully passed calibration. (61 FR 13777, 2 column) However, the PM CEMS at the Lafarge test were not calibrated according to Performance Specification 11 (PS) in the proposed rule, and substantial problems surfaced during the test. EPA's proposed PS-11 requires 15 sampling runs to be conducted. During the Lafarge test, only three Method 5 samples were collected at three different grain-load conditions (9 total samples). This calibration procedure falls short of the 15 samples over three grain-loads required under PS-11 (40 CFR 60, Appendix B). According to the "Evaluation of MACT Control and Monitoring Technologies for Acid Gases, Organics, and Metals, Specifically Mercury, at Lafarge Corp., Fredonia, KS" (Draft Report, February 12, 1996), EPA used two simultaneous Method 5 sampling trains as reference methods to calibrate the PM CEMS at two different times. However, during both calibration trials, data from one of the two reference method trains was discarded because of contamination. Particles sized up to 1 mm were observed on the filter of the contaminated train, and data from the contaminated trains were discarded. EPA chose to use the data from the other reference method train in each instance to calibrate the PM CEMS, without fully researching and resolving the issue of contamination of the other reference method trains. The fact that EPA could not obtain quality data from two reference method trains raises serious questions regarding the "success" of the calibration procedure. In addition, the report does not evaluate the correlation of data if the data from the contaminated trains

were included in the calculations, nor does the report indicate the source of the contamination. Finally, EPA did not provide a public comment period to review the Agency's calibration procedures used during the Lafarge Test, nor has it made a final report of that test available for public comment. In addition, the Sick RM200 PM CEM failed over the relatively short testing period of 11 weeks at the Lafarge facility. The failure was apparently due to sampling system obstruction caused by the high particulate loadings and moisture in the sampling stream which are typical difficulties on wet process cement kilns. EPA's draft report on the Lafarge test suggests that the cause of the instrument failure was unheated purge gas and was unavoidable; however, the fact remains that the Sick RM200 instrument, after being judged acceptable by criteria EPA developed when they selected vendors, failed to perform for even the short duration of the test at Lafarge. Thus, this failure demonstrates that PM CEMS are not necessarily capable of providing sustained compliance monitoring at cement kilns.

CS6A-011 (3) As another part of its justification for the transferability of the Dupont results, EPA cites a brief test conducted at Lafarge Corp.'s cement plant in Fredonia, KS. Referring to cement kilns, the Agency states that this "test" showed that "an informed decision is required to determine what type of in-situ light-scattering PM CEMS is best suited to these sources" (62 FR 67793). On the contrary, CKRC believes that the experiments at Lafarge raised serious questions about the ability of PM CEMS to provide sustained compliance monitoring at cement kilns. Several of these questions and problems were discussed in CKRC's April 21, 1997 comments on the Agency's March 21, 1997 PM CEMS NODA.

Summary

Preliminary test results raise serious questions about stability of calibration curves and transferability of CEMS data. The EPA should consider not only the accuracy of these CEMS, but also the reliability and on-stream time. The Agency must share with industry the results of their extended demonstration tests in great detail, including allowing industry to review the actual data logger printouts, the maintenance and servicing records, and the on-stream time data.

Response

The purpose of the preliminary tests (such as the ones at Rollins-Bridgeport or Lafarge) were to define the technical issues that needed to be addressed and gain insight on whether a full demonstration was warranted.

13. Issues Raised Out-of-Scope

a. PM CEMS are not Good Surrogates for Metals

Comments

CS3A-014 (1) There is no justification for a Particulate Matter (PM) standard or PM CEMS unless PM is shown to be a good surrogate for other HAPs and replaces the monitoring of the other HAPS. PM is not a Hazardous Air Pollutant (HAP), so it cannot be regulated directly under the Clean Air Act (CAA) Maximum Achievable Control Technology (MACT) program. The Agency proposes PM as a surrogate for both non-dioxin/furan (D/F) products of incomplete combustion (PICs) and metals that are not specifically addressed in the standards. However, EPA has supplied no data showing that PM is a good surrogate for non-regulated metals or non-D/F PICs. In fact, EPA's PM CEMS test results indicate that most of the PM is sodium chloride with smaller amounts of iron, sulfur, and aluminum. The majority of the chemicals in the PM are not HAPs, which makes the use of PM as a surrogate questionable. Since the only justification for PM monitoring is as a surrogate for other HAPs, PM CEMS should provide relief from monitoring whatever HAPs for which PM is designated as a surrogate ash, metals, D/F, etc. Otherwise, mandating PM CEMS creates dual and unnecessarily redundant compliance methods for a single parameter.

CS6A-003 (1). There is no justification for a Particulate Matter (PM) standard or a PM Continuous Emissions Monitoring System (CEMS) standard, because PM is not a good surrogate for other HAPs and is not as good a measure of removal efficiency as APCD parameters. PM is not a Hazardous Air Pollutant (HAP), so it cannot be regulated directly under the Clean Air Act (CAA) Maximum Achievable Control Technology (MACT) program. The Agency proposes PM as a surrogate for both non-dioxin/furan (D/F) products of incomplete combustion (PICs) and metals that are not specifically addressed in the standards. However, EPA has supplied no data showing that PM is a good surrogate for non-regulated metals or non-D/F PICs. In fact, an August, 1996 study written by Focus Environmental Inc. for the Chemical Manufacturers Association and submitted to EPA August 19, 1996, "Technical Arguments on the Regulation of Particulate Matter," compared emissions of particulate with emissions of D/Fs, non-D/F PICs, and metals. They found that particulate correlated poorly with all three. Additionally, EPA's PM CEMS test results indicate that most of the PM is sodium chloride with smaller amounts of iron, sulfur, and aluminum, not HAPs. (Draft PM CEMS Demonstration Vol. 1: DuPont, Inc. Experimental Station On-Site Incinerator, Wilmington, DE, Section 2.6.2) The concentration of PM is controlled by emissions of these compounds that are not HAPs, so there is no reliable relationship between PM and HAPs.

EPA has proposed that the PM CEMS readings serve as a surrogate for semi-volatile metal (SVM) and low-volatility metal (LVM) emissions and in some cases, mercury and dioxin emissions. However EPA has provided no data to support that it is a good surrogate for any of these. In fact EPA is continuing to require metals feed monitoring in addition to PM CEMS for continuous compliance demonstration. This indicates EPA is only considering PM CEMS readings as a surrogate for metals removal efficiency, not metal emissions. The most widely recognized site-specific indications of removal efficiency are air pollution control parameters (APCD) parameters, not PM CEMS readings. EPA has provided no data showing that site-specific PM CEMS readings are a better indicator of removal efficiency than site-specific APCD parameters. In fact, by proposing

APCD parameters as the initial operating parameter limits (OPLs) following the comprehensive performance test (CPT), EPA is recognizing that APCD parameters are the key to removal efficiency. EPA is proposing to make PM an OPL based on 9 months of data collected while the APCD is meeting limits determined by the CPT. In essence EPA is proposing that PM CEMS readings are surrogates for APCD parameters and this is the only justification EPA gives for requiring PM CEMS. It is more sensible to use the direct APCD parameters instead of using the APCD parameter surrogate, PM CEMS reading.

CS6A-008 (1) CMA's previous comments on the HWC MACT proposal demonstrated that PM is not a good surrogate for either nondioxin products of incomplete combustion or metals, based on statistical analyses of EPA's own HWI database conducted by Rigo & Rigo and Focus Environmental Inc. See August 19, 1996 comments at 40-43; June 17, 1997 comments at 17. The PM CEMS test results in Section 2.6.2 (Scanning Electron Microscope Results) of the DRAFT Particulate Matter CEMS Demonstration Report indicate that most PM is sodium chloride with smaller amounts of iron, sulfur, and aluminum. Since the majority of the chemicals in the PM are not hazardous air pollutants, the concentration of PM will largely be influenced by emissions of these other compounds, interfering with a reliable hazardous air pollutants relationship.

Although EPA has proposed that PM CEMS serve as a surrogate for semivolatile metals (SVMs) and low volatile metals (LVMs), the Agency is continuing to require metals feed monitoring in addition to PM CEMS for continuous compliance demonstrations. This indicates that EPA really views PM CEMS as a surrogate for metals *removal efficiency*, not metals emissions. However, Focus Environmental's work confirmed EPA's own earlier conclusions that several APCD parameters are far better measures of metals and organics removal efficiency than are PM emissions. See August 19, 1996 comments at 43. The Agency itself recognizes that APCD parameters are good surrogates for removal by requiring their use as operating parameter limits (OPLs) following the performance test burn.

CS6A-009 (1) CRWI agrees with the Agency that, unless activated carbon is injected to control D/F or mercury emissions, there is no direct proportionality between PM emissions and D/F concentrations. CRWI cannot find any data to suggest a linkage between these two parameters. Thus, CRWI suggests that EPA treat PM emissions and D/F emissions as separate parameters in the final rule.

2. CRWI has concerns about the setting of a site-specific PM CEM operating parameter limit (OPL). However, should EPA include this process in the final rule, CRWI has a number of comments.
a. CRWI agrees that all data collected when the facility was outside the range of operating parameters specified in the certificate of compliance should be discarded for the purposes of calculating the OPL.
b. CRWI agrees that all data when the monitor was "out-of-control," as defined in Appendix III – Part 2, should be excluded from this calculation.

CS6A-010 (1) The Agency's rationale for requiring combustion owners/operators to meet a lower level, if that is achieved during testing of the PM CEM, is to ensure that toxic metals are properly controlled. However, the Agency is adopting MACT standards for low-volatile metals (LVM) (i.e., antimony, arsenic, beryllium, and chromium), and semivolatile (SVM) (i.e., lead and cadmium), and

thus, it is not clear how PM can be surrogate for those hazardous air pollutants for which a specific MACT standard is being promulgated.

CS6A-011 (1) CKRC agrees with EPA's conclusion in footnote 13. Our experience is that dioxin and furan emissions are not related to emitted particulate concentration. CKRC, however, disagrees with EPA's assertion that facilities using powdered activated carbon and high efficiency particulate control devices are likely to have a significant amount of dioxins and furans associated with their particulate emissions. While CKRC has previously commented that activated carbon control schemes are not applicable to cement kilns, CKRC is concerned that the Agency has an incorrect belief that could lead to inappropriate PM CEMS requirements and restrictions if this inappropriate technology is improperly required for cement kilns.

CS6A-016 (5) The EPA should have an alternative procedure to determine compliance for waste combustors with feeds containing only organic constituents. As stated in our comments to the revised technical standards for Hazardous Waste Combustors, ... facilities that feed non-metal bearing streams should neither have requirements of the proposed PM standards nor require PM CEMS. We believe, as stated in previous comments, that the MACT standards should regulate hazardous air pollutants (HAPs), which does not include PM. This latest notice of data availability (NODA) in section IV 6, now states that by controlling PM this controls the semi-volatile and low volatile metals. It also states that by controlling PM the standard will control dioxin and furan (D/F) and Hg only when using carbon injection as a control. As shown in the previous CMA comments, PM does not correlate proportionately to any HAP and should not be used as a surrogate.

CS6A-020 (1) Essroc objects to the assumption that there is a strong and consistent correlation between PM emissions and metal HAP emissions. Metal HAP emissions from cement kilns that do not burn hazardous waste are dependent principally on the metal content of the raw material used to produce cement and, to a lesser extent, on the fossil fuels used in combustion. EPA must demonstrate that there is a consistent and predictable relationship between PM emissions and metal HAP emissions to justify making PM CEMS a direct enforcement tool. The EPA has not made this demonstration.

CS6A-022 (1) PM CEMS as an operating parameter for SVM, LVM, D/F and Hg PM CEMS should only be used as an operating parameter for PM compliance. The concentration of SVM, LVM, D/F and Hg in stack gas cannot be accurately quantified using a PM CEMS.

CS6A-025 (1) -The ETC agrees with the use of PM, SVM and LVM COC data to apply a variance factor to the OPL. We agree with the proposed use of 75% of the MACT standard in setting this adjustment factor. While we support this approach, the ETC still maintains our previously stated position that PM is not a suitable surrogate for SVM (see ETC's 6/17/97 comments to NODA 3, 62 FR 2 4212, page 8). As such, PM CEMS must never be used as alternatives to metal feed rate control. Emissions of heavy metals are controlled by limiting metal feed rates to the combustion device. PM CEMS cannot be used as a justification to exempt a facility from metal feed rate controls.

CS6A-029 (1) EPA's proposal would also violate section 112 of the Clean Air Act because compliance with the PM CEMS operating parameter limit would not guarantee compliance with

SVM, LVM, Hg or D/F emission standards. Under EPA's proposal, sources would have no enforceable obligation to comply directly with those emission limitations, but only with their individualized PM operating parameter limits. Because compliance with the PM CEMS operating parameter limit would not guarantee compliance with emission standards for SVM, LVM, D/F or Hg. EPA's proposal would effectively abrogate emission standards for SVM, LVM, D/F and Hg.

CS6A-030 (1) Unless there is data that demonstrates that D/F will be absorbed reliably, with the required efficiency, on forms of PM other than activated carbon, DOE believes that the site-specific PM limit should be a compliance parameter for the D/F standard only when activated carbon is used as a control technology for D/F. In the absence of activated carbon control for D/F, however, the site-specific PM limit could still be allowed to be used as a site-specific compliance parameter for the D/F standard when the owner/operator is able to supply data that adequately supports this.

It seems appropriate to use PM as D/F and Hg operating parameter limits, but only if activated carbon is used to control D/F and Hg, and only if there are sufficient controls to ensure other conditions affecting Hg and D/F emissions are within the envelope established in the performance tests for systems using activated carbon controls. To provide maximum flexibility, a PM emissions limit could also be allowed to function as an operating parameter limit for these pollutants if activated carbon is not used for their control, but the owner/operator can supply sufficient applicable supporting data to the regulatory agency for this situation.

Summary

Many commenters object to the assumption that there is a strong and consistent correlation between PM emissions and metal HAP emissions. Metal HAP emissions from cement kilns that do not burn hazardous waste are dependent principally on the metal content of the raw material used to produce cement and, to a lesser extent, on the fossil fuels used in combustion. EPA must demonstrate that there is a consistent and predictable relationship between PM emissions and metal HAP emissions to justify making PM CEMS a direct enforcement tool. The EPA has not made this demonstration.

Response

EPA believes there is a direct relationship between PM and metals emissions, all other factors being equal, as discussed in Technical Support Document Volume III, Chapter 12.

b. MACT-Standard Based on CEM Data

Comments

CEM1.004(097)(a) 3 . EPA should not set a PM CEMS standard. EPA is recommending establishing a PM Standard which is to be monitored by a PM CEMS, yet it does not currently have monitoring information for PM utilizing CEMS equipment. Currently, EPA has only manual method stack emissions data for PM (61 Fed. Reg. 17379). Since EPA does not posses CEMS PM data, the Agency should not require the emissions data generated by such devices in a standard.

CEM5.049(131) *THE EPA SHOULD NOT SET A PM CEMS STANDARD* The EPA is

recommending establishing a PM CEM standard; yet it does not currently have monitoring information for PM utilizing CEMS equipment. Currently, the EPA has only manual method stack emissions data for PM (61 Fed. Reg. 17379 (April 19, 1996)). Because the EPA does not possess CEMS PM data, the agency should not require the emissions data generated by such devices in a standard. Another consideration in the use of CEMS is that neither industry nor regulatory agencies have much experience with PM CEMS technologies. PM continuous emission monitors are still relatively new and their reliability falls far short of more proven CEMS monitors such as oxygen and CO. This unreliability may require several back-up units adding significant cost to PM monitoring. Until PM continuous monitoring devices become more refined and their reliability improved, a requirement to use these devices would be unnecessarily costly and impractical. It seems prudent therefore, to delay setting a PM CEMS standard until the EPA establishes a database of CEMS data.

CEM5.051(141)(h) d. EPA should not set a PM CEMS standard. EPA is recommending establishing a PM Standard which is to be monitored by a PM CEMS, yet it does not currently have monitoring information for PM utilizing CEMS equipment. Currently, EPA has only manual method stack emissions data for PM (61 Fed. Reg. 17379). Since EPA does not posses CEMS PM data, the Agency should not require the emissions data generated by such devices in a standard. Another consideration to the use of CEMS is that neither industry nor regulatory agencies have considerable experience with PM CEMS technologies. PM continuous emission monitors are still relatively new, and their reliability falls far short of more proven CEMS monitors such as oxygen and CO. This unreliability may require several back up units, adding significantly to the cost of PM monitoring. Until PM continuous monitoring devices become more refined and their reliability improved, a requirement to use CEMS would be unnecessarily costly and impractical.

CEM5.063(a) PM MONITOR CONCERNS The EU standard for particulate CEMS states that the 95 percent statistical interval for the calibration is subtracted from the monitored result before comparing to the standard. The largest acceptable interval is 30 percent [Footnote 2: Council Directive 94/67/EC of 19 December 1994 on the incineration of hazardous waste, Official Journal of the European Communities, L 365/34, December 31, 1994, Annex III, paragraph 4. "the values of the 95% confidence intervals determined at the emission limit values shall not exceed the following percentages of the emission limit values: PM -- 30%"]. Since the confidence limit only applies to the location of the calibration line, it does not describe the interval in which actual measurements are likely to reside -- the tolerance interval is used instead. For the same 95% statistical confidence level, 95% of the particulate CEMS results should be within 140 percent of the calibrated standard. In effect, the compliance limit has to be increased to 240 percent of the stated level to avoid an excess probability of finding violations when the facility is operating exactly as it was during the calibration due to data noise alone.

CS6A-006 (2) Long-term emission data obtained from the continuous PM monitors installed at the Dupont facility provide additional validation to arguments initially raised by RMB staff during EPA's Subpart Da rulemaking. That is, short-term emission data (even those obtained during "trial burns") generally do NOT capture the full range of process or control equipment variability. When the Agency proposes to set emission limitations based on short-term data and to enforce those same emission limits using CEM data, affected facilities are always placed in an untenable ("no win") predicament. Based on numerous statistical models, as well as actual emissions data (like those from the Dupont facility), RMB believes that EPA should be able to enforce emission limits with CEM

data ONLY when the limits have been demonstrated to be achievable by a thorough analysis of CEM data.

CS6A-008 (2) It is premature to include PM CEMS requirements in the December 1998 Final Rule. EPA should conduct additional demonstration projects and issue another NODA specifically addressing the performance of PM CEMS at MACT facilities. Even with this additional data collection, EPA may still be able to meet its target of requiring use of CEMS within one year of the MACT compliance date.

As the NODA recognizes, EPA is poised to promulgate its first rule requiring the use of PM CEMS for compliance. 62 Fed. Reg. 67790. In its eagerness to establish this precedent, however, the Agency has not adequately resolved the many technical and policy issues that are raised by use of this new technology. Faced with choosing between merely establishing a manual method PM standard, on the one hand, and promulgating a single national CEMS-based standard, the Agency has crafted a compromise that essentially launches the regulated community on a nationwide experiment. In this experiment, each source will have to install CEMS and develop a CEMS-based limit from the resulting data. Whether these units will work satisfactorily, and whether the resulting limits will bear any relationship to the national manual method, is an open question. It will not be an academic question, though, for substantial liabilities could be imposed on sources whose units do not work adequately or indicate significant noncompliance even though the source is using MACT technology that could pass a manual method test.

CS6A-008 (2) EPA cannot require compliance with both a manual method standard and its equivalent CEM-based standard. The last issue that arises in the interplay between a national manual method standard and a site-specific standard is the question of whether a source must meet both. CMA submits that if both are in fact measures of the same thing – PM emissions – a source cannot be required to comply with *both*. Either one or the other must be the compliance standard, and the other merely an "excess emissions" indicator with no direct compliance consequences.

The history of EPA's "Enhanced Monitoring" proposed rule is very illuminating in this context. That proposal attempted to require all sources subject to federal Clean Air Act requirements to demonstrate continuous compliance with those requirements. *See* 56 Fed. Reg. 54648 (October 22, 1993). That goal raised a difficult issue, however: how to monitor continuous compliance with manual method-based standards, given that compliance with these standards has historically been demonstrated using infrequent stack tests. CEMs obviously provide continuous, direct measurements of emissions, but for the same reason make manual method standards more stringent – that is, they generate many more "exceedances" over time than the occasional application of stack tests unless averaging times are extended significantly. See Part II.A above. The Agency eventually concluded that converting all existing manual method standards to equivalently stringent CEMS-based standards would require undue time and effort. It also concluded that other operating parameters could not necessarily be correlated reliably with emissions – a finding consistent with the NODA's need to use 54 different operating parameters to obtain a correlation coefficient exceeding 0.9 with manually measured emissions levels. 62 Fed. Reg. 67791. Accordingly, the Agency decided to require CEMS in future rules. The Agency crafted the "Compliance Assurance Monitoring" (CAM) approach for existing sources, using APCD OPLs to provide reasonable assurance that the APCDs have good operations and maintenance and are performing at levels

demonstrated in performance testing. *See* 62 Fed. Reg. 54900, 54902 (October 22,1997).

The CAM rule has been criticized by some because it does not require all sources to adopt continuous emissions monitoring, and instead relies on a combination of manual method testing and APCD parameter monitoring. The Agency's response, which CMA supports, is that developing CEM-based standards that are not more stringent are time-consuming and difficult, and that the CAM approach provides a reasonable assurance of compliance that satisfies Clean Air Act §114(a)(3). Curiously, though, the NODA seems to present the opposite problem. Here, the Agency will require sources to develop CEM limits that really would provide reliable measurements of emissions – they must be derived from actual emissions data, and be highly correlated with manual method readings. Indeed, the Agency stated at the January 8, 1998 public meeting that CEM measurements are *more precise* than manual method measurements of PM. Yet, the Agency will not take the next logical step and provide that these CEMS measurements will become the exclusive compliance method for PM. Sources will still have to use the manual method test to demonstrate compliance, while the CEMS readings are only referred to as "parameters." 62 Fed. Reg. 67796 & n.14, 67800.

This outcome is perverse. Unlike the case of rules examined in the enhanced monitoring proposal, EPA now has a case of a manual method limit that will in fact be measured by CEMS, measurements that will indeed be more precise than those produced by the manual method. Given these facts, it is illogical to require sources still to use the manual method at all for compliance. Worse, it establishes two redundant compliance requirements for the *same* limit, and thus exposes sources to duplicative compliance obligations and potentially inconsistent results. A source could fail a manual method test even though its (more reliable) CEMS readings indicated compliance. The Agency's recent "credible evidence" rule only heightens this concern, because it allows states or any other person to argue that CEMS data show noncompliance with the MACT PM limit, even though the Agency asserts that the manual method is the 'reference' method for determining compliance with the standard. *See* 62 Fed. Reg. 8314, 8328 (Feb. 97).

The Clean Air Act does not require compliance with a manual method test. Section 112 does not require all sources to use the same method to meet a limit. Rather, it requires sources to meet the same limit. Where that same limit can be expressed in terms of another equivalent (or better) method without increasing stringency, it is perfectly permissible to allow compliance to be demonstrated using that other method. Duplicative liability such as proposed in the NODA is contrary to law. Either the requirement to comply with a manual method test must expire once a source begins complying with a CEMS OPL, or else the OPL cannot be enforceable. In the latter case, the OPL must be regarded as merely documenting whether operating conditions are within the bounds defined by the performance test, and exceedances of the OPL should only be seen as identifying when conditions deteriorate from those established conditions, rather than being interpreted as noncompliance. This is the approach to non-reference method parameter data adopted in the Compliance Assurance Monitoring rule, 62 Fed. Reg. 54933-34 (Oct. 22, 1997), and it should be adopted here as well.

CS6A-008 (4) The CAM rule has been criticized by some because it does not require all sources to adopt continuous emissions monitoring, and instead relies on a combination of manual method testing and APCD parameter monitoring. The Agency's response, which CMA supports, is that

developing CEM-based standards that are not more stringent are time-consuming and difficult, and that the CAM approach provides a reasonable assurance of compliance that satisfies Clean Air Act §114(a)(3). Curiously, though, the NODA seems to present the opposite problem. Here, the Agency will require sources to develop CEM limits that really would provide reliable measurements of emissions – they must be derived from actual emissions data, and be highly correlated with manual method readings. Indeed, the Agency stated at the January 8, 1998 public meeting that CEM measurements are *more precise* than manual method measurements of PM. Yet, the Agency will not take the next logical step and provide that these CEMS measurements will become the exclusive compliance method for PM. Sources will still have to use the manual method test to demonstrate compliance, while the CEMS readings are only referred to as "parameters." 62 Fed. Reg. 67796 & n.14, 67800.

This outcome is perverse. Unlike the case of rules examined in the enhanced monitoring proposal, EPA now has a case of a manual method limit that will in fact be measured by CEMS, measurements that will indeed be more precise than those produced by the manual method. Given these facts, it is illogical to require sources still to use the manual method at all for compliance. Worse, it establishes two redundant compliance requirements for the *same* limit, and thus exposes sources to duplicative compliance obligations and potentially inconsistent results. A source could fail a manual method test even though its (more reliable) CEMS readings indicated compliance. The Agency's recent "credible evidence" rule only heightens this concern, because it allows states or any other person to argue that CEMS data show noncompliance with the MACT PM limit, even though the Agency asserts that the manual method is the 'reference' method for determining compliance with the standard. *See* 62 Fed. Reg. 8314, 8328 (Feb. 24, 1997).

Summary

It is premature to include PM CEMS requirements in the December 1998 Final Rule. EPA should conduct additional demonstration projects and issue another NODA specifically addressing the performance of PM CEMS at MACT facilities. Even with this additional data collection, EPA may still be able to meet its target of requiring use of CEMS within one year of the MACT compliance date.

EPA is poised to promulgate its first rule requiring the use of PM CEMS for compliance. In its eagerness to establish this precedent, however, the Agency has not adequately resolved the many technical and policy issues that are raised by use of this new technology. Faced with choosing between merely establishing a manual method PM standard, on the one hand, and promulgating a single national CEMS-based standard, the Agency has crafted a compromise that essentially launches the regulated community on a nationwide experiment. In this experiment, each source will have to install CEMS and develop a CEMS-based limit from the resulting data. Whether these units will work satisfactorily, and whether the resulting limits will bear any relationship to the national manual method, is an open question. It will not be an academic question, though, for substantial liabilities could be imposed on sources whose units do not work adequately or indicate significant noncompliance even though the source is using MACT technology that could pass a manual method test.

Response

The issue of a CEMS-based MACT standard will be addressed in a future rulemaking.

c. *EPA Should Require Many More Monitor Types*

Comments

CS6A-029 (3) Many CEMS other than the PM CEMS are currently on the market and in use both in the United States and Europe. CEMs for chlorine, (Cl2), hydrochloric acid (HCl), hydrofluoric acid (HFl), oxygen (O2), carbon monoxide (CO), nitrogen oxides (NOx), hydrocarbons (HC) and volatile organic compounds (VOC) are all commercially available. In addition, Fourier Transformed Infrared Spectroscopy (FTIR) can be used as a CEMS, and is commercially available. The use of these CEMS would significantly improve sources' ability to comply with emission standards under section 112 of the Clean Air Act, as well as their monitoring, compliance certification and reporting obligations under sections 114 and 503 of the Clean Air Act. In addition, EPA has stated that "the top tier of the monitoring hierarchy is the use of (CEMS) for that HAP or standard." Thus, only where direct measurement by a CEMS is not feasible should EPA consider other monitoring methods.

The NPRM appears to require the use of CO and HC CEMS as parameters to ensure good combustion of D/F. If this is correct, it is commendable. Since the HWC rule will include standards for HC and CO, however, EPA must also use HC and CO CEMS to directly measure compliance with the HC and CO standards. In addition, EPA must require sources to use both CO and HC CEMS as operating parameters for every pollutant for which good combustion is relevant, and to correlate CO and HC CEMS levels to actual emission levels of each such pollutant.

If it is technically feasible, EPA must also consider requiring combustion related CEMS, such as O2, CO, HC and VOC throughout the combustion process, such as in the combustion chamber, at the exit of the combustion chamber or in the preheater/precalciner of a cement kiln. This would provide information about the effectiveness of the combustion that could not be obtained from CEMS placed in the stack.

Similarly, EPA must require the use of enough temperature monitors to make certain that sources know their combustion temperature throughout the combustion process, particularly at cement kilns where the combustion chamber may be as much as 150 meters long. Without knowing whether their combustion conditions are ideal throughout the combustion chamber, sources cannot be sure that they are minimizing emissions, especially for D/F and metals. To provide accurate temperature information, EPA must require temperature monitors at least at every 10 meters in the combustion chamber. EPA has failed to require CEMS for Cl2 and HCl without adequate explanation.

EPA states in the NODA that it does not believe that HCl CEMS are appropriate for the HWC rulemaking and refers back to its explanation in the NPRM. In the NPRM, EPA explained that: Although the Agency prefers the use of CEMS wherever they are available for compliance monitoring, we are concerned that the use of CEMS to monitor HCl and Cl2 emissions may not be cost-effective. This is because facilities are likely to be required to monitor chlorine feed to demonstrate compliance with the SVM and LVM standards anyway, given that a multi-metal (MM) CEMS may not be commercially available for some time.

EPA must require Cl2 and HCl CEMS, or provide a reasoned explanation for failing to do so. EPA has failed to require MM CEMS with adequate explanation.

EPA states it has not tested MM or Cl2 CEMS to determine that performance they can achieve. Without testing them, EPA has not and cannot offer an adequate explanation for failing to require them. EPA must continue testing all CEMS that are not currently available, and require them as soon as they become available.

EPA has declined to require Hg CEMS because it has determined that they are not commercially available. This determination remains unconvincing, given that Hg CEMS are actually in use in Germany. Even if Hg CEMS are unavailable, however, EPA should commit to test them regularly (at least annually). EPA must also include a provision in this HMC rule that sources will be required to install and use Hg CEMS as soon as EPA determines that they are commercially available. Otherwise, EPA will only be able to require the used of Hg CEMS by a rule revision, which would cause unnecessary delays in the deployment of these important monitoring systems. To the extent that EPA has determined not to require any other CEMS because it believes that they are not commercially available, EPA must also test these CEMS at least annually and include a provision in the HWC rule requiring their use as soon as they become commercially available. EPA has failed to require Hydrogen Fluoride CEMS without explanation.

EPA has not explained why it has not required the use of hydrogen fluoride (HFl) CEMS or, indeed, why it has not required the use of hydrogen for HFl. HFl is a HAP that HWC emit and, there fore, EPA has a non-discretionary duty to establish emission standards for HFl under section 112 of the Clean Air Act. To support this standard, EPA must also require the use of HFl, which are commercially available. EPA has failed to require hydrogen sulfide CEMS or FTIR.

Although hydrogen sulfide (H2S) is not a HAP, it is recognized to be a toxic air pollutant to which exposure at any level is hazardous. If HWC emit H2S EPA should use its discretion to set an emission standard for H2S, and should require H2S CEMS, which are commercially available, to support that standard.

FTIR, which is also a commercially available monitoring technology, can be used to monitor many HAPs. EPA must require the use of FTIR, or explain why it has declined to do so.

Summary

One commenter has requested the requirement for additional monitors for all parameters ranging from temperature to mercury.

Response

Presently, it is not technically or economically feasible to investigate the viability of each of these monitoring systems at HWCs. It is anticipated that as time passes and the technologies improve, EPA will further investigate these systems as better indicators of continual compliance. The commenter also suggested EPA require CEMS for which no standard promulgated in today's rule,

such as HF, NOx, etc. EPA cannot require monitoring for monitoring's sake, but rather can require CEMS to demonstrate compliance with a standard.

c. Recognize the Limitations of Parameter Monitoring

Comments

CS6A-029 (8) If sources do not monitor all the parameters necessary to know their actual emissions at all times, EPA's assumption that, because parameters are measured at certain values during a performance test those parameter values thereafter show compliance, is invalid. Reduced to syllogism, EPA's reasoning goes as follows: if a source is in compliance when parameter values equal "x" and "y", then parameter values "x" and "y" equal compliance. This is obviously wrong unless the source has chosen to monitor all the parameters that could possibly affect its emissions. A source may be out of compliance, even when its chosen parameters are at "x" and "y" because its emissions also vary with other parameters. For example, a source may choose to measure pressure drop in a baghouse and, during a performance test which indicates compliance with MACT standards, even though the pressure drop in its baghouse is "z", because any number of other variables in its feedrate, combustion process and pollution control system also influence its emissions. Indeed, HWCs are particularly susceptible to such variations because they continually are combusting different types and combinations of hazardous waste. Thus, data that sources rank to determine their individual PM CEMS operating parameter limits may include data from periods of time when the source is out of compliance.

Summary

If sources do not monitor all the parameters necessary to know their actual emissions at all times, EPA's assumption that, because parameters are measured at certain values during a performance test those parameter values thereafter show compliance, is invalid.

Response

EPA's strategy for operating parameter limits has been tested and historically considered an acceptable measure of compliance demonstration during periods when other direct emission measurements are not being made. The use of PM CEMS represent a dramatic improvement to the OPL approach and will further ensure compliance on a near continuous basis through the use of real time measurements.

CEMS Quality Assurance

1. Zero Gas Requirements

Comment

CEM6.001(111) RES would support any effort to consolidate zero gas requirements for the variety of CEMS.

CEM6.004(153) B. Zero Drift and Zero Gas Requirements (61 Fed. Ref,. at 17,442) CWM opposes the Agency's proposal to change the specification for zero-grade gases from 0-20 percent to a maximum of only 0.1 ppm of the measured constituent. Based on the current availability and grade of calibration gases being used at CWM facilities, CWM disagrees with the Agency's contention that calibration gases with up to 20% impurities are being used for CEM calibrations at HWCS. The zero grade gases used by CWMs incineration facilities consist of 99.99% nitrogen. Although the remaining 0.01% (100 ppm) has not been quantified and certified to not contain any of the measured constituent, its presence is unlikely due to the source material used to produce the calibration gas. To obtain a manufacturer's certification that the zero gas contains less than 0.1 ppm of the measured constituent would add significantly to the cost of the gas and would not likely provide any additional benefits.

CEM6.005(153) D. Zero Drift Test (61 Fed. Reg. at 17,448) CWM supports the Agency's suggestion to eliminate the daily zero drift test. The degree of CEM sophistication has advanced markedly since their development. Zero drift tests are performed automatically prior to calibration, and redundant system checks alert the operator if a zero drift has occurred. This would be a time saving event and would eliminate unnecessary paperwork and recordkeeping, without effecting instrument performance or emission standard compliance.

Comment Summary

Commenters disagreed on whether EPA should proceed with its proposal that it eliminate the low range drift check requirement and replace it with a zero check.

Response

EPA will not proceed with its proposed clarification, but notes that the low range calibration check (from 0 to 20% of full scale) allows facilities to use one gas bottle for all CEMS and not separate gasses for each CEMS.

2. Applicability of Part 60, Appendix F

Comment

CEM9.002(114)(a) QA procedures of Appendix F specify the minimum QA requirements necessary to control and assess the quality of CEM's data used for demonstration of compliance. This appendix defines "out-of-control period" with respect to daily calibration and quarterly audits. There is also

reference to minimum daily data requirement which has been used commonly by the power industry. This concept has also been applied to Municipal Waste Combustors (MWC). An example of minimum daily data requirement from 40 CFR 60.47a (applicable to Electric Utility Steam Generating Units) as it applies to continuous emission monitoring for sulfur dioxide is that the owner shall obtain emission data for at least 18 hours, in at least 22 out of 30 successive boiler operating days. The proposed rule is more stringent, specifically supersedes Appendix F with Appendix to Subpart EEE applicable to hazardous waste burning devices only. The only downtime of the CEM allowed is downtime due to calibration (20 minutes while calibrating a CEM).

In September 1990, guidelines were prepared for the Northeast States for Coordinated Air Use Management (NESCAUM) under a USEPA contract. NESCAUM recommended that states adopt regulations which require the use of CEMs to determine compliance with emission standards on a continuous basis at MWC facilities. The recommendation were:

- Establish initial certification procedures and requirements for CEMS;
- Define quality assurance (QA) procedures and criteria for the ongoing determination of the acceptability of the CEMs and the monitoring data; and
- Specify minimum data capture requirements.

CEM9.004(125)(a) Finally, UARG has some comments on the proposed QA requirements in the appendix to Subpart EEE, as applicable to PM CEMS. First, that appendix (sec. 1. 1) states that these QA requirements would "supersede" the QA requirements in Appendix F of Part 60. Since Appendix F of Part 60 could not apply to this Part 63 rule in the first place, this statement makes no sense.

<u>Comment Summary</u>

Commenters note:

- Certain statements relative to QA procedures for MWCs and utility boilers as they apply in NESCAUM states; and

- Appendix F does not apply to HWCs since Appendix F is found in Part 60 and the HWC rules are found in Part 63.

<u>Response</u>

EPA thanks the commenter for the NESCAUM information but notes the commenter did not link these observations with any recommendation on how the QA procedures that we proposed should be modified.

EPA disagrees with the second commenter. The appendices to Part 60 are relevant if the standards reference those appendices. CEMS requirements found in Appendix B to Part 60 were referenced, so Appendix F would have applied if EPA did not supercede them.

CEMS Relative Accuracy

1. Relative Accuracy Test Audits (RATAs)

Comment

CEM7.001(111) At any rate, RES's subsidiary facilities are well versed in CEMS QA/QC for CO, O_2, THC, SO_2, and even NO_x analyzers as mandated by the various plant permits. It is our view that while a RATA may be reassuring in a superficial sense, it offers little actual testing of a CEMS. Normal operation for most parameters leaves emissions significantly lower than the permit limits, and only process upsets approach most of the limits. RATA runs often do not envelop such upsets, and therefore the statistical comparison is at parameter levels as little as 2% of permit limit. Conversely, the conventional Cylinder Gas Audit (called ACA) tests CEM response to what amount to process upsets, and therefore tests the functionality of the CEMS to a greater degree. A RATA in the context of the Comprehensive Performance Test is somewhat logical, however more frequent RATAs on any analyzer are both costly and misleading, yielding if anything false positive results.

CEM7.003(180) 3. Performance testing is redundant for any emissions parameter for which a CEM is installed.

EPA has proposed (63.1208(d)) that HWIs with CEMs conduct relative accuracy test audits (RATA) for mercury, multi-metal, CO and oxygen CEM systems and relative calibration audits (RCA) for particulate CEM system in conjunction with comprehensive performance testing. EPA also proposes to require sources to conduct more routine QA/QC procedures for each CEM including: Daily Calibration Drift (CD) and Zero Drift (ZD) tests, and Quarterly Absolute Calibration Audits (ACA), except for multi-metal CEMS, ACAS will be required annually.

EPA states that one purpose of performance testing is to demonstrate that the source is in compliance with CEM- monitored emission parameters. CEMs provide continuous feedback that the source is meeting the emission standards. As stated previously, RATAs/RCAs and ACAs are similar tests. ACAs coupled with daily CD and ZD tests are sufficient to verify that the data gathered by CEMs is accurate and valid.

EPA should waive performance testing requirements as well as RATAs and RCAs for any emissions parameters being monitored by CEMs. This waiver would serve as an incentive for regulated facilities to install CEMs for additional emission parameters as the monitoring technology becomes both available and reliable.

CEM7.005(182) 4. Dow suggests EPA adopt a more flexible approach to CEM testing, taking into account historical calibration performance.

Dow believes that EPA has proposed an unnecessarily high frequency of calibration testing which can be modified, yet assure adequate calibration of these instruments. First, as a matter of practicality, EPA must utilize testing approaches which gather enough information on stack instruments without going overboard and collecting it for the sake of collecting it. Dow recommends EPA incorporate the approach used by Germany for certification of stack instrumentation. Dow

strongly suggests that EPA consider decreasing the QA frequency as repeated testing assures that calibration of the CEM is not changing. It is also suggested that a certification of CEMS be considered that incorporates a combination of laboratory and on-site certification similar to the German TUV Certification Process.

Table E-1 below summarizes recommended frequencies and information needs for this type of testing.

Table E-1. Suggested CEM Testing Frequencies
(section of Table pertaining to CMS deleted here, but appears in other place)

Instrument	**Quality Control**	**Quality Assurance**	
		Test Type	Frequency
CEMs			
Multi-metals	Written Protocol	RATA	Each time a Performance Test is Conducted
		ACA	Once per year [11]
PM	Written Protocol	RCA	Once per 18 months
		ACA	Once per 3 months [12]
Hg	Written Protocol	RATA	Each time a Performance Test is Conducted
		ACA	Once per 3 months [13]
HCl, Cl_2, CO, O_2, THC	Written Protocols	RATA	Once per year
		ACA	once per 3 months [14]

[Footnote 11: After sufficient data collected to statistically analyze calibration performance, this frequency would drop to once every two years.]

[Footnote 12: After sufficient data collected to statistically analyze calibration performance, this frequency would drop to annually if such performance is consistent.]

[Footnote 13: After sufficient data collected to statistically analyze calibration performance, this frequency would drop to annually if such performance is consistent.]

[Footnote 14: After sufficient data collected to statistically analyze calibration performance, this frequency would drop to annually if such performance is consistent.]

<u>Comment Summary</u>

Commenters suggest that:

- RATA tests are unnecessary;
- Performance testing is unnecessary if a CEMS is used for compliance with that standard;
- The calibration frequency should be less frequent

Response

EPA disagrees that RATA tests are unnecessary and that their frequency should be reduced. The long-standing standard frequency for RATAs involving gaseous CEMS is one year. This has been acceptable for all other industries subject to gaseous CEMS requirements for over 10 years. While daily calibration drift tests and quarterly Cylinder Gas Audits assess data validity well, annual RATAs serve as a dynamic check of the plant's CEMS accuracy performance relative to another CEMS. As such, RATAs provide an additional and important QA check and generally costs less than $10,000. EPA and all other industries have found their costs and frequency acceptable.

EPA agrees that, if a CEMS is used for compliance with a given standard, no performance test should be required for that standard. However, EPA also disagrees with the comment that performance testing is unnecessary if CEMS are used for compliance, particularly when the CEMS is serving as a surrogate for a hazardous pollutant. It is reasonable for some form of periodic performance testing be performed for the pollutant in question to occasionally confirm the applicability of surrogate measures. EPA proposed that emissions of nondioxin/furan organic hazardous air pollutants be controlled by compliance with continuously monitored emission standards for either of two surrogates: carbon monoxide or hydrocarbons. Carbon monoxide and hydrocarbons are widely accepted indicators of combustion conditions. The current RCRA regulations for hazardous waste combustors use emissions limits on carbon monoxide and hydrocarbons to control emissions of nondioxin/furan toxic organic emissions. Therefore, if a CO CEMS is used, a facility must still perform a performance test for HC to verify compliance with that other standard. See 56 FR 7150 (February 21, 1991) and the Technical Support Document Volume III Chapter 12 documenting the relationship between carbon monoxide, combustion efficiency, and emissions of organic compounds.

2. Manual Methods Used for RATAs

Comment

RCSP-139 (2) EPA has not demonstrated that the manual methods used to do relative accuracy tests can be performed with repeatable and accurate results. Furthermore, EPA is proposing to Relative Accuracy Test Audit monitors that provide continuous real time measurements using manual methods that provide time integrated values. EPA Methods 5, 25 and 29 have not been demonstrated to meet accuracy, repeatability and consistency of time averaging requirements basic to any monitoring program. FMC and FCC object to continuous emission monitoring for PM, Hg and HC on this basis.

Comment Summary

See brief comment.

Response

We do not agree with the commenters contention that Methods 5, 25, and 29 have not been demonstrated.

Performance Specifications

1. Performance Specifications Should Not be Promulgated

Comment

CEM3.027(191)(c) 84. Page 330 It is counter productive to produce a performance specification for a piece of equipment that does not yet exist (i.e., multi-metal CEM).

Comment Summary

See brief comment.

Response

While the commenter specifically addresses Performance Specification 10 for multi-metal CEMS, the comment also applies to other performance specifications EPA proposed yet has not tested. This same issue was also raised by commenters in the context of other CEMS. (Those comments are contained elsewhere with the response referenced here.) The comment will be addressed in this more general sense.

EPA agrees with the commenter that it is inappropriate to specify performance specifications for CEMS unless EPA has determined that those performance specifications are achievable by the CEMS and that level of performance ensures compliance with the standards. Therefore, EPA has chosen not to promulgate Performance Specifications 10, 12, 13, and 14 until it can determine through testing what levels of performance are achievable by the CEMS and acceptable for use as a compliance monitor. EPA has chosen not to promulgate Performance Specification 11 for PM CEMS because EPA plans to further refine Performance Specification 11 based on tests it plans at a MACT cement kiln, LWAK, and incinerator. Performance Specification 11 serve as guidance until the PM CEMS-based standards to support their use are promulgated.

Until enough data is available to promulgate these performance specifications, facilities should instead perform site specific demonstrations of CEMS they elect to use. The numerical values of these performance criteria found in the performance specifications (relative accuracy, calibration and zero drift, etc.) will be those determined by these site specific tests.

2. Placement of the Performance Specifications in the Regulations

CEM5.025(125)(b) II. PM CEMS and PS 11 For many years, the only acceptable and reliable compliance test methods for PM emissions have been manual stack test methods such as Reference Method 5. In this proposal, EPA for the first time has made a preliminary determination that PM CEMS are now sufficiently advanced to use as a compliance monitoring method. Because PM CEMS do not quantitatively measure PM, however, EPA has developed a procedure for establishing the necessary calibration between a Reference Method for PM (e.g., Method 5) and the PM CEMS. This procedure is proposed in PS 11 to Appendix B of the NSPS regulations. According to EPA, the Agency has "tested several of these [PM CEMS] devices at a hazardous waste incinerator and a

cement kiln and has found that PM CEMS maintain calibration...." 61 Fed. Reg. at 17436, col. 2. UARG has the following comments on the proposal to use PM CEMS as a compliance method and the PS I 1 procedures written to implement that requirement.

At the outset, as a procedural matter, UARG objects to promulgation of PS II in Pan 60 of Title 40 of the C.F.R. As EPA knows, Part 60 includes only NSPS regulations promulgated pursuant to § 111 of the Act. MACT standards like the one being proposed in this rulemaking are promulgated under § 112 of the Act and are codified in Part 63. Because EPA is proposing in this rulemaking the use of PS 11 only for a Part 63 MACT standard, it is misleading and inappropriate to propose a rule that amends Part 60. EPA is not relying on § 111 authority in this rulemaking, and has not provided any rationale in the preamble or elsewhere for amending Part 60. Indeed, EPA has included the proposed quality assurance (QA) procedures that will apply to PM CEMS in an appendix to Subpart EEE of Part 63, not in Part 60. It is illogical to include the QA procedures for the PM CEMS compliance monitoring in the relevant Subpart to Part 63, but not to include the performance specifications for the PM CEMS compliance monitoring in that Part 63 Subpart.

UARG is concerned that the placing of PS 11 in Part 60 represents EPA's first step toward requiring the use of PM CEMS as a compliance method for other sources, such as electric utilities. While this proposal does not take that next step, EPA or a state agency could propose to do so. In such a case, there could be some question as to whether the regulated community would have an opportunity to critique PS 11 as applied to units other than hazardous waste combustors, if PS 11 had already been promulgated in Part 60 without any limitation in its applicability to the source category for which it was proposed and promulgated.

Accordingly, if EPA promulgates PS 11, UARG requests that PS 11 be added as an appendix to Subpart EEE, Part 63, just as the Agency has done for the PM CEMS QA procedures. There is no legitimate basis for revising Part 60 in this rulemaking. [Footnote 5: This comment also applies to the other performance specifications in the proposal that would amend Part 60. UARG is focusing only on PS 11 because the utility industry is not, at this time, subject to regulation for any of the pollutants covered by the other proposed performance specifications.]

CEM6.002(125) Finally, UARG members believe that the addition of PS 11 to Appendix B of Part 60 is inappropriate, considering that Part 60 governs monitoring for new source performance standards (NSPS) under §111 of the Act, and this rulemaking only involves MACT standards being added to Part 63.

CS3A-003 (1)(c) However, UARG is also concerned that EPA could promulgate PS 11 in Part 60, as EPA proposed to do, and that, through further rulemaking, might then use PS 11 for any NSPS facility (or SIP facility, pursuant to 40 C.F.R. § 52.12(c)(1)) with a PM emission limit.[FN3] Even if EPA demonstrates that PM CEMs and PS 11 make sense for HWCS, EPA is not, in this rulemaking, attempting to ensure that PS 11 is reasonable for any other source types. Accordingly, it is simply inappropriate to promulgate PS 11 in Part 60. [FN3] As noted in its August 1996 comments, UARG is concerned that EPA believes that, by promulgating PS 11 in Part 60, comments on PS 11 would not be allowed in a later rulemaking that was conducted to require the use of a PM CEMs on an NSPS facility. In conclusion, UARG believes that the PM CEMS Report confirms that PM CEMs are not sufficiently advanced to use for determining compliance with PM emission limits.

EPA should not finalize its proposal to require PM CEMs for compliance determinations, and should not promulgate PS 11.

CS6A-006 (2). EPA's proposed Part 63 MACT standards for HWCs and associated particulate matter monitoring requirements are being promulgated pursuant to the Agency's § 112 authority, which addresses the regulation of hazardous air pollutants. 61 Fed. Reg. at 17360, col. 2 (1996). EPA to date has promulgated all regulations developed under § 112 of the 1990 Clean Air Act Amendments in Part 63 of the Code of Federal Regulations. In this case, however, EPA has proposed to include the monitoring requirements for this Part 63 standard not in Part 63, but in the Part 60 NSPS program. UARG has objected to the inclusion of the monitoring requirements in Part 60 in both sets of comments that have been filed.

It should be emphasized that UARG's objection is premised on the fact that the proposed monitoring provisions will apply only in the context of the HWC MACT standard being added to Part 63. This rulemaking is therefore unlike a Part 63 rulemaking that would reference and rely on a pre-existing Part 60 monitoring provision to satisfy a Part 63 monitoring requirement. In that setting, there is no problem with a Part 63 standard utilizing a Part 60 monitoring provision, because the Part 60 monitoring provision would already have been promulgated pursuant to § 111 and EPA would simply be proposing to use that Part 60 monitoring provision to satisfy a monitoring requirement for a Part 63 standard. In this case, however, EPA is promulgating monitoring provisions for use exclusively in a Part 63 standard. Such monitoring provisions cannot be included in Part 60. The new monitoring provisions will be completely unrelated to the Part 60 monitoring program and will have no applicability except with respect to the Part 63 HWC standards. Accordingly, it is illegal to include the proposed monitoring provisions in Part 60.

In summary, Method 5I, PS 11, and Procedure 2 do not belong in Part 60, and EPA must instead promulgate them in Part 63 (preferably in Subpart EEE, which is the only subpart in Part 63 to which they will apply). However, UARG notes that Method 5I is different than PS 11 and Procedure 2, because Method 5I could in fact be added to Part 60 as an "equivalent" or "alternative" method. See 40 C.F.R. § 60.8(b). (By contrast, PS 11 and Procedure 2 could not currently have any applicability in the Part 60 context, and thus could not be promulgated in Part 60.) UARG agrees with EPA that Method 5I represents a likely improvement over Method 5 for measuring low levels of particulate matter at facilities other than HWCs. However, if it is to be used for facilities other than HWCs, it must be proposed pursuant to §§ 111 and 307(d) of the Act as an "equivalent" or "alternative" method, as EPA has done for other methods added to Appendix A of Part 60. EPA has not proposed Method 5I as an "equivalent" or "alternative" Part 60 method in this case. Until it does, Method 5I cannot be added to Part 60.

<u>Comment Summary</u>

The commenter believes performance specifications found in Appendix B to Part 60 apply only to standards found in Part 60. Since these standards are found in Part 63, the performance specifications should be appended there, not to Part 60.

<u>Response</u>

EPA does not agree with the commenter's supposition that the methods, performance specifications, and quality assurance criteria appended to Part 60 apply only to standards found in Part 60 and not those found in other parts of The Code. The appendices to Part 60 are the repository for all air methods for stationary sources. As such, and to avoid duplication and confusion, it is appropriate that all test methods, Performance Specifications, and quality assurance procedures be placed as appendices to Part 60 irrespective of whether the applicable regulations are found in Part 60 or elsewhere.

Also, EPA does not agree with the commenter's viewpoint that new Performance Specifications, methods, or quality assurance procedures will be required for compliance by sources with standards in Part 60. Test methods for those standards were defined when those subparts were promulgated. For instance in the case of Part 60, Subpart F–Standards of Performance for Portland Cement Plant, the standards are defined in 40 CFR 60.62 and test methods and procedures in §60.64. Part 60, Subparts D, Da, Db, and Dc are similar, with the standards for particulate matter found in §§60.43 and the manual methods used for compliance defined later in the subparts (thought their exact placement varies by subpart). To change the test methods requirements of any standard found in a subpart to Part 60 would require rulemaking or a some similar notice and comment process. The commenter's concerns are better addressed in that forum, when and if it occurs.

Appendix to Subpart EEE

1. Removal of Bad Data

Comment

CEM1.005(100)(b) Likewise the lack of provisions for removal of bad data points from unproved analyzers increases the probability of unjustified enforcement actions.

Comment Summary

See brief comment.

Response

EPA concurs with the commenter, but notes the commenter did not provide sufficient detail for us to act now. We recommend facilities discuss this with their permitting authority. The handling of "flagged data" will be addressed in the context of particulate matter CEMS.

2. Availability of Standard Materials

Comment

CEM9.004(125)(b) Second, the appendix (sec. 5.2.2) refers to "NIST traceable calibration standards" for use in conducting quarterly "absolute calibration audits" of the PM CEMS. UARG is not aware that any such calibration standards exist (or could be made) for the of PM CEMS that are available. [Footnote 8: The only possible exception would be for an opacity transmissometer that was used as a PM CEMS, if filters were available that could be deemed NIST traceable calibration standards. However, as EPA acknowledges in the preamble, see 61 Fed. Reg. at 17435-36, the PM emission levels that will normally exist for Subpart EEE sources are too low to allow the use of opacity transmissometers as PM CEMS.] UARG requests that EPA clarify this reference to NIST traceable calibration standards.

Comment Summary

The commenter states that NIST traceable standards for new CEMS do not exist.

Response

EPA recognizes the commenters concern and will address the issue whenever Performance Specification 11 is reproposed.

3. Batch CEMS

Comment

CEM9.005(141) N. EPA has failed to provide for batch CEMs in Subpart EEE, despite allowing them as alternatives under Performance Specifications 10 through 13

At no point in Subpart EEE and its Appendix does EPA provide methodology for the use of data taken from batch CEMS. Performance Specifications 10 through 13 clearly envision the potential for use of batch CEMS, in that they provide special consideration of response time for such monitors (see PS10, Sec. 4.5.3, PS 11, Sec. 5.4.2, PS 12, Sec. 4.6.3, PS 13, Sec 4.5.3). Here, the sampling time is not to exceed one-third of the averaging period of the applicable standard. As the averaging periods are one to ten hours, the expected sampling time ranges from 20 minutes to more than three hours. Clearly, such monitors will be incapable of generating measurements every 15 seconds. If they are in fact to be allowed, EPA must explicitly provide for a means of treating the data they generate in such a way that the choice of either a batch or a continuous reading monitor will not produce a compliance advantage over the alternative. Lilly suggests that the use of the General Provisions' requirements at 40 CFR 63.8(c) for continuous reading monitors (one measurement every 15 minutes, which may be the average of numerous shorter-period measurements), with the use of a three-measurement (minimum) average requirement for batch monitors, will go a long way toward making the data requirements comparable between the two alternative approaches.

Comment Summary

EPA failed to account for batch CEMS in the Appendix to Subpart EEE.

Response

We agree, but note that none of the performance specifications the commenter references are contained in the final rule. Batch sampling does not apply to the CEMS EPA is promulgating performance specifications for CO, HC, or O_2 CEMS.

Peer Review

Question Posed by EPA to Peer Reviewers: *If the Agency's demonstration of PM and Hg CEMS is successful, is it reasonable to conclude that they are commercially available and effective.*

1. Peer Reviewer -- Brunner

Comment

Brunner and Santoleri do not believe that successful demonstration of the PM and Hg CEMS justifies conclusion that they are commercially available. They expressed concern regarding representativeness of the demonstration facility for the entire regulated population, lack of understanding regarding the relationship between optical properties PM concentration and emission rates and reliability of Hg CEMS.

Brunner -- Need to comprehensively demonstrate the relationship between optical properties, particle size distribution, and loading rate for optical PM CEM methods before they are to be considered ready for mass loading measurements. The PM CEM demonstration should concentrate on the beta gauge monitors. Also, need to demonstrate PM CEM on a wet scrubber system. The testing programs should be modified to include long-term testing on different types of HWC systems.

Comment Summary

Peer review member Brunner provided the following comments:

- A successful demonstration of Hg and PM CEMS does not justify that they are commercially available since the demonstration sites may not be representative of the entire HWC population;
- He is unfamiliar with optical PM CEMS;
- He is unfamiliar with the reliability of Hg CEMS;
- Need to demonstrate that optical PM CEMS can work under conditions of varying particle size and load;
- He believed beta gage PM CEMS work better;
- Need to demonstrate the viability of PM CEMS at truly wet stacks; and
- Demonstration program should include long-term testing at different HWC types.

Response

EPA agrees that a single demonstration *may not* justify whether they will work at other sources, but believes the demonstrations performed were adequate to determine whether Hg and PM CEMS

would work on all sources effected by this rule. See the "reasonable worst case" justifications in each of the demonstration test reports.

EPA notes the Peer Reviewer's lack of familiarity with optical PM CEMS and Hg CEMS.

EPA's PM CEMS demonstration test showed PM CEMS work at a source with varying load and particle size.

The Eli Lilly tests adequately show that heated, extractive PM CEMS can be correlated to manual reference method measurements at sources with entrained water droplets (*i.e.*, truly wet stacks).

EPA agrees that it in an ideal world it is desirable to have as many long-term tests as possible, but disagrees that they are required. PM CEMS are being used on sources worldwide, so the task for EPA was to show what the worst performance one would expect using US methods and procedures. We believe the key advantage of performing more tests is to ensure facilities have an good understanding of how the CEMS work and are comfortable with their use.

2. Peer Reviewer -- Santoleri

Santoleri provided the same summary as Peer Reviewer Brunner. Santoleri pointed out the following issues on PM and Hg CEMs that must be considered:

- Would be an undesirable noncompetitive situation if only one monitor can meet the required specifications.
- CEM maintenance requirements must be fully considered.
- Added financial burden on small on-sites. Questions is there is a need for CEM for sites that handle a constant waste stream.
- The use of light-scattering CEMs is not appropriate for facilities which fire different waste streams and have PM emissions of varying size and type. Calibration is not impossible.
- German experience must be put into context with a consideration of the time to install and train an adequate workforce on use of CEMs.
- Grace period without penalty should be allowed for retrofitting and replacement of CEM units which do not turn out to work.
- Unfair cost to small facilities to use CEMs. What about other sources as opposed to just HWIs.

Comment Summary

See brief comment, above, as well as those in the previous issue 1 of this chapter.

Response

See the response found in the previous issue 1 of this section for more information relative to Peer Reviewer Santoleri's combined write-up with Brunner.

EPA agrees that a noncompetitive situation may result if only one CEMS can meet the promulgated performance specifications at the time of promulgation, but does not agree that this is a certain result. Instruments would not need to be installed for three years after promulgation and this time would allow competitors to redesign their equipment to meet the performance goals found in the specifications.

CEMS maintenance requirements were fully considered.

EPA has taken the financial burden on small incinerators into account. EPA believes a CEMS might be required for sources that handle consistent waste streams. For example, PM emissions are a function of not only combustion by-products, but also the type, design, and use of the air pollution control equipment. (Carbon injection, for instance, works by injecting activated carbon into the flue gas and catching it with some PM APCD.) Whether a CEMS is required for small sources would also depend on the cost of the monitor, weighed against the societal benefits gained by knowing emissions at the source.

EPA believes light scattering PM CEMS have been demonstrated at a source with multiple waste streams. Good correlation between the PM CEMS outputs and the manual method measurements was shown. See the PM CEMS demonstration test report.

EPA agrees that facilities need time to understand how PM CEMS work and how to control their emissions using a PM CEMS. See section 1 issue 6 of this document, specifically the discussion regarding the need for a shakedown period.

EPA believes that, while small HWC facilities may have to bear a higher relative cost for CEMS than larger ones, the cost for CEMS are reasonable. However, small HWC facilities have the option to employ Section 63.1209(g)(1) of rule as a mechanism to petition the Administrator for use of an alternative monitoring method. In regards to other types of non-HWC sources, EPA will evaluate whether to require CEMS on other source categories on specific circumstances of the affected industry, based on such considerations as cost, emission limits, and other factors.

3. Peer Reviewer -- Van Geison

Comment

Van Gieson stated that the European experience and data demonstrate that PM emission monitoring technology is already commercially available for application under the conditions expected at HWC facilities. Van Gieson expressed concern over using the results of a single demonstration for Hg CEMS to conclude commercial availability and effectiveness. Hg CEMS technology is still in the developmental stage and has not yet been demonstrated successfully at full scale operation. In the past, CEMS for other pollutants (opacity, SO_2, and NO_x) that operated well at some facilities were

not able to perform successfully at facilities with different conditions. Demonstration of a single device or a single analytical technique at one demonstration site may not support the conclusion of universal applicability and effectiveness.

Van Gieson -- It is reasonable to conclude that PM CEMs are affective if Agency's demonstration shows this. Hg CEMs are not available or effective since only one monitor is commercially available. Much more demonstration and development are needed for Hg CEMs.

Summary

This peer reviewer stated:

- The fact that PM CEMS are used in Europe adequately demonstrates that they are commercially available;
- A concern that one demonstration of an Hg CEMS may not demonstrate that they are available or feasible for all HWC sources;
- Observed that Hg CEMS have not yet been demonstrated; and
- More development and demonstration of Hg CEMS is necessary.

Response

EPA agrees with the commenter that the fact that PM CEMS are used in Europe means they will work here. However, tests are necessary to determine what performance might be expected using US methods and procedures. Tests also are beneficial in ensuring adequate facility "buy-in" on using the CEMS.

EPA notes that no Hg CEMS requirement is promulgated in today's rule.

4. Public Comment on the Peer Review

Comment

CEM1.NOD.002(221) The peer review comments broadly support CMA's comments regarding BTF levels and CEMS.

CEM1.NOD.004(222)(a) 3. We agree with several of the reviewers comments on CEM's availability. We agree with the statements "in the past CEMS for other pollutants (opacity, SO_x and NO_x) that operate well at some facilities were not able to perform successfully at facilities with different conditions. Demonstration of a single device or a single analytical technique at one demonstration site may not support the conclusion of universal applicability and effectiveness."

CEM1.NOD.004(222)(b) CRWI supports one reviewer's (Santoleri) suggestion that EPA develop a grace period to allow testing and refitting or replacing CEM units that do not work without

incurring penalties. CRWI thinks this concept should be extended into the operation period with the use of a Malfunction Abatement Plan.

CEM1.NOD.004(222)(c) As CRWI stated in our August 19 comments, we support the use of CEM's where the technology is reliable and cost effective. CRWI does not think that the technology for PM and mercury CEMs is currently available.

CEM1.NOD.004(222)(d) CRWI would welcome the opportunity to work with the Agency to develop a method for "certifying" CEM's that includes options to use (based on individual site needs), amount of on-line time, site-specific phase-in periods, applicability for different stack gas environments (e.g. wet vs. dry), and other implementation of CEM's issues. CRWI thinks that a workable solution can be developed that will assure the Agency and the public that emission standards are being met without undue hardship on the regulated community.

CEM1.NOD.005(230) 7.Issue 3: All seem to concur to some extent that single or unique demonstrations of this technology do not mean that the CEMS are commercially available and effective. We agree with and support this conclusion.

CEM1.NOD.006(232) 7.Issue 3: All seem to concur to some extent that single or unique demonstrations of this technology do not mean that the CEMS are commercially available and effective. We agree with and support this conclusion.

CEM1.NOD.008(238) F. Availability of CEMs for PM and Hg: The panel supports what Holnam and other parties stated in their comment on the proposed rule: EPA does not have adequate information on the application of CEMS to monitor PM and Hg to support its use in this rule. Two of the three panel members do not believe that even after a successful demonstration project by EPA, it is reasonable to conclude that CEMS for PM and Hg is commercially available and effective. One panelist believes that PM CEMS is available based on European experience, but that Hg has not been adequately demonstrated. Of particular importance, is the panel's opinion that, based on past experience with other pollutants, CEMS "that operated well at some facilities were not able to perform successfully at facilities with different conditions." Hence, the panel concludes that a demonstration that a particular device works at a particular facility does not indicate that CEMS necessarily has wide applicability. We note that this is one question, for which the panel appears to have appropriately considered the differences among facilities (although the focus is on the differences among facilities in general, not between CKs, LWAKS, and HMs). Holnam believes that the panel's conclusion support the use of an alternative compliance method for both PM and Hg.

CEM1.NOD.009(241) 3. Continuous emissions monitoring systems for compliance: CKRC agrees with the panelists' conclusion that a one time successful demonstration of a CEM in no way makes it reasonable to conclude that such a unit is commercially available and effective. Nor does it provide the necessary assurance that the Agency should mandate the installation and operation of such units as a pre-existing condition for a facility to burn hazardous waste. CKRC, in conjunction with CRWI and CMA, retained a contractor to perform an evaluation of the current state-of-the-art for mercury and PM CEM technology. This critical review will be provided to the Agency under separate cover in the next few weeks.

CEM1.NOD.010(243) F. Continuous Emission Monitors (CEMS) The ETC has reviewed the comments of all three peer reviewers regarding CEMS. We concur with all of the technical points regarding CEMs made by the peer reviewers, and note that these comments support the ETC MACT comments. In particular, we urge EPA to address the maintenance and reliability arguments presented by Santoleri and Brunner.

CEM1.NOD.011(245) Third, Dow wants to reinforce concerns regarding the role of CEMs in monitoring hazardous waste combustion emissions. Consistent with the views of CRWI, CMA and the peer reviewers, Dow believes it is inappropriate for EPA to mandate the use of CEMs which are not fully developed, technologically. Although Dow is aware of the Agency's ongoing work on CEMS, this work still fails to address the full range of operating environments in which such technologies must operate.

CEM2.NOD.001(221) Finally, the engineering peer reviews support our assertion that PM and Hg CEMs should not be required.

CEM2.NOD.002(221) CMA believes EPA's proposal to require continuous emissions monitors for mercury and particulate matter compliance lacks a valid technical basis. In trying to validate the Agency's claim that continuous mercury and particulate matter emissions monitors are available and can thus be required under a MACT rule, CMA, along with the Cement Kiln Recycling Coalition and the Coalition for Responsible Waste Incineration, commissioned an independent study of state-of-the-art mercury and particulate matter CEMS. The final report will be sent to the docket under separate cover. Highlights, however, are presented below.

CEM2.NOD.003(221) As for Hg monitors, the contractor is finding that most of the analyzers are unable to measure either particulate bound or speciated mercury directly, in contrast to vendor claims. The inability of these CEMs to sample isokinetically can cause biased results when compared to an EPA reference method.

CEM2.NOD.004(221) Although there are a variety of monitors seemingly available, they have not been used to demonstrate compliance with the performance standards as outlined by EPA on a regular basis. This fact alone causes CMA to question EPA's current requirement for these units for MACT compliance. EPA's engineering peer reviewers unanimously agreed that "[demonstration of a single device or a single analytical technique at one demonstration site may not support the conclusion of universal applicability and effectiveness," thus casting serious doubt on the validity of requiring CEMS. Highlights of individual reviewers are reported below.

CEM2.NOD.005(221) "Likewise, Hg monitoring equipment is not commonly used and should not be imposed on an operator until it is demonstrated to be practical on similar installations." Mr. Van Gieson "Without a body of evidence to evaluate any of the performance characteristics of this [Hg CEMS] device, and since no other commercially available instrumentation has been identified or demonstrated, it is not reasonable to conclude that mercury CEMs are commercially available and effective."

CEM2.NOD.006(221) Therefore, strengthened by the comments from the independent peer reviews, CMA strongly urges EPA to allow hazardous waste combustion facilities to continue to use

other existing, proven compliance methods for mercury and particulate matter emission standards, including the use of continuous samplers, as outlined in our comments on the proposed rule. Accordingly, EPA cannot properly require the installation and operation of CEMs until these devices have been proven and validated.

CEM2.NOD.007(221) In addition, while CMA is generally supportive of the use of proven continuous emissions monitors, CMA objected to the requirement for CEMs for particulate matter (PM) and mercury (Hg), as they are inadequately developed, not readily available nor provably reliable.

CEM2.NOD.008(229) Similarly, while Eastman generally supports the use of continuous emission monitors (CEMS), it does not believe that particulate matter (PM) or mercury (Hg) CEMS are adequately developed, readily available, or proven to be reliable, and, therefore believes that EPA should not mandate their installation on all hazardous waste combustors.

CEM2.NOD.009(229)(a) CEMS for Particulate and Mercury: As stated in its August 19, 1996 comments, Eastman believes that CEMS generally provide operating and compliance advantages for both the operating facility and the Agency, and, therefore, supports their development and use. However, Eastman does not believe that CEMS for PM and Hg have been proven to be developed to the point that they should be mandated for all hazardous waste combustors. The engineering peer reviewers also questioned the state of development of these CEMS. Brunner and Santoleri do not believe that successful demonstration of the PM and Hg CEMS justifies conclusion that they are commercially available. They expressed concern regarding representativeness of the demonstration facility for the entire regulated population, lack of understanding regarding the relationship between optical properties PM concentration and emission rates and reliability of Hg CEMS.11 (p. 5) While Van Gieson stated that the European experience and data demonstrate that PM emission monitoring technology is already commercially available, he expressed concern over the availability of mercury CEMS. Van Gieson expressed concern over using the results of a single demonstration for Hg CEMS to conclude commercial availability and effectiveness. Hg CEMS- technology is still in the development stage and has not yet been demonstrated successfully at full scale operation. In the past CEMS for other pollutants (opacity, SO_x and NO_x) that operated well at some facilities were not able to perform successfully at facilities with different conditions. Demonstration of a single device or a single analytical technique at one demonstration site may not support the conclusion of universal applicability and effectiveness. (p. 5)

CEM2.NOD.011(243) We also concur with Brunner and Van Gieson that it is not reasonable to conclude that mercury CEMs are available. There are more appropriate measures of Hg, HCl, and Cl_2 emissions.

CEM2.NOD.012(244) The peer review also incorrectly concludes that PM and Hg CEMS are commercially available and effective: 1) Only a few models of Hg CEMS are currently available. Performance and reliability of these units have not been fully demonstrated over extended periods. Also, these systems are very expensive. New Hg CEMS are being developed, but extensive field testing is necessary to demonstrate the capabilities, effectiveness, and reliability of this technology.

CEM2.NOD.013(246) Question 3: PM and Mercury CEMS: RES concurs with the Engineering

Panel that mercury and PM Continuous Emission Monitors ("CEM") are not currently proven as acceptable for routine commercial operation. A significant problem with PM CEMs is the requirement for site-specific calibrations. This was discussed by both Brunner, "Where a HWC will be firing a variety of waste streams --- calibration may be close to impossible" and Santoleri, "For. a system which has feed stock changes on a hourly basis, the requirement for site specific calibration can only mean the system can not differentiate between different loadings and different particle characteristics." We agree with Santoleri (Item 7.1.1.4) that "a grace period should be included in the initial rulings which allows the testing and then retrofitting or replacement of PM units which do not work without incurring any penalty." There was somewhat less pessimism about the mercury CEM but reservations were still strong. For example, Brunner said, "The testing program should be modified to include additional long- term testing on different types of HWC systems to establish equipment reliability." RES agrees with the panel and supports a long-term testing program of a one-year duration to determine the applicability of the best PM and mercury CEMs to realistic incineration plant environments. RES is willing to participate in this program by allowing the EPA to install and develop operating experience on our incineration systems. The MACT Rule should be promulgated using the current control method of stack tests with operational and feed controls. Then, when the CEMs are ready, they could be phased into the MACT regulations. Promulgation of the MACT Rule should not be delayed because of CEM unavailability.

CEM5.NOD.002(221) Therefore, strengthened by the comments from the independent peer reviews, CMA strongly urges EPA to allow hazardous waste combustion facilities to continue to use other existing, proven compliance methods for mercury and particulate matter emission standards, including the use of continuous samplers, as outlined in our comments on the proposed rule. Accordingly, EPA cannot properly require the installation and operation of CEMs until these devices have been proven and validated.

CEM5.NOD.003(221) The peer review comments broadly support CMA's comments regarding BTF levels and CEMS.

CEM5.NOD.004(221) Finally, the engineering peer reviews support our assertion that PM and Hg CEMs should not be required.

CEM5.NOD.005(221) CMA believes EPA's proposal to require continuous emissions monitors for mercury and particulate matter compliance lacks a valid technical basis. In trying to validate the Agency's claim that continuous mercury and particulate matter emissions monitors are available and can thus be required under a MACT rule, CMA, along with the Cement Kiln Recycling Coalition and the Coalition for Responsible Waste Incineration, commissioned an independent study of state-of-the-art mercury and particulate matter CEMS. The final report will be sent to the docket under separate cover. Highlights, however, are presented below.

CEM5.NOD.006(221) In their review of PM monitors, the consultant is finding that these devices are used mainly as opacity monitors or as qualitative indicators of control system performance. In addition, most of these units have problems with moisture and condensibles being recorded as particulate. This is extremely significant for incinerators which use wet scrubbers for air pollution control, as this will overstate actual particulate concentrations.

CEM5.NOD.007(221) Although there are a variety of monitors seemingly available, they have not been used to demonstrate compliance with the performance standards as outlined by EPA on a regular basis. This fact alone causes CMA to question EPA's current requirement for these units for MACT compliance. EPA's engineering peer reviewers unanimously agreed that "demonstration of a single device or a single analytical technique at one demonstration site may not support the conclusion of universal applicability and effectiveness," thus casting serious doubt on the validity of requiring CEMS. Highlights of individual reviewers are reported below.

CEM5.NOD.008(221) Mr. Santoleri "Currently, PM monitors ... use light scattering and light attenuation [to] measure the particulate. The particle size and shape have a significant impact on this measurement technique. A hazardous waste incinerator will have a variety of types of dust exiting the unit.... For a system which has feedstock changes on a hourly basis, the requirement for site specific calibration can only mean the system can not differentiate between different loadings and different particle characteristics." "Monitoring ... [by] the majority of the units will not produce a cost effective reduction in these particles." Mr. Brunner "Particulate matter loading can not be inferred from optical measurements alone.... [T]here is no correlation between opacity and particulate loading without knowing the particulate size distribution.... Therefore, a concentration of 0.5 pm particles could be visible while the same loading would not be visible if the mean particle size were less than 0.2 pm or greater than 2.0 pm mean diameter. The relationship between optical characteristics and loading is very strongly influenced by particulate size distribution." "It is recommended that optical meters not be considered further for particulate loading measurements until more complete studies are made of the relationship between particulate loading and particulate size distribution.... Forecasting a particulate size distribution is close to impossible..... [T]here would be no basis on which to assume that a calibration would hold from one set of feed/combustion conditions to another." "The proposed DEMONSTRATION TEST PROGRAM, however, does not properly address the issue of reliability and effectiveness of CEMS." "PM monitoring has not been used on a commercial basis and until it has some kind of track record in the field where maintenance effort and reliability can be established, it should not be used as CEMs obligation."

CEM5.NOD.009(221) The results of the PM CEMs show that even with commercially available technology from multiple vendors, a demonstration project may not conclusively demonstrate availability and effectiveness. (emphasis added)

CEM5.NOD.010(221) In addition, while CMA is generally supportive of the use of proven continuous emissions monitors, CMA objected to the requirement for CEMs for particulate matter (PM) and mercury (Hg), as they are inadequately developed, not readily available nor provably reliable.

CEM5.NOD.011(229) Similarly, while Eastman generally supports the use of continuous emission monitors (CEMS), it does not believe that particulate matter (PM) or mercury (Hg) CEMS are adequately developed, readily available, or proven to be reliable, and, therefore believes that EPA should not mandate their installation on all hazardous waste combustors.

CEM5.NOD.012(229) CEMS for Particulate and Mercury: As stated in its August 19, 1996 comments, Eastman believes that CEMS generally provide operating and compliance advantages for both the operating facility and the Agency, and, therefore, supports their development and use.

However, Eastman does not believe that CEMS for PM and Hg have been proven to be developed to the point that they should be mandated for all hazardous waste combustors. The engineering peer reviewers also questioned the state of development of these CEMS. Brunner and Santoleri do not believe that successful demonstration of the PM and Hg CEMS justifies conclusion that they are commercially available. They expressed concern regarding representativeness of the demonstration facility for the entire regulated population, lack of understanding regarding the relationship between optical properties PM concentration and emission rates and reliability of Hg CEMS.11 (p. 5) As it has said in previous comments, Eastman believes that CEMS for PM and Hg should be optional. Facilities should be able to demonstrate compliance by either CEMS monitoring or through the use of feedrate/operating parameter controls. To encourage the development of CEMS, EPA should provide incentives that will make it attractive for owner/operators to choose to install CEMS.

CEM5.NOD.013(233) 3. EPA offers no exclusions from PM CEMS for off gas systems equipped with High Efficiency Particulate Air (HEPA) filtration even though HEPAs are recognized as MACT for PM control DOE facilities routinely use HEPA filters to control radionuclides. These HEPA filters achieve over a 99.97% removal efficiency at .3 microns for particulate. Therefore, DOE believes that the requirement to use CEMS to measure PM to the level proposed in the rule is unnecessary under the DOE approach which achieves much more stringent particulate removal levels than the proposed MACT rule would require.

CEM5.NOD.014(233) 5.II.C.7.a. Evaluation of Monitoring Options: EPA proposes under 40 CFR 63.1210 that PM is a surrogate indicator for metals and semivolatile organic emissions and thus PM should be monitored using a PM CEMS (61 FR 17435, col. 1). DOE believes that the proposed limits for metals and D/F emissions levels are so low that PM emissions will never reach the proposed limit of 0.03 gr/dscf for PM. Thus, PM CEMS is not warranted. Facilities proposing to implement metals feed rate limits to control metals emissions would not need to install a PM monitor because PM emissions will be thereby controlled. DOE requests that EPA allow the installation of PM CEMS to be optional. DOE believes that facilities should be free to select normal waste feeds that have the highest ash content for the trial burn in which soils and liquids should be used. DOE points out that its Mixed Waste Focus Area is working to develop emission monitors which can be used for existing facilities which treat RMW. It is estimated that an additional 10 to 24 months will be required to develop these monitors.

CEM5.NOD.015(243) We also concur with and encourage EPA to adopt Santoleri's recommendation in Section 7.1.1.4 of allowing for a break-in period for new CEMS, such as PM.

CEM5.NOD.016(244) 2) PM compliance monitoring is mandatory in the proposed rule and the data available regarding LWAK PM emissions is based on EPA Sampling Method No. 5. No data is available regarding the comparison of gravimetric response of the PM CEMs to the PM emissions data gathered using EPA Method 5. While the PM CEMS may be effective, as stated in the peer review, it is not logical to conclude that the PM CEMS should be used to assure compliance with a standard based on data gathered using EPA Method 5. It should also be noted that the standard error (SE) for EPA method 5 is 10.4 percent, assuming the same laboratory conducts all the test measurements.

CEM5.NOD.017(246) Question 3: PM and Mercury CEMS: RES concurs with the Engineering

Panel that mercury and PM Continuous Emission Monitors ("CEM") are not currently proven as acceptable for routine commercial operation. A significant problem with PM CEMs is the requirement for site-specific calibrations. This was discussed by both Brunner, "Where a HWC will be firing a variety of waste streams --- calibration may be close to impossible" and Santoleri, "For. a system which has feed stock changes on a hourly basis, the requirement for site specific calibration can only mean the system can not differentiate between different loadings and different particle characteristics." We agree with Santoleri (Item 7.1.1.4) that "a grace period should be included in the initial rulings which allows the testing and then retrofitting or replacement of PM units which do not work without incurring any penalty." There was somewhat less pessimism about the mercury CEM but reservations were still strong. For example, Brunner said, "The testing program should be modified to include additional long- term testing on different types of HWC systems to establish equipment reliability." RES agrees with the panel and supports a long-term testing program of a one-year duration to determine the applicability of the best PM and mercury CEMs to realistic incineration plant environments. RES is willing to participate in this program by allowing the EPA to install and develop operating experience on our incineration systems. The MACT Rule should be promulgated using the current control method of stack tests with operational and feed controls. Then, when the CEMs are ready, they could be phased into the MACT regulations. Promulgation of the MACT Rule should not be delayed because of CEM unavailability.

RCSP-229 (4) CEMS for Particulate and Mercury: As stated in its August 19,1996 comments, Eastman believes that CEMS generally provide operating and compliance advantages for both the operating facility and the Agency, and, therefore, supports their development and use. However, Eastman does not believe that CEMS for PM and Hg have been proven to be developed to the point that they should be mandated for all hazardous waste combustors. The engineering peer reviewers also questioned the state of development of these CEMS. "Brunner and Santoleri do not believe that successful demonstration of the PM and Hg CEMS justifies conclusion that they are commercially available. They expressed concern regarding representativeness of the demonstration facility for the entire regulated population, lack of understanding regarding the relationship between optical properties PM concentration and emission rates and reliability of Hg CEMS.11 (p. 5) As it has said in previous comments, Eastman believes that CEMS for PM and Hg should be optional. Facilities should be able to demonstrate compliance by either CEMS monitoring or through the use of feedrate/operating parameter controls. To encourage the development of CEMS, EPA should provide incentives that will make it attractive for owner/operators to choose to install CEMS

<u>Summary</u>

Commenters stated that the peer review's conclusions affirm their earlier comments that Hg and PM CEMS are not adequately demonstrated or commercially available. One commenter stated the opposite, that the peer review concluded that Hg and PM CEMS were commercially available, but disagreed with this interpretation of the peer review's conclusion. Subissues include:

- Demonstration of a single device or a single analytical technique at one demonstration site may not support the conclusion of universal applicability and effectiveness;

- A grace period should be allowed for CEMS whose performance is not as intended;

- A willingness to cooperate;
- EPA's proposal to require Hg and PM CEMS lacks technical or legal basis;
- Any CEMS requirement should be phased in;
- The need to exclude sources equipped with HEPA filters from any PM CEMS requirement;
- PM emissions at DOE facilities are far below the proposed 0.030 gr/dscf emission standard, so a PM CEMS is not needed;
- As well as specific quotes made by certain members of the peer review.

Response

EPA notes the peer review's affirmation of their original comments and our responses to those comments. For responses to Hg CEMS comments, see section 2 issue 1 of this volume of the Response to Comments document. For responses to PM CEMS comments, see section 5 issue 1 of this volume of the Response to Comments document.

EPA agrees that a demonstration test at a single source may not necessarily mean it will work elsewhere. This is why EPA closely analyzed what would be worst case for performance of the monitors and tested the Hg and PM CEMS where we did. EPA believes in this case both the Hg and PM CEMS demonstration test sites were a reasonable worst case for performance of the respective CEMS, and therefore if performance is acceptable at the demonstration test source, performance would be no worse at other sources.

We note the commenters need for a grace period and refer the reader to section 1 issue 4, dealing with Incentives for optional CEMS, of this volume of the Response to Comments document.

EPA also notes commenters willingness to assist us in demonstrating CEMS and thanks the commenter for helping us.

For more on EPA's technical and legal basis to require CEMS, see section 1 issue 1 of this volume of the Response to Comments document.

EPA has chosen not to act on the issue of whether any CEMS requirement should be phased in.

EPA does not understand why a device's removal efficiency or the size of the PM passing through the filter when the device is properly operated has any bearing on whether it should use a PM CEMS. The commenter did not characterize emissions when the device is not operating properly or how often this occurs.

We also note that DOE's facilities have emissions below the proposed 0.030 gr/dscf emissions standard, but note a 0.015 gr/dscf standard is being promulgated. The commenter did not note how

emissions relate to this emissions level.

Comments related to what specific peer reviewers said in their comments are addressed in the appropriate section for that peer reviewer, above.