used to increase method precision. This requirement applies whether you use Method 5i to demonstration compliance with the emission standard or to correlate a particulate matter CEMS. In addition, if you elect to petition the Administrator for approval to use a particulate matter CEMS and elect to use Method 5 to correlate the CEMS, you must also obtain paired Method 5 data to improve method precision and, thus, the correlation.

During our CEMS testing, we collected particulate matter data using two simultaneously-conducted manual method sampling trains. We called the results from these simultaneous runs ''paired data.'' We discussed the use of paired trains in the December 1997 NODA as being optional but requested comment on whether we should require paired trains, state a strong preference for them, or be silent on the issue. Many commenters believe paired trains should be used at all times so precision can be documented. With these comments in mind, and consistent with our continued focus on the collection of high quality emission measurements, we include a requirement in Method 5i to obtain paired data. Method 5i also includes a minimum acceptable relative standard deviation between these data pairs. As discussed below, both data in the pair are rejected if the data exceed the acceptable relative standard deviation.

To improve the correlation between the manual method and a particulate matter CEMS, we also recommend that sources electing to use Method 5 also obtain paired Method 5 data. Again, data sets that exceed an acceptable relative standard deviation, as discussed below, should be rejected. This recommendation will be implemented during the Administrator's review of your petition requesting use a particulate matter CEMS. If you elect to correlate the CEMS using Method 5, you are expected to include in your petition a statement that you will obtain paired data and will conform with our recommended relative standard deviation for the paired data.

iii. What Are the Procedures for Identifying Outliers? We have established maximum relative standard deviation values for paired data for both Method 5i and Method 5. If a data pair exceed the relative standard deviation, the pair is identified as an outlier and is not considered in the correlation of a particulate matter CEMS with the reference method. In addition, Method 5i pairs that exceed the relative standard deviation are considered outliers and cannot be used to document compliance with the emission standard.

In the initial phase of our CEMS tests, we established a procedure for eliminating imprecise data. This consisted of eliminating a set of paired data if the data disagree by more than some previously established amount. Two identical methods running at the same time should yield the same result; if they do not, the precision of both data is suspect. Commenters agree with the need to identify and eliminate imprecise data to enhance method precision. This is an especially important step when comparing manual particulate matter measurements to particulate matter CEMS measurements. As a result, we include criteria in Method 5i to ensure data precision.

When evaluating the particulate matter CEMS Demonstration Test data, we screened the data to remove these precision outliers. Data outliers at that time were defined as paired data points with a relative standard deviation [209] of greater than 30 percent. We developed this 30% criterion by analyzing historical Method 5 data. Several commenters, including a particulate matter CEMS vendor with extensive European experience with correlation programs, recommend that we tighten the relative standard deviation criteria. We concur, because Method 5i is more precise than Method 5 given the improvements discussed above. Therefore, one would logically expect a reasonable precision criterion such as the relative standard deviation derived from Method 5i data to be less than a similarly reasonable one derived from Method 5 data. We investigated the particulate matter CEMS Demonstration Test data base as well other available Method 5i data (such as the data from a test program recently conducted at another US incinerator). We conclude that a 10% relative standard deviation for particulate matter emissions greater than or equal to 10 mg/dscm, increased linearly to 25% for concentrations down to 1 mg/dscm, is a better representation of acceptable, precise Method 5i paired data [210]. Data obtained at concentrations lower than 1 mg/dscm have no relative standard deviation limit.

The relative standard deviation criterion for Method 5 data used for particulate matter CEMS correlations continues to be 30%.

iv. Why Didn't EPA Issue Method 5i as Guidance Rather than Promulgating It as a Method? Most commenters state that Method 5i should be guidance rather than a published method and it should not be a requirement for performing particulate matter CEMS correlation testing or documenting compliance with the emission standard. In particular, several commenters in the cement kiln industry express concern over the limitations of Method 5i regarding the mass of particulate it could collect. This section addresses these concerns.

We have promulgated Method 5i as a method because it provides significant improvement in precision and accuracy of low level particulate matter measurements relative to Method 5. Consequently, although Method 5i is not a required method, we expect that permitting officials will disapprove comprehensive performance test plans that recommend using Method 5 for low level particulate levels. Further, we expect that petitions to use a particulate matter CEMS that recommend performance acceptance criteria (e.g., confidence level, tolerance level, correlation coefficient) based on correlating the CEMS with Method 5 measurements will be disapproved. This is because we expect the CEMS to be able to achieve better acceptance criteria values using Method 5i (because it is more accurate and precise than Method 5), and expect better relative standard deviation between test pairs (resulting in lower cost of correlation testing because fewer data would be screened out as outliers).

Given that we expect and want widespread use of Method 5i, and to ensure that its key provisions are followed, it is appropriate to promulgate it as a method rather than guidance. If the procedure were issued only as guidance, the source or stack tester could choose to omit key provisions, thus negating the benefits of the method.

Relative to the direct reference in Method 5i that the method is ''most effective for total particulate matter catches of 50 mg or less,'' this means the method is most effective at hazardous waste combustors with particulate matter emissions below approximately 45 mg/dscm (~0.02 gr/dscf). This applicability statement is not intended to be a bright line; total train catches exceeding 50 mg would not invalidate

[209] RSD, or ''relative standard deviation'', is a dimensionless number greater than zero defined as the standard deviation of the samples, divided by the mean of the samples. In the special case where only 2 data represent the sample, the mathematics of determining the relative standard deviation simplifies greatly to $|C_A - C_B|/(C_A + C_B)$, where C_A and C_B are the concentration results from the two trains that represent the pair.

[210] See Chapter 11, Section 2 of the technical background document for details on the statistical procedures used to derive these benchmarks: USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume IV: Compliance With the Hazardous Waste Combustor Standards,'' July 1999.

the method. Rather, we include this guidance to users of the method to help them determine whether the method is applicable for their source. Note that this statement is found in the applicability section of the method, rather than the method description sections that follow. As such, the reference is clearly an advisory statement, not a quality assurance criterion. Total train catches above 50 mg are acceptable with the method and the results from such trains can be used to document compliance with the emission standard and for correlating CEMS. But, users of Method 5i are advised that problems (such as plugging of the filter) may arise when emissions are expected to exceed 45 mg/dscm.[211]

v. What Additional Costs Are Associated with Method 5i? Commenters raise several issues regarding the additional costs of performing Method 5i testing relative to using Method 5. There is an added cost for the purchase of new Method 5i filter housings. These new lightweight holders are the key addition to the procedure needed to improve precision and accuracy and represent a one-time expense that emission testing firms or sources that perform testing in-house will have to incur to perform Method 5i. We do not view this cost as significant and conclude that the use of a light-weight filter housing is a reasonable and appropriate feature of the method.

Other commenters suggest that the requirement for pesticide-grade acetone in the version of Method 5i contained in the December 1997 NODA unnecessarily raises the cost of performing the method. Instead, they ask us to identify a performance level for the acetone instead of a grade requirement because it would allow test crews to meet that performance in the most economical manner. We agree that prescribing a certain type of acetone may unnecessarily increase costs and removed the requirement for pesticide-grade acetone. Accordingly, the same purity requirements cited in Method 5 for acetone are maintained for Method 5i. The prescreening of acetone purity in the laboratory prior to field use, consistent with present Method 5 requirements, is also maintained in Method 5i.

Commenters make similar cost-related comments relative to the requirement for Teflon® beakers. At the request of several commenters, we have expanded the requirement for Teflon® beakers to allow the use of beakers made from other similar light-weight materials. Because materials other than Teflon® can be used to fabricate light-weight breakers, changing the requirement from a technology basis to a performance basis will reduce costs while achieving the performance goals of the method.

There were no significant comments regarding the added cost of paired-train testing.

vi. What Is the Practical Quantification Limit of the Method 5i Filter Sample? We received several comments related to the minimum detection limit of Method 5i, including: the minimum sample required, guidance on how long to sample, what mass should ideally be collected on any filter, and the practical quantification limit.

Commenters are concerned that while we address the maximum amount of particulate matter the method could handle, we are silent on the issue of what minimum sample is required. This is important because analytical errors, such as weighing of the filters, tend to have the same error value associated with it irrespective of the mass loading. To address this concern, Method 5i provides guidance on determining the minimum mass of the collected sample based on estimated particulate matter concentrations.

Related to the particulate mass collection issue is the issue of how long a user of Method 5i needs to sample in order to an adequate amount of particulate on the filter. The amount of particulate matter collected is directly related to time duration of the sampling period, i.e., the longer one samples, the more particulate is collected and vice-versa. Therefore, Method 5i provides guidance on selecting a suitable sampling time based on the estimated concentration of the gas stream.

Both these issues directly relate to how much particulate matter should ideally be collected on any individual filter. Our experience indicates a minimum target mass is 10 to 20 mg.

Finally, we conclude that the targeted practical quantification limit for Method 5i is 3.0 mg of sample. Discussion of how this quantification limit is determined is highly technical and beyond the scope of this preamble. See the technical support document for more details.[212]

vii. How Are Blanks Used with Method 5i? Several commenters question the use of acetone blanks or made recommendations for additional blanks. We clarify in this section the collection and use of sample blank data.

We recognize that high blank results can adversely effect the analytical results, especially at low particulate matter concentrations. To avoid the effect high blank results can have on the analytical results, today's Method 5i adopts a strategy similar to several of the organic compound test procedures (such as Method 23 in part 60 and Method 0010 in SW–846) that require collection of blanks but do not permit correction to the analytical results. Collection and analysis of blanks remains an important component in the sampling and analysis process for documenting the quality of the data, however. If a test run has high blank results, the data may be suspect. Permitting officials will address this issue on a case-by-case basis.

The importance of minimizing contamination is stressed throughout Method 5i for both sample handling and use of high purity sample media. If proper handling procedures are observed, we expect that the blank values will be less than the method detection limit or within the value for constant weight determination (0.5 mg). Therefore, the allowance for blank correction that is provided in Method 5 is not permitted in Method 5i. The method also recommends several additional types of blanks to provide further documentation of the integrity and purity of the acetone throughout the duration of the field sampling program.

b. What Is the Status of Particulate Matter CEMS Performance Specification 11 and Quality Assurance/Quality Control Procedure 2? We are not finalizing proposed Performance Specification 11 and Quality Assurance/Quality Control Procedure 2 because the final rule does not require the use of particulate matter CEMS. We considered stakeholder comments on these documents, however, and have incorporated many comments into the current drafts. We plan to publish these documents when we address the particulate matter CEMS requirement. In the interim, we will make them available as guidance to sources that are

[211] Stack testers have developed ways to deal with plugging of a filter. Many stack testers simply remove the filter before it plugs, install a new, clean filter, and continue the sampling process where they left off with the old filter. The mass gain is then the total mass accumulated on all filters during the run. However, using multiple filters for a single run takes more time, not only to install the new filter but also to condition and weigh multiple filters for a single run. For Method 5i, it would also involve more capital cost because the stack tester would need more light-weight filter assemblies to perform the same number of runs. For these reasons and even though the situation can be acceptably managed, it is impractical to have the filter plug. This led to our recommendation that Method 5i is best suited for particulate matter (i.e., filter) loadings of at most 50 mg, or stack concentrations of less than 45 mg/dscm (roughly 0.02 gr/dscf).

[212] See USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume IV: Compliance With the Hazardous Waste Combustor Standards,'' July 1999.

considering the option of using a particulate matter CEMS to document compliance.

c. How Have We Resolved Other Particulate Matter CEMS Issues? In this section we discuss two additional issues: (1) Why didn't we require continuous opacity monitors for compliance with the particulate matter standard for incinerators and lightweight aggregate kilns; and (2) can high correlation emissions testing runs exceed the particulate matter standard?

i. Why Didn't We Require Continuous Opacity Monitors for Compliance Assurance for Incinerators and Lightweight Aggregate Kilns? As discussed elsewhere in today's notice, we require cement kilns to use continuous opacity monitors (COMS) to comply with a 20 percent opacity standard to ensure compliance with the particulate matter emission standard. This is the opacity component of the New Source Performance Standard for particulate matter for Portland cement plants. See § 60.62. Because we are adopting the mass-based portion of the New Source Performance Standard for particulate matter as the MACT standard (i.e., 0.15 kg/Mg dry feed), the opacity component of the New Source Performance Standard is useful for compliance assurance.

We do not require that incinerators and lightweight aggregate kilns use opacity monitors for compliance assurance because we are not able to identify an opacity level that is achievable by sources using MACT control and that would ensure compliance with the particulate matter standards for these source categories. This is the same issue discussed above in the context of particulate matter CEMS and is the primary reason that we are not requiring use of these CEMS at this time.

Although we are requiring that cement kilns use COMS for compliance assurance, these monitors cannot provide the same level of compliance assurance as particulate matter CEMS. Opacity monitors measure a characteristic of particulate matter (i.e., opacity) and cannot correlate with the manual stack method as well as a particulate matter CEMS. COMS are particularly problematic for sources with small stack diameters (e.g., incinerators) and low emissions because both of these factors contribute to very low opacity readings which results in high measurement error as a percentage of the opacity value. Thus, we are obtaining additional data to support rulemaking in the near future to require use of particulate matter CEMS for compliance assurance.

Approximately 80 percent of hazardous waste burning cement kilns are not currently subject to the New Source Performance Standard and many of these sources may not be equipped with COMS that meet Performance Specification 1 in appendix B, part 60. Thus, many hazardous waste burning cement kilns will be required to install COMS, even though we intend to require use of particulate matter CEMS in the near future. We do not believe that this requirement will be overly burdensome, however, because sources may request approval to install particulate matter CEMS rather than COMS. See § 63.8(f). Our testing of particulate matter CEMS at a cement kiln will be completed well before sources need to make decisions on how best to comply with the COMS requirement of the rule. We will develop regulations and guidance on performance specifications and correlation criteria for particulate matter CEMS as a result of that testing, and sources can use that guidance to request approval to use a particulate matter CEMS in lieu of a COMS. We expect that most sources will elect to use this approach to minimize compliance costs over the long term.

ii. Can High Correlation Runs Exceed the Particulate Matter Standard? The final rule states that the particulate matter and opacity standards of parts 60, 61, 63, 264, 265, and 266 (i.e., all applicable parts of Title 40) do not apply during particulate matter CEMS correlation testing, provided that you comply with certain provisions discussed below that ensure that the provision is not abused. This provision, as the rest of the rule, is effective immediately. Thus, you need not wait for the compliance date to take advantage of this particulate matter CEMS correlation test provision.

We include this provision in the rule because many commenters question whether high correlation test runs that exceed the particulate matter emission standard constitute noncompliance with the standard. We have responded to this concern previously by stating that a single manual method test run that exceeds the standard does not constitute noncompliance with the standard because compliance is based on the average of a minimum of three runs.[213] We now acknowledge, however, that during high run correlation testing a source may need to exceed the emission standard even after averaging emissions across runs. Similarly, a source may need to exceed a particulate matter operating parameter limit. Given the benefits of compliance assurance using a CEMS, we agree with commenters that short-term excursions of the particulate matter standard or operating parameter limits for the purpose of CEMS correlation testing is warranted. The benefits that a CEMS provides for compliance assurance outweighs the short-term emissions exceedances that may occur during high end emissions correlation testing. Consequently, we have included a conditional waiver of the applicability of all Federal particulate matter and opacity standards (and associated operating parameter limits).

The waiver of applicability of the particulate matter and opacity emission standards and associated operating parameter limits is conditioned on the following requirements to ensure that the waiver is not abused. Based on information from commenters and expertise gained during our testing, the rule requires that you develop and submit to permitting officials a particulate matter CEMS correlation test plan along with a statement of when and how any excess emissions will occur during the correlation tests (i.e., how you will modify operating conditions to ensure a wide range of particulate emissions, and thus a valid correlation test). If the permitting officials fail to respond to the test plan in 30 days, you can proceed with the tests as described in the test plan. If the permitting officials comment on the plan, you must address those comments and resubmit the plan for approval.

In addition, runs that exceed any particulate matter or opacity emission standard or operating parameter limit are limited to no more than a total of 96 hours per correlation test (i.e., including all runs of all test conditions). We determined that the 96 hour total duration for exceedances for a correlation test is reasonable because it is comprised of one day to increase emissions to the desired level and reach system equilibrium, two days of testing[214] at the equilibrium condition followed by a return to normal equipment settings indicative of compliance with emissions standards and operating parameter limits, and one

[213] One exception is the destruction and removal efficiency standard, for which compliance is based on a single test run and not the average of three runs.

[214] The two days assumes sources will conduct a total of 18 runs, 6 runs in each of the low, medium, and high particulate matter emission ranges. To approve use of a particulate matter CEMS, we will likely require that a minimum of 15 runs comprise a correlation test. If this is the case, some runs will likely be eliminated because they fail method or source-specific quality assurance/quality control procedures.

day to reach equilibrium at normal conditions. Finally, to ensure these periods of high emissions are due to the *bona fide* need described here, a manual method test crew must be on-site and making measurements (or in the event some unforseen problem develops, prepared to make measurements) at least 24 hours after you make equipment or workplace modifications to increase particulate matter emissions to levels of the high correlation runs.

3. What Is the Status of Total Mercury CEMS?

We are not requiring use of total mercury CEMS in this rulemaking because data in hand do not adequately demonstrate nationally that these CEMS are reliable compliance assurance tools at all types of facilities. Nonetheless, we are committed to the development of CEMS that measure total mercury emissions and are continuing to pursue the development of these CEMS in our research efforts.

In the April 1996 NPRM, we proposed that total mercury CEMS be used for compliance with the mercury standards. We also said if you elect to use a multimetals CEMS that passed proposed acceptability criteria, you could use that CEMS instead of a total mercury CEMS to document compliance with the mercury standard. Finally, we indicated that if neither mercury nor multimetal CEMS were required in the final rule (*i.e.,* because they have not been adequately demonstrated), compliance assurance would be based on specified operating parameter limits.

In the March 1997 NODA, we elicited comment on early aspects of our approach to demonstrate total mercury CEMS. And, in the December 1997 NODA, we presented a summary of the demonstration test results and our preliminary conclusion that we were unable to adequately demonstrate total mercury CEMS at a cement kiln, a site judged to be a reasonable worst-case for performance of the total mercury CEMS. As new data are not available, we continue to adhere to this conclusion, and comments received in response to the December 1997 NODA concur with this conclusion. Therefore, we are not requiring total mercury CEMS in this rulemaking.

Nonetheless, the current lack of data to demonstrate total mercury CEMS at a cement kiln or otherwise on a generic bases (*i.e.,* for all sources within a category) does not mean that the technology, as currently developed, cannot be shown to work at particular sources. Consequently, the final rule provides you the option of using total mercury CEMS in lieu of complying with the operating parameter limits of § 63.1209(l). As for particulate matter and other CEMS, the rule allows you to petition the Administrator (*i.e.,* permitting officials) under § 63.8(f) to use a total mercury CEMS based on documentation that it can meet acceptable performance specifications, correlation acceptance criteria (*i.e.,* correlation coefficient, tolerance level, and confidence level). Although we are not promulgating the proposed performance specification for total mercury CEMS (Performance Specification 12) given that we were not able to document that a mercury CEMS can meet the specification in a (worst-case) cement kiln application, the proposed specification may be useful to you as a point of departure for a performance specification that you may recommend is achievable and reasonable.

4. What Is the Status of the Proposed Performance Specifications for Multimetal, Hydrochloric Acid, and Chlorine Gas CEMS?

We are not promulgating proposed Performance Specifications 10, 13, and 14 for multimetal, hydrochloric acid, and chlorine gas CEMS because we have not determined that the CEMS can achieve the specifications.

In the April 1996 NPRM, we proposed performance specifications for multimetal, hydrochloric acid, and chlorine gas CEMS to allow sources to use these CEMS for compliance with the metals and hydrochloric acid/chlorine gas standards. Given that we have not demonstrated that these CEMS can meet their performance specifications and our experience with a mercury CEMS where we were not able to demonstrate that the mercury CEMS could meet our proposed performance specification, we are not certain that these CEMS can meet the proposed performance specifications. Accordingly, it would be inappropriate to promulgate them.

As discussed previously, we encourage sources to investigate the use of CEMS and to petition permitting officials under § 63.8(f) to obtain approval to use them. The proposed performance specifications may be useful to you as a point of departure in your efforts to document performance specifications that are achievable and that ensure reasonable correlation with reference manual methods.

5. How Have We Addressed Other Issues: Continuous Samplers as CEMS, Averaging Periods for CEMS, and Incentives for Using CEMS?

a. Are Continuous Samplers a CEMS? Several commenters, mostly owner/operators of on-site incinerators, suggest that we should adjust certain CEMS criteria (*e.g.,* averaging period, response time) to allow use of a continuous sampler known as the 3M Method. The 3M Method is a continuous metals sampling system. It automatically extracts stack gas and accumulates a sample on a filter medium over any desired period—24 hours, days, or weeks. The sample is manually extracted, analyzed, and reported. Various incinerator operators are using or have expressed an interest in using this type of approach to demonstrate compliance with current RCRA metals emission limits. Many commenters contend that the 3M Method is a CEMS and that we developed our performance specifications for CEMS to exclude techniques like the 3M Method.

After careful analysis, we conclude that the 3M Method is not a CEMS. It does not meet our long-standing definition of a CEMS in parts 60 or 63. Specifically, it is not a fully automated piece(s) of equipment used to extract a sample, condition and analyze the sample, and report the results of the analysis in the units of the standard. Also, the 3M Method is unable to ''complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period'' as required by § 63.8(c)(4)(ii). As a result, making the subtle changes (*e.g.,* to the averaging period, response time) to our multimetal CEMS performance specification that commenters recommend would not alter the fact that the device does not automatically analyze the sample on the frequency required for a CEMS.

A continuous sampler (coupled with periodic analysis of the sample) is inferior to a CEMS for two reasons. First, if the sampling period is longer than the time it takes to perform three manual performance tests, compliance with the standard cannot be assured. Approaches like the 3M Method tend to have reporting periods on the order of days, weeks, or even a month. The reporting period is comprised of the time required to accumulate the sample and the additional time to analyze the sample and report results. Because the stringency of a standard is a function of both the numerical value of the standard and the averaging period (*e.g.,* at a given numerical limit, the longer the averaging period the less stringent the standard), a compliance approach having a sampling period greater than the 12 hours we estimate it may take to conduct three manual method stack test runs using Method 29 cannot ensure compliance with the standard.[215] If the sampling period were greater than the time required to conduct three test runs, the numerical value of the standard would have to be reduced to ensure an equally stringent standard. Unfortunately, we do not know how to derive alternative emission limits as a function of the averaging period that would be equivalent to the emission standard. We raised this issue at proposal, and commenters did not offer a solution.

Second, the results from a continuous sampler are reported after the fact, resulting in higher excess emissions than with a CEMS. Depending on the sample analysis frequency, it could take days or weeks to determine that an exceedance has occurred and that corrective measures need to be taken. A CEMS can provide near real-time information on emissions such that exceedances can be avoided or minimized.

Absent the generic availability of multimetal CEMS, continuous samplers such as the 3M Method may nonetheless be a valuable compliance tool. We have acknowledged that relying on operating parameter limits may be an imperfect approach for compliance assurance. Sampling and analysis of feedstreams to determine metals feedrates can be problematic given the complexities of some waste matrices. In addition, the operating parameters for the particulate matter control device for which limits must be established may not always correlate well with the device's control efficiency for metals and thus metals emissions. Because of these concerns, we encourage sources to investigate the feasibility of multimetal CEMS. But, absent a CEMS, a continuous sampler may provide an attractive alternative or complement to some of the operating parameter limits under §§ 63.1209 (l) and (n). You may petition permitting officials under § 63.8(f) to use the 3M Method (or other sampler) as an alternative method of compliance with the emissions standards. Permitting officials will balance the benefits of a continuous sampler with the benefits of the operating parameter limits on a case-by-case basis.

b. What Are the Averaging Periods for CEMS and How Are They Implemented? We discuss the following issues in this section: (1) Duration of the averaging period; (2) frequency of updating the averaging period; and (3) how averaging periods are calculated initially and under intermittent operations.

i. What Is the Duration of the Averaging Period? We conclude that a six-hour averaging period is most appropriate for particulate matter CEMS, and a 12-hour averaging period is most appropriate for total mercury, multi metals, hydrogen chloride, and chlorine gas CEMS.

We proposed that the averaging period for CEMS (*i.e.*, other than carbon monoxide, hydrocarbon, and oxygen) be equivalent to the time required to conduct three runs of the comprehensive performance test using manual stack methods. As discussed above and at proposal, we proposed this approach because, to ensure compliance with the standard, the CEMS averaging period must be the same as the time required to conduct the performance test.[216]

Commenters suggest two general approaches to establish averaging periods for CEMS: technology-based and risk-based. Commenters supporting a technology-based approach favor our proposed approach and rationale where the time duration of three emissions tests would be the averaging period for CEMS. Commenters favoring a risk-based approach state that the averaging period should be years rather than hours because the risk posed by emissions at levels of the standard were not found to be substantial, assuming years of exposure. We disagree with this rationale. CEMS are an option (that sources may request under § 63.8(f)) to document compliance with the emission standard. As discussed above, if the averaging period for CEMS were longer than the duration of the comprehensive performance test, we could not ensure that a source maintains compliance with the standards.

Establishing an averaging period based on the time to conduct three manual method stack test runs is somewhat subjective. There is no fixed sampling time for manual methods—sampling periods vary depending on the amount of time required to "catch" enough sample. Thus, we have some discretion in selecting an averaging period using this approach. Commenters generally favor longer averaging periods as an incentive for using CEMS (i.e., because a limit is less stringent if compliance is based on a long versus short averaging period). We agree that choosing a longer averaging period would provide an incentive for the use of CEMS, but conclude that the selected averaging period must be within the range (i.e., high end) of times required to perform the three stack test runs.

We derive the averaging period for particulate matter CEMS as follows. Most particulate matter manual method tests are one hour in duration, but a few stack sampling companies sample for longer periods, up to two hours. Therefore, we use the high end of the range of values, 2 hours, as the basis for calculating the averaging period. We recommend a six-hour rolling average considering that it may require 2 hours to conduct each of three stack tests.

For mercury, multi-metals, hydrochloric acid, and chlorine gas CEMS, we recommend a 12-hour rolling averaging. The data base we used to determine the standards shows that the sampling periods for manual method tests for these standards ranged from one to four hours. Choosing the high end of the range of values, 4 hours, as the basis for calculating the averaging period, we conclude that a 12-hour rolling average would be appropriate.

ii. How Frequently Is the Rolling Average Updated? We conclude that the rolling average for particulate matter, total mercury, and multimetal CEMS should be updated hourly, while the rolling average for hydrochloric acid and chlorine gas CEMS should be updated each minute.

We proposed that all rolling averages would be updated every minute and would be based on the average of the one-minute block average CEMS observations that occurred over the averaging period. This proposed one-minute update is the same that is used for carbon monoxide and total hydrocarbon CEMS under the RCRA BIF regulations. (We are retaining that update frequency in the final rule for those monitors, and recommend it for hydrochloric acid and chlorine gas CEMS.)

Commenters favor selecting the frequency of updating the rolling average taking into account the variability of the CEMS and limitations concerning how the correlation data are collected. We agree with this approach, as discussed below.

1. Particulate Matter CEMS. Commenters said that particulate matter CEMS correlation tests are approximately one hour in duration and, if the rolling average were updated

[215] A technical support document for the February 1991 municipal waste combustor rule contains a good description of how not only the numerical limit, but the averaging period as well, determines the overall stringency of the standard. See Appendices A and B found in "Municipal Waste Combustion: Background Information for Promulgated Standards and Guidelines—Summary of Public Comments and Responses Appendices A to C", EPA–450/3–91–004, December 1990.

[216] Actually, the CEMS averaging period can be no longer than the time required to conduct three runs of the performance test to ensure compliance with the standard. Although compliance with the standard would be ensured if the CEMS averaging period were less than the time required to conduct the performance test, this approach would be overly stringent because it would ensure compliance with an emission level lower than the standard.

each minute, the CEMS would observe more variability in emissions within this one hour than the manual method (which is an average of those emissions during the hour). For this reason, we conclude it is reasonable that particulate matter CEMS data be recorded as a block-hour and that the rolling average be updated every hour as the average of the previous six block-hours. Updating the particulate matter CEMS every hour also means the number of compliance opportunities is the same irrespective of whether a light-scattering or beta-gage particulate matter CEMS is used (i.e., because beta-gage CEMS make observations periodically while light-scattering CEMS make observations continuously).

Furthermore, to ensure consistency with existing air rules governing CEMS other than opacity, a valid hour should be comprised of four or more equally spaced measurements during the hour. See § 60.13(h). This means that batch systems, such as beta gages, must complete one cycle of operation every 15 minutes, or more frequently if possible. See § 63.8(c)(4)(ii). CEMS that produce a continuous stream of data, such as light-scattering CEMS, will produce data throughout the hour.

You may not be able to have four valid 15-minute measurement in an hour, however, to calculate an hourly block-average. Examples include when the source shuts down or the CEMS produces flagged (i.e., problematic) data. In addressing this issue, we balanced the need for the average of the measurements taken during the hour to be representative of emissions during the hour with the need to accommodate problems with data availability that will develop. We conclude that a particulate matter CEMS needs to sample stack gas and produce a valid result from this sample for most of the hour. This means that the CEMS needs to be observing stack gas at least half (30 minutes, or two 15-minute cycles of operation) of the block-hour. Emissions from less than one hour might be unrepresentative of emissions during the hour, and on balance we conclude that this approach is reasonable. If a particulate matter CEMS does not sample stack gas and produce a valid result from that sample for at least 30 minutes of a given hour, the hour is not a valid block-hour. In documenting compliance with the data availability recommendation in the draft performance specification, invalid block-hours due to unavailability of the CEMS that occur when the source is in operation count against data availability. If the hour is not valid because the source was not operating for more than 30 minutes of the hour, however, the invalid block-hour does not count against the data availability recommendation.[217]

2. Total Mercury and Multimetal CEMS. As discussed for particulate matter CEMS, we also expect manual methods will be required to correlate total mercury and multimetal CEMS prior to using them for compliance. For the reasons discussed above in the context of particulate matter CEMS, we therefore recommend the observations from these CEMS be recorded as block-hour averages and that the 12-hour rolling average be updated every hour based on the average of the previous 12 block-hour averages.

3. Hydrochloric Acid and Chlorine Gas CEMS. Unlike the particulate matter, total mercury, and multimetal CEMS, hydrochloric acid and chlorine gas CEMS are likely to be calibrated using Protocol 1 gas bottles rather than correlated to manual method stack test results. Therefore, the variability of observations measured by the CEMS over some averaging period versus the duration of a stack test is not an issue. We conclude that it is appropriate to update the 12-hour rolling average for these CEMS every minute, as required for carbon monoxide and hydrocarbons CEMS.

iii. How Are Averaging Periods Calculated Initially and under Intermittent Operations?

1. Practical Effective Date of Rolling Averages for CEMS. As discussed in Part Five, Sections VII.B.4 above in the context of continuous monitoring systems in general, CEMS recordings will not become effective for compliance monitoring on the compliance date until you have recorded enough observations to calculate the rolling average applicable to the CEMS. For example, the six hourly rolling average for particulate matter CEMS does not become effective until you have recorded six block-hours of observations on the compliance date. Given that compliance with the standards begins nominally at 12:01 am on the compliance date, the six hour rolling average for particulate matter CEMS does not become effective as a practical matter until 6:01 am on the compliance date. Similarly, the 12-hour rolling average for a multimetal CEMS does not become effective until you have recorded 12 block-hours of observations after the compliance date. Thus, the 12-hour rolling average for multimetals CEMS becomes effective as a practical matter at 12:01 p.m. on the compliance date.

We adopt this approach simply because a rolling average does not exist until enough observations have been recorded to calculate the rolling average.

2. How Rolling Averages Are Calculated Upon Intermittent Operations. We have determined that you are to ignore periods of time when CEMS observations are not recorded for any reason (*e.g.,* source shutdown) when calculating rolling averages. For example, consider how the six hour rolling average for a particulate matter CEMS would be calculated if a source shuts down for yearly maintenance for a three week period. The first one-hour block average value recorded when the source renews operations is added to the last 5 one-hour block averages recorded before the source shut down for maintenance to calculate the six hour rolling average.

We adopt this approach for all continuous monitoring systems, including CEMS, because it is simple and reasonable. See discussion in Part Five, Section B.4 above.

c. What Are the Incentives for Using CEMS as Alternative Monitoring? We strongly support the use of CEMS for compliance with standards, even though we are not requiring their use in today's rule (except for carbon monoxide, hydrocarbon, and oxygen CEMS) for the reasons discussed above. We endorse the principle that, as technology advances, current rules should not act as an obstacle to adopting new CEMS technologies for compliance. For instance, today's rule does not require total mercury CEMS because implementation and demonstration obstacles observed during our tests under what we consider worst-case conditions (*i.e.,* a cement kiln) could not be resolved in sufficient time to require total mercury CEMS at all hazardous waste combustors. However, we fully expect total mercury CEMS will improve to the point that the technical issues encountered in our tests can be resolved. At that point, we do not want the compliance regime of today's rule—comprised of emissions testing and limits on operating parameters—to be so rigid as to preclude the use of CEMS. Commenters are generally supportive of this concept, but note that facilities would be reluctant to adopt new technologies without adequate incentives. This section describes potential incentives: emissions testing would not be required; limits on operating parameters would not apply while the CEMS is in service; and the feedstream analysis requirements for the

[217] Data availability is defined as the fraction, expressed as a percentage, of the number of block-hours the CEMS is operational and obtaining valid data during facility operations, divided by the number of block-hours the facility was operating.

parameters measured by the CEMS (*i.e.*, metals or chlorine) would not apply.

i. What Incentives Do Commenters Suggest? Several commenters suggest that we provide various incentives to encourage development and implementation of new and emerging CEMS. Comments by the Coalition for Responsible Waste Incineration (CRWI) include a variety of actions to encourage voluntary installation of CEMS,[218] including: Reduce testing for any parameter measured by a CEMS to the correlation and maintenance of that CEMS; waive operating parameter limits that are linked to the pollutant measured by the CEMS; minimize regulatory oversight on waste analysis if compliance is consistently demonstrated by a CEMS; increase the emission limit for a source using a CEMS to account for the uncertainty of CEMS observations; allow a phase-in period when a source can evaluate CEMS performance and develop maintenance practices and the CEMS would not be used for compliance; allow a phase-in period to establish a reasonable availability requirement for that CEMS at a particular location; and allow sources to evaluate CEMS on a trial basis to determine if these instruments are appropriate for their operations with no penalties if the units do not work or have excessive downtime. Many of CRWI's suggestions have merit, as discussed below.

ii. How Do We Respond to Commenter's Recommended Incentives?

1. Waiver of Emissions Testing and Operating Parameter Limits. CRWI's first two suggestions (reduced testing and waiver of operating parameter limits) are closely linked. The purpose of conducting a comprehensive performance test is to document compliance with emission standard initially (and periodically thereafter) and establish limits on specified operating parameters to ensure that compliance is maintained. Because a CEMS ensures compliance continuously, it serves the purpose of both the performance test and compliance with operating parameter limits. Accordingly, we agree with CRWI that both emissions testing and operating parameter limits for the pollutant in question would not apply to sources using a CEMS.

There is one key caveat to this position, however. Because 100% availability of any CEMS is unrealistic, we require a means of assuring compliance with the emission standards during periods when the CEMS is not available. To meet that need, you may elect to install redundant CEMS or assure continuous compliance by monitoring and recording traditional operating parameter limits during periods when the CEMS is not available. Most likely, you will elect to use operating parameters as the back-up when the CEMS is unavailable because it would be a less expensive approach. You could establish these operating parameter limits, though, through CEMS measurements rather than comprehensive performance test measures. In fact, it may be prudent for you to evaluate relationships between various operating parameters for the particulate matter control device[219] and emission levels recorded by the CEMS to develop a good predictive model of emissions. You could then petition the Administrator (*i.e.*, permitting officials) under § 63.8(f) to base compliance during CEMS malfunctions on limits on alternative monitoring parameters derived from the predictive model.

2. Waiver of Feedstream Analysis Requirements. If you obtain approval to use a CEMS for compliance under the petitioning provisions of § 63.8(f), we agree with the commenter's recommendation that you should not be subject to the feedstream analysis requirements pertinent to the pollutant you are measuring with a CEMS. As examples, if you use a total mercury CEMS, you are not subject to a feedrate limit for mercury, and if you operate an incinerator and use a particulate matter CEMS, you are not subject to a feedrate limit for total ash.

If you are not subject to a feedrate limit for ash, metals, or chorine because you use a CEMS for compliance, you are not subject to the feedstream analysis requirements for these materials. As a practical matter, however, this waiver may be moot because, as discussed above, you will probably elect to comply with operating parameter limits during CEMS malfunctions. However, a second, back-up CEMS would also be acceptable. Absent a second CEMS, you would need to establish feedrate limits for these materials as a back-up compliance approach, and you would need to know the feedrate at any time given that the CEMS may malfunction at any time. In addition, even when the CEMS is operating within the performance specifications approved by the permitting officials, you have the responsibility to minimize exceedances by, for example, characterizing your feedstreams adequately to enable you to take corrective measures if a CEMS-monitored emission is approaching the standard. This level of feedstream characterization, however, is less than the characterization required to establish and comply with feedrate operating limits during CEMS malfunctions or absent a CEMS.

3. Increase the Averaging Period for CEMS-Monitored Pollutants. The averaging period for a CEMS-monitored pollutant should not be artificially inflated (*i.e.*, increased beyond the time required to conduct three manual method test runs) because the standard would be less stringent. See previous discussions on this issue.

4. Increase Emission Limits to Account for CEMS Uncertainty. We do not agree with the suggestion that an emission limit needs to be increased on a site-specific basis to accommodate CEMS inaccuracy and imprecision (*i.e.*, the acceptance criteria in the CEMS performance specification that the source recommends and the permitting officials approve will necessarily allow some inaccuracy and imprecision). Again, we encourage sources to use a CEMS because it is a better indicator of compliance than the promulgated compliance regime (*i.e.*, periodic emissions testing and operating parameter limits). We established the final emission standards with achievability (through the use of the prescribed compliance methods) in mind. We have accounted for the inaccuracies and imprecisions in the emissions data in the process of establishing the standard. See previous discussions in Part Four, Section V.D. If the CEMS performance specification acceptance criteria (that must be approved by permitting officials under a § 63.8(f) petition) were to allow the CEMS measurements to be more inaccurate or imprecise than the promulgated compliance regime of performance testing coupled with limits on operating parameters, the potential for improved compliance assurance with the CEMS would be negated. Consequently, we reject the idea that the standards need to be increased on a site-specific basis as an incentive for sources to use CEMS.

5. Allow a CEMS Phase-In Period. CRWI's final three incentive suggestions deal with the need for a CEMS phase-in period. This phase-in period would be used to evaluate CEMS performance, including identifying acceptable performance specification levels, maintenance requirements, and measurement location. CRWI further suggested that the Agency not penalize

[218] By "optional use of CEMS", we mean using CEM not required by this rule, *i.e.*, other than those for carbon monoxide, oxygen, and hydrocarbon.

[219] You are not restricted to those specified in § 63.1209. You may identify parameters for your source that correlate better with particulate emissions than those we have specified generically.

a source if the CEMS does not work or has excessive downtime.

CRWI provided these comments in response to our proposal to require compliance using CEMS and that sources document that the CEMS meets a prescribed performance specification and correlation acceptance criteria. Although we agree that a phase-in period would be appropriate, the issue is moot given that we are not requiring the use of CEMS.[220] Prior to submitting a petition under § 63.8(f) to gain approval to use a CEMS, we presume a source will identify the performance specification, correlation criteria, and availability factors they believe are achievable. (We expect sources to use the criteria we have proposed, as revised after considering comments and further analysis and provided through guidance, as a point of departure.) Thus, each source will have unlimited opportunity to phase-in CEMS and subsequently recommend under § 63.8(f) performance specifications and correlation acceptance criteria.

We do not agree as a legal matter that we can state generically that CEMS data obtained during the demonstration period are shielded from enforcement if the CEMS data are credible and were to indicate exceedance of an emission standard. In this situation, we cannot shield a source from action by either by a regulatory agency or a citizen suit. On balance, given our legal constraints, our policy desire to have CEMS used for compliance, and uncertainty about the ultimate accuracy of the CEMS data, we can use our enforcement discretion whether to use particulate matter CEMS data as credible evidence in the event the CEMS indicates an exceedance until the time the CEMS is formally adopted as a compliance tool. Sources and regulators may decide to draft a formal testing agreement that states that the CEMS data obtained prior to the time the CEMS is accepted as a compliance tool cannot be used as credible evidence of exceedance of an emission standard.

D. What Are the Compliance Monitoring Requirements?

In this section we discuss the operating parameter limits that ensure compliance with each emission standard.

1. What Are the Operating Parameter Limits for Dioxin/Furan?

You must maintain compliance with the dioxin/furan emission standard by establishing and complying with limits on operating parameters. See § 63.1209(k). The following table summarizes these operating parameter limits. All sources must comply with the operating parameter limits applicable to good combustion practices. Other operating parameter limits apply if you use the dioxin/furan control technique to which they apply.

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[220] Other than carbon monoxide, hydrocarbon, and oxygen CEMS.

Summary of Dioxin/Furan Monitoring Requirements

Control Technique	Compliance Using	Limits From	Averaging Period	How Limit Is Established
Combustion Gas Temperature Quench	Continuous monitoring system (CMS) for maximum temperature at the inlet to the dry particulate matter control device, except lightweight aggregate kilns must monitor gas temperature at the kiln exit	Comprehensive performance test	1-hour	Avg of the test run averages
Good Combustion Practices	CMS for maximum waste feedrates for pumpable and total wastes for each feed system	Comprehensive performance test	1-hour	Avg of the maximum hourly rolling averages for each run
	CMS for minimum gas temperature for each combustion chamber	Comprehensive performance test	1-hour	Avg of the test run averages
	CMS for maximum gas flowrate or kiln production rate	Comprehensive performance test	1-hour	Avg of the maximum hourly rolling averages for each run
	Monitoring of parameters recommended by the source to maintain operation of each hazardous waste firing system[1]	Based on source recommendation	To be determined case-by-case	To be determined case-by-case
Activated Carbon Injection[2]	Good particulate matter control: Monitoring requirements are the same as required for compliance assurance with the particulate matter standard. See Section VII.D.6 below.			
	CMS for minimum carbon feedrate	Comprehensive performance test	1-hour	Avg of the test run averages
	CMS for minimum carrier fluid flowrate or nozzle pressure drop	Manufacturer specifications	1-hour	n/a
	Identification of carbon brand and type or adsorption properties	Comprehensive performance test	n/a	Same properties based on manufacturer's specifications
Activated Carbon Bed[2]	Good particulate matter control: Monitoring requirements are the same as required for compliance assurance with the particulate matter standard. See Section VII.D.6 below.			
	Determination of maximum age of each carbon bed segment	Comprehensive performance test[3]	n/a	Maximum age of each segment during testing[3]
	Identification of carbon brand and type or adsorption properties	Comprehensive performance test	n/a	Same properties based on manufacturer's specifications

	CMS for maximum gas temperature at the inlet or exit of the bed	Comprehensive performance test	1-hour	Avg of the test run averages
Catalytic Oxidizer[2]	CMS for minimum gas temperature at inlet to catalyst	Comprehensive performance test	1-hour	Avg of the test run averages
	Identification of maximum catalyst time in-use	Manufacturer specifications	as specified	
	Identification of catalytic metal loading	Comprehensive performance test	n/a	Same as used during comprehensive test
	Identification of maximum space-time for the catalyst			
	Identification of substrate construct: materials, pore size			
	CMS for maximum flue gas temperature at inlet to catalyst	Manufacturer specifications	1-hour	As specified
Dioxin/Furan Formation Inhibitor[2]	CMS for minimum inhibitor feedrate	Comprehensive performance test	1-hour	Avg of the test run averages
	Identification of inhibitor brand and type or inhibitor properties	Comprehensive performance test	n/a	Same properties based on manufacturer's specifications

1 You must recommend operating parameters, monitoring approaches, and limits in the comprehensive performance test plan to maintain operation of each hazardous waste firing system.

2 A CMS for gas flowrate or kiln production rate is also required with the same provisions as required for those parameters under the Good Combustion Practices control technique.

3 Maximum carbon age limits for the compliance period after the initial comprehensive performance test may be based on manufacturer specifications. See discussion in part d.2 of this section.

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Dioxin/furan emissions from hazardous waste combustors are primarily attributable to surface-catalyzed formation reactions downstream from the combustion chamber when gas temperatures are in the 450 °F to 650 °F window (*e.g.*, in an electrostatic precipitator or fabric filter; in extensive ductwork between the exit of a lightweight aggregate kiln and the inlet to the fabric filter; as combustion gas passes through an incinerator waste heat recovery boiler). In addition, dioxin/furan partition in two phases in stack emissions: a portion is adsorbed onto particulate matter and a portion is emitted as a vapor (gas). Because of these factors, and absent a CEMS for dioxin/furan, we are requiring a combination of approaches to control dioxin/furan emissions: (1) Temperature control at the inlet to a dry particulate matter control device to limit dioxin/furan formation in the control device; (2) operation under good combustion conditions to minimize dioxin/furan precursors and dioxin/furan formation during combustion; and (3) compliance with operating parameter limits on dioxin/furan emission control equipment (*e.g.*, carbon injection) that you may elect to use.

We discuss below the operating parameter limits that apply to each dioxin/furan control technique.

a. Combustion Gas Temperature Quench. To minimize dioxin/furan formation in a dry particulate matter control device that suspends collected particulate matter in the gas flow (e.g., electrostatic precipitator, fabric filter), the rule limits the gas temperature at the inlet to these control devices [221] to levels occurring during the comprehensive performance test. For lightweight aggregate kilns, however, you must monitor the gas temperature at the kiln exit rather than at the inlet to the particulate matter control device. This is because the dioxin/furan emission standard for lightweight aggregate kilns specifies rapid quench of combustion gas to 400 °F or less at the kiln exit. [222]

If your combustor is equipped with a wet scrubber as the initial particulate matter control device, you are not required to establish limits on combustion gas temperature at the scrubber. This is because wet scrubbers do not suspend collected particulate matter in the gas stream and gas temperatures are well below 400 °F in the scrubber.[223] Thus, scrubbers do not enhance surface-catalyzed formation reactions.

We proposed limits on the gas temperature at the inlet to a dry particulate matter control device (see 61 FR at 17424). Temperature control at this location is important because surface-catalyzed formation reactions can increase by a factor of 10 for every 150 °F increase in temperature within the window of 350 °F to approximately 700 °F. We received no adverse comments on the proposal, and thus, are adopting this compliance requirement in the final rule.

You must establish an hourly rolling average temperature limit based on operations during the comprehensive performance test. The hourly rolling average limit is established as the average of the test run averages. See Part Five, Sections VII.B.1 and B.3 above for a discussion on the approach for calculating limits from comprehensive performance test data.

b. Good Combustion Practices. All hazardous waste combustors must use good combustion practices to control dioxin/furan emissions by: (1) Destroying dioxin/furan that may be present in feedstreams; (2) minimizing formation of dioxin/furan during combustion; and (3) minimizing dioxin/furan precursor that could enhance post-combustion formation reactions. As proposed, you must establish and continuously monitor limits on three key operating parameters that affect good combustion: (1) Maximum hazardous waste feedrate; (2) minimum temperature at the exit of each combustion chamber; and (3) residence time in the combustion chamber as indicated by gas flowrate or kiln production rate. We have also determined that you must establish appropriate monitoring requirements to ensure that the operation of each hazardous waste firing system is maintained. We discuss each of these parameters below.

i. Maximum Hazardous Waste Feedrate. You must establish and continuously monitor a maximum hazardous waste feedrate limit for pumpable and nonpumpable wastes. See 61 FR at 17422. An increase in waste feedrate without a corresponding increase in combustion air can cause inefficient combustion that may produce (or incompletely destroy) dioxin/furan precursors. You must also establish hazardous waste feedrate limits for each location where waste is fed.

One commenter suggests that there is no reason to limit the feedrate of each feedstream; a limit on the total hazardous waste feedrate to each combustion chamber would be a more appropriate control parameter. We concur in part. Limits are not established for each feedstream. Rather, limits apply to total and pumpable wastes feedrates for each feed location. Limits on pumpable wastes are needed because the physical form of the waste can affect the rate of oxygen demand and thus combustion efficiency. Pumpable wastes often will expose a greater surface area per mass of waste than nonpumpable wastes, thus creating a more rapid oxygen demand. If that demand is not satisfied, inefficient combustion will occur. We also note that these waste feedrate limit requirements are consistent with current RCRA permitting requirements for hazardous waste combustors.

As proposed, you must establish hourly rolling average limits for hazardous waste feedrate from comprehensive performance test data as the average of the highest hourly rolling averages for each run. See Part Five, Section VII.B.3 above for the rationale for this approach for calculating limits from comprehensive performance test data.

ii. Minimum Gas Temperature in the Combustion Zone. You must establish and continuously monitor limits on minimum gas temperature in the combustion zone of each combustion chamber irrespective of whether hazardous waste is fed into the chamber. See 61 FR at 17422. These limits are needed because, as combustion zone temperatures decrease, combustion efficiency can decrease resulting in increased formation of (or incomplete destruction of) dioxin/furan precursors.[224]

Monitoring combustion zone temperatures can be problematic, however, because the actual burning zone temperature cannot be measured at many units (e.g., cement kilns). For this reason, the BIF rule requires

[221] The temperature at the inlet to a cyclone separator used as a prefiltering process for removing larger particles is not limited. Cyclones do not suspend collected particulate matter in the gas stream. Thus, these devices do not have the same potential to enhance dioxin/furan formation as electrostatic precipitators and fabric filters.

[222] As discussed in Part Four, Section VIII, lightweight aggregate kilns can have extensive ducting between the kiln exit and the inlet to the fabric filter. If gas temperatures are limited at the inlet to the fabric filter, substantial dioxin/furan formation could occur in the ducting.

[223] For this reason, you are not required to document during the comprehensive performance test that gas temperatures in the wet scrubber are not greater than 400 °F. Also, we note that the 400 °F temperature limit of the dioxin/furan standard does not apply to wet scrubbers, but rather to the inlet to a dry particulate matter control device and the kiln exit of a lightweight aggregate kiln.

[224] See USEPA, ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume IV: Compliance with the Hazardous Waste Combustor Standards'', February, 1999.

measurement of the ''combustion chamber temperature where the temperature measurement is as close to the combustion zone as possible.'' See § 266.103(c)(1)(vii). In some cases, temperature is measured at a location quite removed from the combustion zone due to extreme temperatures and the harsh conditions at the combustion zone. We discussed this issue at proposal and indicated that we were concerned that monitoring at such remote locations may not accurately reflect changes in combustion zone temperatures. See 61 FR at 17423.

We requested comment on possible options to address the issue. Under one option, the final rule would have allowed the source to identify a parameter that correlates with combustion zone temperature and to provide data or information to support the use of that parameter in the operating record. Under another option, the final rule would have enabled regulatory officials on a case-specific basis to require the use of alternate parameters as deemed appropriate, or to determine that there is no practicable approach to ensure that minimum combustion chamber temperature is maintained (and what the recourse/consequence would be).

Some commenters recommend the status quo as identified by the BIF rule requirements for monitoring combustion zone temperature. These commenters suggest that more prescriptive requirements would not be implementable for cement kilns because use of the temperature measurement instrumentation would simply not be practicable under combustion zone conditions in a cement kiln. We agree that combustion zone temperature monitoring for certain types of sources requires some site-specific considerations (as evidenced in our second proposed option discussed above), and conclude that more specific language than that used in the BIF rule to address this issue would not be appropriate. Accordingly, we adopt language similar to the BIF rule in today's final rule. You must measure the temperature of each combustion chamber at a location that best represents, as practicable, the bulk gas temperature in the combustion zone of that chamber. You are required to identify the temperature measurement location and method in the comprehensive performance test plan, which is subject to Agency approval.

The temperature limit(s) apply to each combustion zone, as proposed. See 61 FR at 17423. For incinerators with a primary and secondary chamber, you must establish separate limits for the combustion zone in each chamber.[225] For kilns, you must establish separate temperature limits at each location where hazardous waste may be fired (e.g., the hot end where clinker is discharged; and the upper end of the kiln where raw material is fed). We also proposed to include temperature limits for hazardous waste fired at the midkiln. One commenter indicates that it is technically infeasible to measure temperature directly at the midkiln waste feeding location, however. We agree that midkiln gas temperature is difficult to measure due to the rotation of the kiln.[226] Thus, the final rule allows temperature measurement at the kiln back-end as a surrogate.

You must establish an hourly rolling average temperature limit based on operations during the comprehensive performance test. The hourly rolling average limit is established as the average of the test run averages. See Part Five, Sections VII.B.1 and B.3 above for a discussion on the approach for calculating limits from comprehensive performance test data.

iii. Maximum Flue Gas Rate or Kiln Production Rate. As proposed, you must establish and continuously monitor a limit on maximum flue gas flowrate or, as a surrogate, kiln production rate. See 61 FR at 17423. Flue gas flowrates in excess of those that occur during comprehensive performance testing reduce the time that combustion gases are exposed to combustion chamber temperatures. Thus, combustion efficiency can decrease potentially causing an increase in dioxin/furan precursors and, ultimately, dioxin/furan emissions.[227]

For cement kilns and lightweight aggregate kilns, the rule allows the use of production rate as a surrogate for flue gas flowrate. This is the approach currently used for the BIF rule for these devices, given that flue gas flowrate correlates with production rate (e.g., feedrate of raw materials or rate of production of clinker or aggregate).

At proposal, however, we expressed concern that production rate may not relate well to flue gas flowrate in situations where the moisture content of the feed to the combustor changes dramatically. See 61 FR at 17423. Some commenters concur and also express concern that production rate is not a reliable surrogate for flue gas flowrate because changes in ambient temperature can cause increased heat rates and changes in operating conditions can result in variability in excess air rates. Based on an analysis of kiln processes, however, we conclude that these issues should not be a concern. With respect to changes in moisture content of the feed, kilns tend to have a steady and homogeneous waste and raw material processing system. Thus, the feed moisture content does not fluctuate widely, and variation in moisture content of the stack does not significantly affect gas flowrate.[228] Thus, production rate should be an adequate surrogate for gas flowrate for our purposes here.

You must establish a maximum gas flowrate or production rate limit as the average of the maximum hourly rolling averages for each run of the comprehensive performance test. See Part Five, Sections VII.B.3 above for the rationale for the approach for calculating limits from comprehensive performance test data.

iv. Operation of Each Hazardous Waste Firing System. You must recommend in the comprehensive performance test plan that you submit for review and approval operating parameters, limits, and monitoring approaches to ensure that each hazardous waste firing system continues to operate as efficiently as demonstrated during the comprehensive performance test.

It is important to maintain operation of the hazardous waste firing system at levels of the performance test to ensure that the same or greater surface area of the waste is exposed to combustion conditions (e.g., temperature and oxygen). Oxidation takes place more quickly and completely as the surface area per unit of mass of the waste increases. If the firing system were to degrade over time such that smaller surface area is exposed to combustion conditions, inefficient combustion could result leading potentially to an increase in dioxin/furan precursors.

[225] The temperature limits apply to a combustion chamber even if hazardous waste is not burned in the chamber for two reasons. First, an incinerator may rely on an afterburner that is fired with a fuel other than hazardous waste to ensure good combustion of organic compounds volatilized from hazardous waste in the primary chamber. Second, MACT controls apply to total emissions (except where the rule makes specific provisions), irrespective of whether they derive from burning hazardous waste or other material, or from raw materials.

[226] See USEPA. ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume IV: Compliance with the Hazardous Waste Combustor Standards'', February, 1999, for further discussion.

[227] We note that an increase in gas flowrate can also adversely affect the performance of a dioxin/furan emission control device (e.g., carbon injection, catalytic oxidizer). Thus, gas flowrate is controlled for this reason as well.

[228] See USEPA, ''Final TSD for hazardous Waste Combustor MACT Standards, Volume IV: Compliance with the Hazardous Waste Combustor Standards'', February, 1999 for further discussion.

At proposal, we discussed establishing operating parameter limits only for minimum nozzle pressure and maximum viscosity of wastes fired using a liquid waste injection system. In developing the final rule, however, we determined that RCRA permit writers currently establish operating parameter limits on each waste firing system to ensure compliance with the RCRA destruction and removal efficiency (DRE) standard. We are continuing the DRE requirement as a MACT standard, and as discussed in Section VII.D.7 below, the DRE operating parameter limits are identical to those required to maintain good combustion practices for compliance with the dioxin/furan standard. This is because compliance with the DRE standard is ensured by maintaining good combustion practices. Consequently, we include a requirement to establish limits on operating parameters for each waste or fuel firing system as a measure of good combustion practices for the dioxin/furan standard as well to be technically correct and for purposes of completeness.[229] Because this requirement is identical to an existing RCRA requirement, it will not impose an incremental burden.

The rule does not prescribe generic operating parameters and how to identify limits because, given the variety of firing systems and waste and fuel properties, they are better defined on a site-specific basis. Examples of monitoring parameters for a liquid waste firing system would be, as proposed, minimum nozzle pressure established as an hourly rolling average based on the average of the minimum hourly rolling averages for each run, coupled with a limit on maximum waste viscosity. The viscosity limit could be monitored periodically based on sampling and analysis. Examples of monitoring parameters for a lance firing system for sludges could be minimum pressure established as discussed above, plus a limit on the solids content of the waste.

v. Consideration of Restrictions on Batch Size, Feeding Frequency, and Minimum Oxygen Concentration. We proposed site-specific limits on maximum batch size, batch feeding frequency, and minimum combustion gas oxygen concentration as additional compliance requirements to ensure good combustion practices. See 61 FR at 17423. After carefully considering all comments, and for the reasons discussed below, we conclude that the carbon monoxide and hydrocarbon emission standards assure use of good combustion practices during batch feed operations. This is because the carbon monoxide and hydrocarbon CEMS are reliable and continuous indicators of combustion efficiency. In situations where batch feed operating requirements may be needed to better assure good combustion practices, however, we rely on the permit writer's discretionary authority under § 63.1209(g)(2) to impose additional operating parameter limits on a site-specific basis.

Many hazardous waste combustors burn waste fuel in batches, such as metal drums or plastic containers. Some containerized waste can volatilize rapidly, causing a momentary oxygen-deficient condition that can result in an increase in emissions of carbon monoxide, hydrocarbon, and dioxin/furan precursors. We proposed to limit batch size, batch feeding frequency, and minimum combustion gas oxygen concentration to address this concern.

Commenters suggest that the proposed batch feed requirements (that would limit operations to the smallest batch, the longest time interval, and the maximum oxygen concentration demonstrated during the comprehensive performance test) would result in extremely conservative limits that would severely limit a source's ability to batch-feed waste. Given these concerns and our reanalysis of the need for these limits, we conclude that the carbon monoxide and hydrocarbon emission standards will effectively ensure good combustion practices for most batch feed operations. Consequently, the final rule does not require limits for batch feed operating parameters.

Carbon monoxide or hydrocarbon monitoring may not be adequate for all batch feed operations, however, to ensure good combustion practices are maintained. We anticipate that permitting officials will determine on a site-specific basis, typically during review of the initial comprehensive performance test plan, whether limits on one or more batch feed operating parameters need to be established to ensure good combustion practices are maintained. This review should consider your previous compliance history (e.g., frequency of automatic waste feed cutoffs attributable to batch feed operations that resulted in an exceedance of an operating limit or standard under RCRA regulations prior to the compliance date), together with the design and operating features of the combustor. Providing permitting officials the authority under § 63.1209(g)(2) to establish batch feed operating parameter limits only where warranted precludes the need to impose the limits on all sources.

Permitting officials may also determine that limits on batch feed operating parameters are needed for a particular source based on the frequency of automatic waste feed cutoffs after the MACT compliance date. Permitting officials would consider cutoffs that are attributable to batch feed operations and that result in an exceedance of an operating parameter limit or the carbon monoxide or hydrocarbon emission standard. Given that you must notify permitting officials if you have 10 or more automatic waste feed cutoffs in a 60-day period that result in an exceedance of an operating parameter limit or CEMS-monitored emission standard, permitting officials should take the opportunity to determine if batch feed operations contributed to the frequency of exceedances. If so, permitting officials should use the authority under § 63.1209(g)(2) to establish batch feed operating parameter limits.

Although we are not finalizing batch feed operating parameter limits, we anticipate that permitting officials will require you (during review and approval of the test plan) to simulate worst-case batch feed operating conditions during the comprehensive performance test when demonstrating compliance with the dioxin/furan and destruction and removal efficiency standards. It would be inappropriate for you to operate your batch feed system during the comprehensive performance test in a manner that is not considered worst-case, considering the types and quantities of wastes you may burn, and the range of values you may encounter during operations for batch feed-related operating parameters (e.g., oxygen levels, batch size and/or btu content, waste volatility, batch feeding frequency).

To ensure that the CEMS-monitored carbon monoxide and hydrocarbon emission standards ensure good combustion practices for batch feed operations, the final rule includes special requirements to ensure that ''out-of-span'' carbon monoxide and hydrocarbon CEMS readings are adequately accounted for. We proposed batch feed operating parameter limits in part because of concern that the carbon monoxide and hydrocarbon CEMS may not accurately calculate hourly rolling averages when you encounter emission concentrations that exceed the span of the CEMS. This is an important

[229] Because incomplete combustion of fuels (e.g., oil, coal, tires) could contribute to increased dioxin/furan emissions by producing dioxin/furan precursors, permitting official may require (during review and approval of the comprehensive performance test plan) that you establish limits on operating parameters for firing systems in addition to those firing hazardous waste.

consideration because batch feed operations have the potential to generate large carbon monoxide or hydrocarbon spikes—large enough at times to exceed the span of the detector. When this occurs, the CEMS in effect ''pegs out'' and the analyzer may only record data at the upper end of its span, while in fact carbon monoxide/hydrocarbon concentrations are much higher. In these situations, the true carbon monoxide/hydrocarbon concentration is not being used to calculate the hourly rolling average. This has two significant consequences of concern to us.[230]

First, you could experience a large carbon monoxide/hydrocarbon spike (as a result of feeding a large or highly volatile batch) which causes the monitor to ''peg out.'' In this situation, the CEMS would record carbon monoxide/hydrocarbon levels that are lower than actual levels. This under-reporting of emission levels would result in an hourly rolling average that is biased low. You may in fact be exceeding the emission standard even though the CEMS indicates you are in compliance. Second, if a carbon monoxide/hydrocarbon excursion causes an automatic waste feed cutoff, you may be allowed to resume hazardous waste burning much sooner than you would be allowed if the CEMS were measuring true hourly rolling averages. This is because you must continue monitoring operating parameter limits and CEMS-monitored emission standards after an automatic waste feed cutoff and you may not restart hazardous waste feeding until all limits and CEMS-monitored emission standards are within permissible levels.[231]

As explained in Part Five, Section VII.D.4 below, we have resolved these ''out of span'' concerns by including special provisions in today's rule for instances when you encounter hydrocarbon/carbon monoxide CEMS measurements that are above the upper span required by the performance specifications.[232] These special provisions require you to assume hydrocarbons and carbon monoxide are being emitted at levels of 500 ppmv and 10,000 ppmv, respectively, when any one minute average exceeds the upper span level of the detector.[233] Although we did not propose these special provisions, they are a logical outgrowth of the proposed batch feed requirements and commenters concerns about those requirements.

For the reasons discussed above, we conclude that national requirements for batch feed operating parameter limits are not warranted.

c. Activated Carbon Injection. If your combustor is equipped with an activated carbon injection system, you must establish and comply with limits on the following operating parameters: Good particulate matter control, minimum carbon feedrate, minimum carrier fluid flowrate or nozzle pressure drop, and identification of the carbon brand and type or the adsorption characteristics of the carbon. These are the same compliance parameters that we proposed. See 61 FR at 17424.

i. Good Particulate Matter Control. You must comply with the operating parameter limits for particulate matter control (see discussion in Section VII.D.6 below and § 63.1209(m)) because carbon injection controls dioxin/furan in conjunction with particulate matter control. Dioxin/furan is adsorbed onto carbon that is injected into the combustion gas, and the carbon is removed from stack gas by a particulate control device.

Although we proposed to require good particulate matter control as a control technique for dioxin/furan irrespective of whether carbon injection was used, commenters indicate that we have no data demonstrating the relationship between particulate matter and dioxin/furan emissions. Commenters further indicate that dioxin/furan occur predominately in the gas phase, not adsorbed onto particulate. We agree with commenters that hazardous waste combustors operating under the good combustion practices required by this final rule are not likely to have significant carbon particulates in stack gas (i.e., because carbonaceous particulates (soot) are indicative of poor combustion efficiency). Thus, unless activated carbon injection is used as a control technique, dioxin/furan will occur predominately in the gas phase. We therefore conclude that requiring good particulate control as a control technique for dioxin/furan is not warranted unless a source is equipped with activated carbon injection.[234]

ii. Minimum Carbon Feedrate. As proposed, you must establish and continuously monitor a limit on minimum carbon feedrate to ensure that dioxin/furan removal efficiency is maintained. You must establish an hourly rolling average feedrate limit based on operations during the comprehensive performance test. The hourly rolling average limit is established as the average of the test run averages. See Part Five, Sections VII.B.1 and B.3 above for a discussion of the approach for calculating limits from comprehensive performance test data.

iii. Minimum Carrier Fluid Flowrate or Nozzle Pressure Drop. A carrier fluid, gas or liquid, is necessary to transport and inject the carbon into the gas stream. As proposed, you must establish and continuously monitor a limit on either minimum carrier fluid flowrate or pressure drop across the nozzle to ensure that the flow and dispersion of the injected carbon into the flue gas stream is maintained.

We proposed to require you to base the limit on the carbon injection manufacturer's specifications. One commenter notes that there are no manufacturer specifications for carrier gas flowrate or pressure drop. Therefore, the final rule allows you to use engineering information and principles to establish the limit for minimum carrier fluid flowrate or pressure drop across the injection nozzle. You must identify the limit and the rationale for deriving it in the comprehensive performance test plan that you submit for review and approval.

iv. Identification of Carbon Brand and Type or Adsorption Properties. You must either identify the carbon brand and type used during the comprehensive performance test and continue using that carbon, or identify the adsorption properties of that carbon and use a carbon having equivalent or better properties. This will ensure that the carbon's adsorption properties are maintained.[235]

We proposed to require you to use the same brand and type of carbon that was

[230] As explained in Part Five, Section VII.D.4 of the text, this concern is not limited to batch feed operations.

[231] A higher hourly rolling average carbon monoxide level that is above the standard requires a longer period of time to drop below the standard.

[232] The carbon monoxide CEMS upper span level for the high range is 3000 ppmv. The upper span level for hydrocarbon CEMS is 100 ppmv. (See Performance Specifications 4B and 8A in Appendix B, part 60, and the appendix to subpart EEE, part 63—Quality Assurance Procedures for Continuous Emissions Monitors Used for Hazardous Waste Combustors, Section 6.3).

[233] You would not be required to assume these one-minute values if you use a CEMS that meets the performance specifications for a range that is higher than the recorded one-minute average. In this case, the CEMS must meet performance specifications for the higher range as well as the ranges specified in the performance specifications in Appendix B, part 60. See § 63.1209 (a)(3) and (a)(4).

[234] We discuss below, however, that good particulate matter control is also required if a source is equipped with a carbon bed. This is to ensure that particulate control upstream of the carbon bed is maintained to performance test levels to prevent blinding of the bed and loss of removal efficiency.

[235] Examples of carbon properties include specific surface area, pore volume, average pore size, pore size distribution, bulk density, porosity, carbon source, impregnation, and activization procedure. See USEPA, ''Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the HWC MACT Standards,'' July 1999.

used during the comprehensive performance test. Commenters object to this requirement and suggest that they should have the option of using alternative types of carbon that would achieve equivalent or better performance than the carbon used during the performance test. We concur, and the final rule allows you to document in the comprehensive performance test plan key parameters that affect adsorption and the limits you have established on those parameters based on the carbon to be used during the performance test. You may substitute at any time a different brand or type of carbon provided that the replacement has equivalent or improved properties and conforms to the key sorbent parameters you have identified. You must include in the operating record written documentation that the substitute carbon will provide the same level of control as the original carbon.

d. Activated Carbon Bed. If your combustor is equipped with an activated carbon bed, you must establish and comply with limits on the following operating parameters: good particulate matter control; maximum age of each carbon bed segment; identification of carbon brand and type or adsorption properties, and maximum temperature at the inlet or exit of the bed. These are the same compliance parameters that we proposed. See 61 FR at 17424.

i. Good Particulate Matter Control. You must comply with the operating parameter limits for particulate matter control (see discussion in Section VII.D.6 below and § 63.1209(m)). If good control of particulate matter is not maintained prior to the inlet to the carbon bed, particulate matter could contaminate the bed and affect dioxin/furan removal efficiency. In addition, if particulate matter control is used downstream from the carbon bed, those controls must conform to good particulate matter control. This is because this ''polishing'' particulate matter control device may capture carbon-containing dioxin/furan that may escape from the carbon bed. Thus, the efficiency of this polishing control must be maintained to ensure compliance with the dioxin/furan emission standard.

ii. Maximum Age of Each Bed Segment. As proposed, you must establish a maximum age of each bed segment to ensure that removal efficiency is maintained. Because activated carbon removes dioxin/furan (and mercury) by adsorption, carbon in the bed becomes less effective over time as the active sites for adsorption become occupied. Thus, bed age is an important operating parameter.

At proposal, we requested comment on using carbon aging or some form of a breakthrough calculation to identify a limit on carbon age. See 61 FR at 17424. A breakthrough calculation would give a theoretical minimum carbon change-out schedule that you could use to ensure that breakthrough (i.e., the dramatic reduction in efficiency of the carbon bed due to too many active sites being occupied) does not occur.

Commenters indicate that carbon effectiveness depends on the carbon bed age and pollutant types and concentrations in the gas streams, and therefore a carbon change-out schedule should be based on a breakthrough calculation rather than carbon age. We agree that a breakthrough calculation may be a better measurement of carbon effectiveness, but it would be difficult to define generically for all situations. A breakthrough calculation could be performed only after experimentation determines the relationship between incoming adsorbed chemicals and the adsorption rate of the carbon. The adsorption rate of carbon could be determined experimentally, but the speciation of adsorbed chemicals in a flue gas stream is site-specific and may vary greatly at a given site over time.

We conclude that because carbon age contributes to carbon ineffectiveness, it serves as an adequate surrogate and is less difficult to implement on a national basis. Therefore, the rule requires sources to identify maximum carbon age as the maximum age of each bed segment during the comprehensive performance test. Carbon age is measured in terms of the cumulative volume of combustion gas flow through the carbon since its addition to the bed. Sources may use the manufacturer's specifications rather than actual bed age during the initial comprehensive performance test to identify the initial limit on maximum bed age. If you elect to use manufacturer's specifications for the initial limit on bed age, you must also recommend in the comprehensive performance test plan submitted for review and approval a schedule of dioxin/furan testing prior to the confirmatory performance test that will confirm that the manufacturer's specification of bed age is sufficient to ensure that you maintain compliance with the emission standard.

If either existing or new sources prefer to use some form of breakthrough calculation to establish maximum bed age, you may petition permitting officials under § 63.1209(g)(1)[236] to apply for an alternative monitoring scheme.

iii. Identification of Carbon Brand and Type or Adsorption Properties. You must either identify the carbon brand and type used during the comprehensive performance test and continue using that carbon, or identify the adsorption properties of that carbon and use a carbon having equivalent or better properties. This requirement is identical to that discussed above for activated carbon injection systems.

iv. Maximum Temperature at the Inlet or Exit of the Bed. You must establish and continuously monitor a limit on the maximum temperature at the inlet or exit of the carbon bed. This is because a combustion gas temperature spike can cause adsorbed dioxin/furan (and mercury) to desorb and reenter the gas stream. In addition, the adsorption properties of carbon are adversely affected at higher temperatures.

At proposal, we requested comment on whether it would be necessary to control temperature at the inlet to the carbon bed. See 61 FR at 17425. Some commenters support temperature control noting the concern that temperature spikes could cause desorption of dioxin/furan (and mercury). We concur, and are requiring you to establish a maximum temperature limit at the inlet or exit of the bed. We are allowing you the option of measuring temperature at either end of the bed to give you greater flexibility in locating the temperature continuous monitoring system. Monitoring temperature at either end of the bed should be adequate to ensure that bed temperatures are maintained at levels not exceeding those during the comprehensive performance test (because the temperature remains relatively constant across the bed).

You must establish an hourly rolling average temperature limit based on operations during the comprehensive performance test. The hourly rolling average limit is established as the average of the test run averages. See Part Five, Sections VII.B.1 and B.3 above for a discussion of the approach for calculating limits from comprehensive performance test data.

e. Catalytic Oxidizer. If your combustor is equipped with a catalytic oxidizer, you must establish and comply with limits on the following operating parameters: minimum gas temperature

[236] We have incorporated the alternative monitoring provisions of § 63.8(f) in § 63.1209(g)(1) so that alternative monitoring provisions for nonCEMS CMS can be implemented by authorized States. The alternative monitoring provisions of § 63.1209(g)(1) do not apply to CEMS, however. The alternative monitoring provisions of § 63.8(f) continue to apply to CEMS because implementation of those provisions is not eligible to be delegated to States at this time.

at the inlet of the catalyst; maximum age in use; catalyst replacement specifications; and maximum flue gas temperature at the inlet of the catalyst. These are the same compliance parameters that we proposed. See 61 FR at 17425.

Catalytic oxidizers used to control stack emissions are similar to those used in automotive and industrial applications. The flue gas passes over catalytic metals, such as palladium and platinum, supported by an alumina washcoat on some metal or ceramic substrate. When the flue gas passes through the catalyst, a reaction takes place similar to combustion, converting hydrocarbons to carbon monoxide, then carbon dioxide. Catalytic oxidizers can also be ''poisoned'' by lead and other metals in the same manner as automotive and industrial catalysts.

i. Minimum Gas Temperature at the Inlet of the Catalyst. You must establish and continuously monitor a limit on the minimum flue gas temperature at the inlet of the catalyst to ensure that the catalyst is above light-off temperature. Light-off temperature is that minimum temperature at which the catalyst is hot enough to catalyze the reactions of hydrocarbons and carbon monoxide.

You must establish an hourly rolling average temperature limit based on operations during the comprehensive performance test. The hourly rolling average limit is established as the average of the test run averages.

ii. Maximum Time In-Use. You must establish a limit on the maximum time in-use of the catalyst because a catalyst is poisoned and generally degraded over use. You must establish the limit based on the manufacturer's specifications.

iii. Catalytic Metal Loading, Maximum Space-Time, and Substrate Construct. When you replace a catalyst, the replacement must be of the same design to ensure that destruction efficiency is maintained. Consequently, the rule requires that you specify the following catalyst properties: Loading of catalytic metals; space-time; and monolith substrate construction.

Catalytic metal loading is important because, without sufficient catalytic metal on the catalyst, it does not function properly. Also, some catalytic metals are more efficient than others. Therefore, the replacement catalyst must have at least the same catalytic metal loading for each catalytic metal as the catalyst used during the comprehensive performance test.

Space-time, expressed in inverse seconds (s^{-1}), is defined as the maximum rated volumetric flow through the catalyst divided by the volume of the catalyst. This is important because it is a measure of the gas flow residence time and, hence, the amount of time the flue gas is in the catalyst. The longer the gas is in the catalyst, the more time the catalyst has to cause hydrocarbons and carbon monoxide to react. Replacement catalysts must have the same or lower space-time as the one used during the comprehensive performance test.

Substrate construction is also an important parameter affecting destruction efficiency of the catalyst. Three factors are important. First, substrates for industrial applications are typically monoliths, made of rippled metal plates banded together around the circumference of the catalyst. Ceramic monoliths and pellets can also be used. Because of the many types of substrates, you must use the same materials of construction, monolith or pellets and metal or ceramic, used during the comprehensive performance test as replacements. Second, monoliths form a honeycomb like structure when viewed from one end. The pore density (i.e., number of pores per square inch) is critical because the pores must be small enough to ensure intimate contact between the flue gas and the catalyst but large enough to allow unrestricted flow through the catalyst. Therefore, if you use a monolith substrate during the comprehensive performance test, the replacement catalyst must have the same pore density. Third, catalysts are supported by a washcoat, typically alumina. We require that replacement catalysts have the same type and loading of washcoat as was on the catalyst used during the comprehensive performance test.

iv. Maximum Flue Gas Temperature at the Inlet to the Catalyst. You must establish and continuously monitor a limit on maximum flue gas temperature at the inlet to the catalyst. Inlet temperature is important because sustained high flue gas temperature can result in sintering of the catalyst, degrading its performance. You must establish the limit as an hourly rolling average, based on manufacturer specifications.

In the proposed rule, we would have allowed a waiver from these operating parameter limits if you documented to the Administrator that establishing limits on other operating parameters would be more appropriate to ensure that the dioxin/furan destruction efficiency of the oxidizer is maintained after the performance test. See 61 FR at 17425. We are not finalizing a specific waiver for catalytic oxidizer parameters because you are eligible to apply for the same relief under the existing alternative monitoring provisions of § 63.1209(g)(1).

f. Dioxin/Furan Formation Inhibitor. If you feed a dioxin/furan formation inhibitor into your combustor as an additive (e.g., sulfur), you must: (1) Establish a limit on minimum inhibitor feedrate; and (2) identify either the brand and type of inhibitor or the properties of the inhibitor.

i. Minimum Inhibitor Feedrate. As proposed, you must establish and continuously monitor a limit on minimum inhibitor feedrate to help ensure that dioxin/furan formation reactions continue to be inhibited at levels of the comprehensive performance test. See 61 FR at 17425. You must establish an hourly rolling average feedrate limit based on operations during the comprehensive performance test. The hourly rolling average limit is established as the average of the test run averages.

This minimum inhibitor feedrate pertains to additives to feedstreams, not naturally occurring inhibitors that may be found in fossil fuels, hazardous waste, or raw materials. At proposal, we requested comment on whether it would be appropriate to establish feedrate limits on the amount of naturally occurring inhibitors based on levels fed during the comprehensive performance test. See 61 FR at 17425. For example, it is conceivable that a source would choose to burn high sulfur fuel or waste only during the comprehensive performance test and then switch back to low sulfur fuels or waste after the test, thus reducing dioxin/furan emissions during the comprehensive test to levels that would not be maintained after the test. Commenters do not provide information on this matter and we do not have enough information on the types or effects of naturally occurring substances that may act as inhibitors. Therefore, the final rule does not establish limits on naturally occurring inhibitors. Permitting officials, however, may choose to address the issue of naturally occurring inhibitors when warranted during review of the comprehensive performance test plan. (See discretionary authority of permitting officials under § 63.1209(g)(2) to impose additional or alternative operating parameter limits on a site-specific basis.)

ii. Identification of Either the Brand and Type of Inhibitor or the Properties of the Inhibitor. As proposed, you must either identify the inhibitor brand and type used during the comprehensive performance test and continue using that inhibitor, or identify the properties of that inhibitor that affect its ability to inhibit dioxin/furan formation reactions and use an inhibitor having equivalent or better properties. This requirement is identical to that discussed above for activated carbon systems.

2. What Are the Operating Parameter Limits for Mercury?

You must maintain compliance with the mercury emission standard by establishing and complying with limits on operating parameters. See § 63.1209(l). The following table summarizes these operating parameter limits. All sources must comply with the limits on mercury feedrate. Other operating parameter limits apply if you use the mercury control technique to which they apply.

Summary of Mercury Monitoring Requirements

Control Technique	Compliance Using	Limits From	Averaging Period	How Limit Is Established
Limit on Maximum Total Mercury Feedrate in all Feedstreams	Sampling and analysis of feedstreams for mercury concentration and a continuous monitoring system for feedstream flowrate[1]	Comprehensive performance test	12-hour	Average of the test run averages
Activated Carbon Injection	Monitoring requirements are the same as required for compliance assurance with the dioxin/furan emission standard. See Section VII.D.1 above.			
Activated Carbon Bed	Monitoring requirements are the same as required for compliance assurance with the dioxin/furan emission standard. See Section VII.D.1 above.			
Wet Scrubber	Monitoring requirements are the same as required for compliance assurance with the hydrochloric acid/chlorine gas emission standard. See Section VII.D.5 below.			

[1] This limit applies to all feedstreams, except natural gas, process air, and feedstreams from vapor recovery systems. See the discussion on maximum semivolatile metal and low volatile metal feedrate limits below in the text.

Mercury emissions from hazardous waste combustors are controlled by controlling the feedrate of mercury, wet scrubbing to remove soluble mercury species (e.g, mercuric chloride), and carbon adsorption. We discuss below the operating parameter limits that apply to each control technique. We also discuss why we are not limiting the temperature at the inlet to the dry particulate matter control device as a control parameter for mercury.

a. Maximum Mercury Feedrate. As proposed, you must establish and comply with a maximum total feedrate limit for mercury for all feedstreams. See 61 FR at 17428. The amount of mercury fed into the combustor directly affects emissions and the removal efficiency of emission control equipment. To establish and comply with the feedrate limit, you must sample and analyze and continuously monitor the flowrate of all feedstreams (including hazardous waste, raw materials, and other fuels and additives) except natural gas, process air, and feedstreams from vapor recovery systems for mercury content.[237] As proposed, you must establish a maximum 12-hour rolling average feedrate limit based on operations during the comprehensive performance test as the average of the test run averages.

Rather than establish mercury feedrate limits as the levels fed during the comprehensive performance test, you may request as part of your performance test plan to use the mercury feedrates and associated emission rates during the performance test to extrapolate to higher allowable feedrate limits and emission rates. See Section VII.D.3 below for a discussion of the rationale and procedures for obtaining approval to extrapolate metal feedrates.

In addition, you may use the performance test waiver provision under § 63.1207(m) to document compliance with the emission standard. Under that provision, you must monitor the total mercury feedrate from all feedstreams and the gas flowrate and document that the maximum theoretical emission concentration does not exceed the mercury emission standard. Thus, this is another compliance approach where you would not establish feedrate limits on mercury during the comprehensive performance test.

b. Wet Scrubbing. As proposed, if your combustor is equipped with a wet scrubber, you must establish and comply with limits on the same operating parameters (and in the same manner) that apply to compliance assurance with the hydrochloric acid/ chlorine gas emission standard for wet scrubbers. See Section VII.D.5 below for a discussion of those parameters.

c. Activated Carbon Injection. As proposed, if your combustor is equipped with an activated carbon injection system, you must establish and comply with limits on the same operating parameters (and in the same manner) that apply to compliance assurance with the dioxin/furan emission standard for activated carbon injection systems.

d. Activated Carbon Bed. As proposed, if your combustor is equipped with an activated carbon bed, you must establish and comply with limits on the same operating parameters (and in the same manner) that apply to compliance assurance with the dioxin/furan emission standard for activated carbon beds.

e. Consideration of a Limit on Maximum Inlet Temperature to a Dry Particulate Matter Control Device. The final rule does not require you to control inlet temperature to a dry particulate

[237] See discussion in Section VII.D.3. below in the text for rationale for exempting these feedstreams for monitoring for mercury content.

matter air pollution control device to control mercury emissions. At proposal, we expressed concern that high inlet temperatures to a dry particulate matter control device could cause low mercury removal efficiency because mercury volatility increases with increasing temperature. See 61 FR at 17428. Therefore, we proposed to limit inlet temperatures to levels during the comprehensive performance test.

Commenters suggest that a maximum inlet temperature for dry particulate matter control devices is not needed because mercury is generally highly volatile within the range of inlet temperatures of all dry particulate matter control devices. We are persuaded by the commenters that inlet temperature to these devices is not critically important to mercury control, although temperature can potentially have an impact on the volatility of certain mercury species (e.g., oxides). We conclude that the other operating parameter limits are sufficient to ensure compliance with the mercury emission standard. In particular, we note that a limit on maximum inlet temperature to these control devices is required for compliance assurance with the dioxin/furan, semivolatile metal, and low volatile metal emission standards.

3. What Are the Operating Parameter Limits for Semivolatile and Low Volatile Metals?

You must maintain compliance with the semivolatile metal and low volatile metal emission standards by establishing and complying with limits on operating parameters. See § 63.1209(n). The following table summarizes these operating parameter limits. All sources must comply with the limits on feedrates of semivolatile metals, low volatile metals, and chlorine. Other operating parameter limits apply depending on the type of particulate matter control device you use.

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Summary of Semivolatile and Low Volatile Metals Monitoring Requirements

Control Technique	Compliance Using	Limit From	Averaging Period	How Limit Is Established
Good Particulate Matter Control	Monitoring requirements are the same as required for compliance assurance with the particulate matter standard. See Section VII.D.6 below.			
Limit on Maximum Inlet Temperature to Dry Particulate Matter Control Device	Continuous monitoring system (CMS)	Comprehensive performance test	1-hour	Avg of the test run averages
Limit on Maximum Total Semivolatile and Low Volatile Metal Feedrates from all Feedstreams	Sampling and analysis of feedstreams[1] for metals concentrations and a CMS for feedstream flowrate	Comprehensive performance test	12-hour	Avg of the average hourly rolling averages for each run
Limit on Maximum Total Pumpable Low Volatile Metal Feedrate from all Feedstreams	Sampling and analysis of feedstreams[1] for metals concentrations and a CMS for feedstream flowrate	Comprehensive performance test	12-hour	Avg of the average hourly rolling averages for each run
Limit on Maximum Total Chlorine Feedrate from all Feedstreams	Sampling and analysis of feedstreams[1] for chlorine and chloride concentrations and a CMS for feedstream flowrate	Comprehensive performance test	12-hour	Avg of the average hourly rolling averages for each run

[1] This limit applies to all feedstreams, except natural gas, process air, and feedstreams from vapor recovery systems. See the discussion on maximum semivolatile metal and low volatile metal feedrate limits below in the text.

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Semivolatile and low volatile metal emissions from hazardous waste combustors are controlled by controlling the feedrate of the metals and particulate matter emissions. In addition, because chlorine feedrate can affect the volatility of metals and thus metals levels in the combustion gas, and because the temperature at the inlet to the dry particulate matter control device can affect whether the metal is in the vapor (gas) or solid (particulate) phase, control of these parameters is also important to control emissions of these metals. We discuss below the operating parameter limits that apply to each control technique. We also discuss use of metal surrogates during performance testing, provisions for allowing extrapolation of performance test feedrate levels to calculate metal feedrate limits, and conditional waiver of the limit on low volatile metals in pumpable feedstreams.

a. Good Particulate Matter Control. As proposed, you must comply with the operating parameter limits for particulate matter control (see discussion in Section VII.D.6 below and § 63.1209(m)) because semivolatile and low volatile metals are primarily in the solid (particulate) phase at the gas temperature (i.e., 400°F or lower) of the particulate matter control device. Thus, these metals are largely removed from flue gas as particulate matter.

b. Maximum Inlet Temperature to Dry Particulate Matter Control Device. As proposed, you must establish and continuously monitor a limit on the maximum temperature at the inlet to a dry particulate matter control device. Although most semivolatile and low volatile metals are in the solid, particulate phase at the temperature at the inlet to the dry control device mandated by today's rule (i.e., 400°F or lower), some species of these metals remain in the vapor phase. We are requiring a limit on maximum temperature at the inlet to the control device to ensure that the fraction of these metals that are volatile (and thus not controlled by the particulate matter control device) does not increase during operations after the comprehensive performance test.

As proposed, you must establish an hourly rolling average temperature limit based on operations during the comprehensive performance test. The hourly rolling average limit is established as the average of the test run averages. See Part Five, Sections VII.B.1 and B.3 above for a discussion of the approach for calculating limits from comprehensive performance test data.

Commenters suggest that this limit may conflict with the maximum temperature limit at the inlet to the particulate matter control device that is also required for compliance assurance with the dioxin/furan emission standard. We do not understand commenters' concern. If for some reason the dioxin/furan and metals emissions tests are not conducted simultaneously, the governing temperature limit will be the lower of the limits established from the separate tests. This provides compliance assurance for both standards.

c. Maximum Semivolatile and Low Volatile Metals Feedrate Limits. You must establish limits on the maximum total feedrate of both semivolatile metals and low volatile metals from all feedstreams at levels fed during the comprehensive performance test. Metals feedrates are related to emissions in that, as metals feedrates increase at a source, metals emissions increase. See Part Four, Section II.A above for discussion on the relationship between metals feedrates and emissions. Thus, metals feedrates are an important control technique.

For low volatile metals, you must also establish a limit on the maximum total feedrate of pumpable liquids from all feedstreams. The rule requires a separate limit for pumpable feedstreams because metals present in pumpable feedstreams may partition between the combustion gas and bottom ash (or kiln product) at a higher rate than metals in nonpumpable feedstreams (i.e., low volatile metals in pumpable feedstreams tend to partition primarily to the combustion gas). The rule does not require a separate limit for semivolatile metals in pumpable feedstreams because partitioning between the combustion gas and bottom ash or product for these metals does not appear to be affected by the physical state of the feedstream.[238]

To establish and comply with the feedrate limits, you must sample and analyze and continuously monitor the flowrate of all feedstreams (including hazardous waste, raw materials, and other fuels and additives) except natural gas, process air, and feedstreams from vapor recovery systems for semivolatile and low volatile metals content. As proposed, you must establish maximum 12-hour rolling average feedrate limits based on operations during the comprehensive performance test as the average of the test run averages.

i. Use of Metal Surrogates. You may use one metal within a volatility group as a surrogate during comprehensive performance testing for other metals in that volatility group. For example, you may use chromium as a surrogate during the performance test for all low volatile metals. Similarly, you may use lead as a surrogate for cadmium, the other semivolatile metal. This is because the metals within a volatility group have generally the same volatility. Thus, they will generally be equally difficult to control with an emissions control device.

In addition, you may use either semivolatile metal as a surrogate for any low volatile metal because semivolatile metals will be more difficult to control than low volatile metals.[239] This will help alleviate concerns regarding the need to spike each metal during comprehensive performance testing. If you want to spike metals, you need not spike each metal to comply with today's rule but only one metal within a volatility group (or potentially one semivolatile metal for both volatility groups).

ii. Extrapolation of Performance Test Feedrate Levels to Calculate Metal Feedrate Limits.[240] You may request under § 63.1209(n)(2)(ii) to use the metal feedrates and emission rates associated with the comprehensive performance test to extrapolate feedrate limits and emission rates at levels higher than demonstrated during the performance test. Extrapolation can be advantageous because it avoids much of the spiking that sources normally undertake during compliance testing and the associated costs, risks to operating and testing personnel, and environmental loading from emissions.

Under an approved extrapolation approach, you would be required to feed metals at no less than normal rates to narrow the amount of extrapolation requested. Further, we expect that some spiking would be desired to increase confidence in the measured, performance test feedrate levels that will be used to project feedrate limits (i.e., the errors associated with sampling and analyzing heterogeneous feedstreams can be minimized by spiking known quantities). Extrapolation approaches that request feedrate limits that are significantly higher than the historical range of

[238] See USEPA., ''Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the MACT Standards,'' February 1998.

[239] This is because a greater portion of semivolatile metals volatilize in the combustion chamber and condenses in the flue gas on small particulates or as fume. The major portion of low volatile metals in flue gas are entrained on larger particulates (rather than condensing from volatile species) and are thus easier to remove with a particulate control device.

[240] Although this extrapolation discussion is presented in context of semivolatile and low volatile metal feedrates, similar provisions could be implemented for mercury feedrates.

feedrates should not be approved. Extrapolated feedrate limits should be limited to levels within the range of the highest historical feedrates for the source. We are taking this policy position to avoid creating an incentive to burn wastes with higher than historical levels of metals. Metals are not destroyed by combustion but rather are emitted as a fraction of the amount fed to the combustor. If you want to burn wastes with higher than historical levels of metals, you must incur the costs and address the hazards to plant personnel and testing crews associated with spiking metals into your feedstreams during comprehensive performance testing.

Although we also investigated downward interpolation (i.e., between the measured feedrate and emission level and zero), we are concerned that downward interpolation may not be conservative. Our data indicates that system removal efficiency can decrease as metal feedrate decreases. Thus, actual emissions may be higher than emissions projected by interpolation for lower feedrates. Consequently, we are not allowing downward interpolation.

We are not specifying an extrapolation methodology to provide as much flexibility as possible to consider extrapolation methodologies that would best meet individual needs. We have investigated extrapolation approaches [241] and discussed in the May 1997 NODA a statistical extrapolation methodology. Commenters raise concerns, however, about defining a single acceptable extrapolation method. They note that other methods might be developed in the future that prove to be better, especially for a given source. We agree that the approach discussed in the NODA may be too inflexible and are not promulgating it today.[242] Consequently, today's rule does not specify a single method but allows you to recommend a method for review and approval by permitting officials.

Your recommended extrapolation methodology must be included in the performance test plan. See § 63.1207(f)(1)(x). Permitting officials will review the methodology considering in particular whether: (1) Performance test metal feedrates are appropriate (i.e., whether feedrates are at least at normal levels, whether some level of spiking would be appropriate depending on the heterogeneity of the waste, and whether the physical form and species of spiked material is appropriate); and (2) the requested, extrapolated feedrates are warranted considering historical metal feedrate data.

We received comments both in favor of and in opposition to metals extrapolation and interpolation. Those in favor suggest extrapolation would simplify the comprehensive performance test procedure, reduce costs, and decrease emissions during testing. Those in opposition are concerned about: (1) Whether there is a predictable relationship between feedrates and emission rates; (2) the possibility of higher overall metals loading to the environment over the life of the facility (i.e., because higher feedrate limits would be relatively easy to obtain); (3) the difficulty in defining a ''normal'' feedrate for facilities with variable metal feeds; and (4) whether all conditions influencing potential metals emissions, such as combustion temperature and metal compound speciation, could be adequately considered.

Given the pros and cons associated with various extrapolation methodologies and policies, we are still concerned that sources would be able to: (1) Feed metals at higher rates without a specific compliance demonstration of the associated metals emissions; and (2) obtain approval to feed metals at higher levels than normal, even though all combustion sources should be trying to minimize metals feedrates. However, because the alternative is metal spiking (as evidenced in facility testing for BIF compliance) and metal spiking is a significant concern as well, we find that the balance is better struck by allowing, with site-specific review and where warranted approval, extrapolation as a means to reduce unnecessary emissions, reduce unnecessary costs incurred by facilities, and better protect the health of testing personnel during performance tests.

iii. Conditional Waiver of Limit on Low Volatile Metals in Pumpable Feedstreams. Commenters indicate that they may want to base feedrate limits only on the worst-case feedstream—pumpable hazardous waste. The feedrate limit would be based only on the feedrate of the pumpable hazardous waste during the comprehensive performance test, even though nonpumpable feedstreams would be contributing some metals to emissions. In this situation, commenters suggest that separate feedrate limits for total and pumpable feedstreams would not be needed. We agree that if you define the total feedstream feedrate limit as the pumpable feedstream feedrate during the performance test, dual limits are not required. The feedrate of metals in total feedstreams must be monitored and shown to be below the pumpable feedstream-based limit. See § 63.1209(n)(2)(C).

iv. Response to other Comments. We discuss below our response to several other comments: (1) Recommendation for national uniform feedrate limits; (2) concerns that feedstream monitoring is problematic; and (3) recommendations that monitoring natural gas and vapor recovery system feedstreams is unnecessary.

A commenter states that nationally uniform feedrate limits are needed for metals and chlorine and that any other approach would be inconsistent with the CAA. The commenter stated that hazardous waste combustion device operators should not be allowed to self-select any level of toxic metal feedrate just because they can show compliance with the MACT standard. We believe that standards prescribing national feedrate limits on metals or chlorine are not necessary to ensure MACT control of metals and hydrochloric acid/chlorine gas and may be overly restrictive. Emissions of metals and hydrochloric acid/chlorine gas are controlled by controlling the feedrate of metals and chlorine, and emission control devices. In developing MACT standards for a source category, if we can identify emission levels that are being achieved by the best performing sources using MACT control, we generally establish the MACT standard as an emission level rather than prescribed operating limits (e.g., feedrate limits). This approach is preferable because it gives the source the option of determining the most cost-effective measures to comply with the standard. Some sources may elect to comply with the emission standards using primarily feedrate control, while others may elect to rely primarily on emission controls. Under either approach, the emission levels are equivalent to those being achieved by the best performing existing sources. Other factors that we considered in determining to express the standards as an emission level rather than feedrate limits include: (1) There is not a single, universal correlation factor between feedrate and metal emissions to use to determine a national feedrate that would be equivalent to the emission levels achieved by the best performing sources; (2) emission standards communicate better to the public that meaningful controls are being applied because the hazardous waste combustor

[241] See USEPA, ''Draft Technical Support Document for HWC MACT Standards (NODA), Volume III: Evaluation of Metal Emissions Database to Investigate Extrapolation and Interpolation Issues,'' April 1997.

[242] We plan to develop guidance on approaches that provide greater flexibility.

emission standards can be compared to standards for other waste combustors (e.g., municipal and medical waste combustors) and combustion devices; and (3) CEMS, the ultimate compliance assurance tool that we encourage sources to use,[243] are incompatible with standards expressed as feedrate limits.

Another commenter is concerned that feedrate monitoring of highly heterogeneous waste streams is problematic and analytical turnaround times can be rather long. The commenter suggests that alternatives beyond feedstream monitoring (such as predictive emissions monitoring) should be allowed. Although we acknowledge that there may be difficulties in monitoring the feedrate of metals or chlorine in certain waste streams, there generally is no better way to assure compliance with these standards other than using CEMS. Predictive modeling appears to introduce unnecessarily some greater compliance uncertainty than feedstream testing. Thus, we conclude that feedstream monitoring is a necessary monitoring tool if a multimetals CEMS is not used. (We also note that feedstream monitoring under MACT will not be substantially more burdensome or problematic than the requirements now in place under RCRA regulations.)

In addition, another commenter suggests that sources should not have to monitor metals and chlorine in natural gas feedstreams because it is impractical and levels are low and unvarying. The commenter suggests that sources should be allowed to use characterization data from natural gas vendors. We agree that the cost and possible hazards of monitoring natural gas for metals and chlorine is not warranted because our data shows metals are not present at levels of concern. Therefore, you are not required to monitor metals and chlorine levels in natural gas feedstreams. However, you must document in the comprehensive performance test plan the expected levels of these constituents and account for the expected levels in documenting compliance with feedrate limits (e.g., by assuming worst-case concentrations and monitoring the natural gas flowrate). See § 63.1209(c)(5).

Finally, some commenters are concerned that feedstreams from vapor recovery systems (e.g., waste fuel tank and container emissions) are difficult, costly, and often dangerous to monitor frequently for metals and chlorine levels. Particularly because of some of the safety issues concerned, the rule does not require continuous monitoring of metals and chlorine for feedstreams from vapor recovery systems. However, as is the case for natural gas, you must document in the comprehensive performance test plan the expected levels of these constituents and account for the expected levels in documenting compliance with feedrate limits.

d. Maximum Chlorine Feedrate. As proposed, you must establish a limit on the maximum feedrate for total chlorine (both organic and inorganic) in all feedstreams based on the level fed during the comprehensive performance test. A limit on maximum chlorine feedrate is necessary because most metals are more volatile in the chlorinated form. Thus, for example, more low volatile metals may report to the combustion gas as a vapor than would be otherwise be entrained in the combustion gas absent the presence of chlorine. In addition, the vapor form of the metal is more difficult to control. Although most semivolatile and low volatile metal species are in the particulate phase at gas temperatures at the inlet to the particulate matter control device, semivolatile metals that condense from the vapor phase partition to smaller particulates and are more difficult to control than low volatile metals that are emitted in the form of entrained, larger particulates.

To establish and comply with the feedrate limit, you must sample and analyze, and continuously monitor the flowrate, of all feedstreams (including hazardous waste, raw materials, and other fuels and additives) except natural gas, process air, and feedstreams from vapor recovery systems for total chlorine content. As proposed, you must establish a maximum 12-hour rolling average feedrate limit based on operations during the comprehensive performance test as the average of the test run averages.

Commenters suggest that chlorine feedrate limits are not needed for sources with semivolatile and low volatile metal feedrates, when expressed as maximum theoretical emission concentrations, less than the emission standard. We agree. In this situation, you would be eligible for the waiver of performance test under § 63.1207(m). The requirements of that provision (e.g., monitor and record metals feedrates and gas flowrates to ensure that metals feedrate, expressed as a maximum theoretical emission concentration, does not exceed the emission standard) apply in lieu of the operating parameter limits based on performance testing discussed above. We note, however, that you would still need to establish a maximum feedrate limit for total chlorine as an operating parameter limit for the hydrochloric acid/chlorine gas emission standard (discussed below), unless you also qualified for a waiver of that emission standard under § 63.1207(m).

4. What Are the Monitoring Requirements for Carbon Monoxide and Hydrocarbon?

You must maintain compliance with the carbon monoxide and hydrocarbon emission standards using continuous emissions monitoring systems (CEMS). In addition, you must use an oxygen CEMS to correct continuously the carbon monoxide and hydrocarbon levels recorded by their CEMS to 7 percent oxygen.

As proposed, the averaging period for carbon monoxide and hydrocarbon CEMS is a one-hour rolling average updated each minute. This is consistent with current RCRA requirements and commenters did not recommend an alternative averaging period.

We also are promulgating performance specifications for carbon monoxide, hydrocarbon, and oxygen CEMS. The carbon monoxide and oxygen CEMS performance specifications are codified as Performance Specification 4B in appendix B, part 60. This performance specification is the same as the specification currently used for BIFs in appendix IX, part 266. It also is very similar to existing appendix B, part 60 Performance Specifications 3 (for oxygen) and 4A (for carbon monoxide). New specification 4B references many of the provisions of Specifications 3 and 4A.

The hydrocarbon CEMS performance specification is codified as Performance Specification 8A in appendix B, part 60. This specification is also identical to the specification currently used for BIFs in section 2.2 of appendix IX, part 266, with one exception. We deleted the quality assurance section and placed it in the appendix to subpart EEE of part 63 promulgated today to be consistent with our approach to part 60 performance specifications.

We discuss below several issues pertaining to monitoring with these CEMS: (1) The requirement to establish site-specific alternative span values in some situations; (2) consequences of exceeding the span value of the CEMS; and (3) the need to adjust the oxygen correction factor during startup and shutdown.

a. When Are You Required to Establish Site-Specific Alternative Span

[243] As discussed previously in the text, feedrate limits as a compliance tool can be problematic for difficult to sample or analyze feedstreams. Further, the emissions resulting from a given feedrate level may increase (or decrease) over time, providing uncertainty about actual emissions.

Values? As proposed, if you normally operate at an oxygen correction factor of more than 2 (e.g., a cement kiln monitoring carbon monoxide in the by-pass duct), you must use a carbon monoxide or hydrocarbon CEMS with a span proportionately lower than the values prescribed in the performance specifications relative to the oxygen correction factor at the CEMS sampling point. See the appendix to Subpart EEE, part 63: Quality Assurance Procedures for Continuous Emissions Monitors Used for Hazardous Waste Combustors.

This requirement arose from our experience with implementing the BIF rule when we determined that the prescribed span values for the carbon monoxide and hydrocarbon CEMS may lead to high error in corrected emission values due to the effects of making the oxygen correction. For example, a cement kiln may analyze for carbon monoxide emissions in the by-pass duct with oxygen correction factors on the order of 10. At the low range of the carbon monoxide CEMS span—200 ppm as prescribed by Performance Specification 4B—with an acceptable calibration drift of three percent, an error of 6 ppm is the result. Accounting for the oxygen correction factor of 10, however, drives the error in the measurement due to calibration drift up to 60 ppm. This is more than half the carbon monoxide emission standard of 100 ppm and is not acceptable. At carbon monoxide readings close to the 100 ppm standard, true carbon monoxide levels may be well above or well below the standard.

Consider the same example under today's requirement. For an oxygen correction factor of 10, the low range span for the carbon monoxide CEMS must be 200 divided by 10, or 20 ppm. The allowable calibration drift of three percent of the span allows an error of 0.6 ppm at 20 ppm. Applying an oxygen correction factor of 10 results in an absolute calibration drift error of 6ppm at an oxygen-corrected carbon monoxide reading of 200.

b. What Are the Consequences of Exceeding the Span Value for Carbon Monoxide and Hydrocarbon CEMS? If you do not elect to use a carbon monoxide CEMS with a higher span value of 10,000 ppmv and a hydrocarbon CEMS with a higher span value of 500 ppmv, you must configure your CEMS so that a one-minute carbon monoxide value reported as 3,000 ppmv or greater must be recorded (and used to calculate the hourly rolling average) as 10,000 ppmv, and a one-minute hydrocarbon value reported as 200 ppmv or greater must be recorded as 500 ppmv.

If you elect to use a carbon monoxide CEMS with a span range of 0–10,000 ppmv, you must use one or more carbon monoxide CEMS that meet the Performance Specification 4B for three ranges: 0–200 ppmv; 1–3,000 ppmv; and 0–10,000 ppmv. Specification 4B provides requirements for the first two ranges. For the (optional) high range of 0–10,000 ppmv, the CEMS must also comply with Performance Specification 4B, except that the calibration drift must be less than 300 ppmv and calibration error must be less than 500 ppmv. These values are based on the allowable drift and error, expressed as a percentage of span, that the specification requires for the two lower span levels.

If you elect to use a hydrocarbon CEMS with a span range of 0–500 ppmv, you must use one or more hydrocarbon CEMS that meet Performance Specification 8A for two ranges: 0–100 ppmv, and 0–500 ppmv. Specification 8A provides requirements for the first range. For the (optional) high range of 0–500 ppmv, the CEMS must also comply with Performance Specification 8A, except: (1) The zero and high-level daily calibration gas must be between 0 and 100 ppmv and between 250 and 450 ppmv, respectively; (2) the strip chart recorder, computer, or digital recorder must be capable of recording all readings within the CEMS measurement range and must have a resolution of 2.5 ppmv; (3) the CEMS calibration must not differ by more than ±15 ppmv after each 24 hour period of the seven day test at both zero and high levels; (4) the calibration error must be no greater than 25 ppmv; and (5) the zero level, mid-level, and high level values used to determine calibration error must be in the range of 0–200 ppmv, 150–200 ppmv, and 350–400 ppmv, respectively. These requirements for the optional high range (0–500 ppmv) are derived proportionately from the requirements in Specification 8A for the lower range (0–100 ppmv).

The rule provides this requirement because we are concerned that, when carbon monoxide and hydrocarbon monitors record a one-minute value at the upper span level, the actual level of carbon monoxide or hydrocarbons may be much higher (i.e., these CEMS often ''peg-out'' at the upper span level). This has two inappropriate consequences. First, the source may actually be exceeding the carbon monoxide or hydrocarbon standard even though the CEMS indicates that it is not. Second, if the carbon monoxide or hydrocarbon hourly rolling average were to exceed the standard, triggering an automatic waste feed cutoff, the emission level may drop back below the standard much sooner than it otherwise would if the actual one-minute average emission levels were recorded (i.e., rather than one-minute averages pegged at the upper span value). Thus, this diminishes the economic disincentive for incurring automatic waste feed cutoffs of not being able to restart the hazardous waste feed until carbon monoxide and hydrocarbon levels are below the standard.

We considered applying these ''out-of-span'' requirements when any recorded value (i.e., any value recorded by the CEMS on a frequency of at least every 15 seconds), rather than one-minute average values, exceeded the upper span level. Commenters point out, however, that CEMS may experience short-term electronic glitches that cause the monitored output to spike for a very short time period. We concur, and conclude that we should be concerned only about one-minute average values because these short-term electronic glitches (that are not caused by emission excursions) could result in an undesirable increase in automatic waste feed cutoffs.

You may prefer to use carbon monoxide or hydrocarbon CEMS that have upper span values between 3,000 and 10,000 ppmv and between 100 and 500 ppmv, respectively. If you believe that you would not have one-minute average carbon monoxide or hydrocarbon levels as high as 10,000 ppmv and 500 ppmv, respectively, you may determine that it would be less expensive to use monitors with lower upper span levels (e.g., you may be able to use a single carbon monoxide CEMS to meet performance specifications for all three spans—the two lower spans required by Specification 4B, and a higher span (but less than 10,000)). You must still record, however, any one-minute average carbon monoxide or hydrocarbon levels that are at or above the span as 10,000 ppmv and 500 ppmv, respectively.

c. How Is the Oxygen Correction Factor Adjusted during Startup and Shutdown? You must identify in your Startup Shutdown, and Malfunction Plan a projected oxygen correction factor to use during periods of startup and shutdown. The projected oxygen correction factor should be based on normal operations. See § 63.1206(c)(2)(iii). The rule provides this requirement because the oxygen concentration in the combustor can exceed 15% during startup and shutdown, causing the correction factor to increase exponentially from the normal value. Such large correction factors result in corrected carbon monoxide and hydrocarbon levels that are inappropriately inflated.

5. What Are the Operating Parameter Limits for Hydrochloric Acid/Chlorine Gas?

You must maintain compliance with the hydrochloric acid/chlorine gas emission standard by establishing and complying with limits on operating parameters. See § 63.1209(o). The following table summarizes these operating parameter limits. All sources must comply with the maximum chlorine feedrate limit. Other operating parameter limits apply depending on the type of hydrochloric acid/chlorine gas emission control device you use.

BILLING CODE 6560–50–P

Summary of Hydrochloric Acid/Chlorine Gas Monitoring Requirements

Control Technique	Compliance Using	Limits From	Averaging Period	How Limit Is Established
Limit on Maximum Chlorine Feedrate	Sampling and analysis of feedstreams[1] for chlorine (organic and inorganic) and a continuous monitoring system (CMS) for feedstream flowrate	Comprehensive performance test	12-hour	Avg of the average hourly rolling averages for each run
Wet Scrubber	CMS for maximum flue gas flowrate or kiln production rate	Comprehensive performance test	1-hour	Avg of the maximum hourly rolling averages for each run
	High energy scrubbers: CMS for minimum pressure drop across scrubber	Comprehensive performance test	1-hour	Avg of the test run averages
	Low energy scrubbers: CMS for minimum pressure drop across scrubber	Manufacturer specifications	1-hour	n/a
	Low energy scrubbers: CMS for minimum liquid feed pressure	Manufacturer specifications	1-hour	n/a
	CMS for minimum liquid pH	Comprehensive performance test	1-hour	Avg of the test run averages
	CMS for limit on minimum scrubber liquid flowrate and maximum flue gas flowrate or CMS for limit on minimum liquid/gas ratio	Comprehensive performance test	1-hour	Avg of the test run averages
Dry Scrubber[2]	CMS for minimum sorbent feedrate	Comprehensive performance test	1-hour	Avg of the test run averages
	CMS for minimum carrier fluid flowrate or nozzle pressure drop	Manufacturer specification	1-hour	n/a
	Identification of sorbent brand and type or adsorption properties	Comprehensive performance test	n/a	Same properties based on manufacturer's specifications

[1] This limit applies to all feedstreams, except natural gas, process air, and feedstreams from vapor recovery systems. See the discussion in Section VII.D.3 above in the text for the rationale for these exceptions.

[2] A CMS for gas flowrate or kiln production rate is also required with the same provisions as required for that compliance parameter for wet scrubbers.

BILLING CODE 6560–50–C

Hydrochloric acid/chlorine gas emissions from hazardous waste combustors are controlled by controlling the feedrate of total chlorine (organic and inorganic) and either wet or dry scrubbers. We discuss below the operating parameter limits that apply to each control technique.

a. Maximum Chlorine Feedrate Limit. As proposed, you must establish a limit on the maximum feedrate of chlorine, both organic and inorganic, from all feedstreams based on levels fed during the comprehensive performance test. Chlorine feedrate is an important emission control technique because the amount of chlorine fed into a combustor directly affects emissions of hydrochloric acid/chlorine gas. To establish and comply with the feedrate limit, you must sample and analyze, and continuously monitor the flowrate, of all feedstreams (including hazardous waste, raw materials, and other fuels and additives) except natural gas, process air, and feedstreams from vapor recovery systems for chlorine content.[244] Also as proposed, you must establish a maximum 12-hour rolling average feedrate limit based on operations during the comprehensive performance test as the average of the test run averages.

One commenter states that a chlorine feedrate is not necessary for cement kilns because cement kilns have an inherent incentive to control chlorine feedrates: to avoid operational problems such as the formation of material rings in the kiln or alkali-chloride condensation on the walls. Although we understand that cement kilns must monitor chlorine feedrates for operational reasons, several cement kilns in our data base emit levels of hydrochloric acid/chlorine gas at levels above today's emissions standard. We conclude, therefore, that the operational incentive to limit chlorine feedrates is not adequate to ensure compliance with the hydrochloric acid/chlorine gas emission standard.

b. Wet Scrubbers. If your combustor is equipped with a wet scrubber, you must establish, continuously monitor, and comply with limits on the following operating parameters:

i. Maximum Flue Gas Flowrate or Kiln Production Rate. As proposed, you must establish a limit on maximum flue gas flowrate or kiln production rate as a surrogate. See 61 FR at 17433. Gas flowrate is a key parameter affecting the control efficiency of a wet scrubber (and any emissions control device). As gas flowrate increases, control efficiency generally decreases unless other operating parameters are adjusted to accommodate the increased flowrate. Cement kilns and lightweight aggregate kilns may establish a limit on maximum production rate (e.g., raw material feedrate or clinker or aggregate production rate) in lieu of a maximum gas flowrate given that production rate directly relates to flue gas flowrate.

As proposed, you must establish a maximum gas flowrate or production rate limit as the average of the maximum hourly rolling averages for each run of the comprehensive performance test.

We did not receive adverse comment on this compliance parameter.

ii. Minimum Pressure Drop Across the Scrubber. You must establish a limit on minimum pressure drop across the scrubber. If your combustor is equipped with a high energy scrubber (e.g., venturi, calvert), you must establish an hourly rolling average limits based on operations during the comprehensive performance test. The hourly rolling average is established as the average of the test run averages.

If your combustor is equipped with a low energy scrubber (e.g., spray tower), you must establish a limit on minimum pressure drop based on the manufacturer's specification. You must comply with the limit on an hourly rolling average basis.

Pressure drop across a wet scrubber is an important operating parameter because it is an indicator of good mixing of the two fluids, the scrubber liquid and the flue gas. A low pressure drop indicates poor mixing and, hence, poor efficiency. A high pressure drop indicates good removal efficiency.

One commenter states that wet scrubber pressure drop is not an important parameter for packed-bed, low energy wet scrubbers. The commenter states that the performance of a packed-bed scrubber is based on good liquid-to-gas contacting. Thus, performance is dependent on packing design and scrubber fluid flow. In addition, the commenter states that scrubber liquid flow rate (and recirculation rate and make-up water flow rate) are adequate for assuring proper scrubber operation. We note that for many types of low energy wet scrubbers, pressure drop can be a rough indicator of scrubber liquid and flue gas contacting. Thus, although it is not a critical parameter, the minimum pressure drop of a low energy scrubber should still be monitored and complied with on a continuous basis.

Because pressure drop for a low energy scrubber (e.g., spray towers, packed beds, or tray towers) is not as important as for a high energy scrubber to maintain performance, however, the rule requires you to establish a limit on the minimum pressure drop for a low energy scrubber based on manufacturer specifications, rather than levels demonstrated during compliance testing. You must comply with this limit on an hourly rolling average basis. The pressure drop for high energy wet scrubbers, such as venturi or calvert scrubbers, however, is a key operating parameter to ensure the scrubber maintains performance. Accordingly, you must base the minimum pressure drop for these devices on levels achieved during the comprehensive test, and you must establish an hourly rolling average limit.

iii. Minimum Liquid Feed Pressure. You must establish a limit on minimum liquid feed pressure to a low energy scrubber. The limit must be based on manufacturer's specifications and you must comply with it on an hourly rolling average basis.

The rule requires a limit on liquid feed pressure because the removal efficiency of a low energy wet scrubber can be directly affected by the atomization efficiency of the scrubber. A drop in liquid feed pressure may be an indicator of poor atomization and poor scrubber removal efficiency. We are not requiring a limit on minimum liquid feed pressure for high energy scrubbers because liquid flow rate rather than feed pressure is the dominant operating parameter for high energy scrubbers.

We acknowledge, however, that not all wet scrubbers rely on atomization efficiency to maintain performance. If manufacturer's specifications indicate that atomization efficiency is not an important parameter that controls the efficiency of your scrubber, you may petition permitting officials under § 63.1209(g)(1) to waive this operating parameter limit.

iv. Minimum Liquid pH. You must establish dual ten-minute and hourly rolling average limits on minimum pH of the scrubber water based on operations during the comprehensive performance test. The hourly rolling average is established as the average of the test run averages.

The pH of the scrubber liquid is an important operating parameter because, at low pH, the scrubber solution is more acidic and removal efficiency of hydrochloric acid and chlorine gas decreases.

These requirements, except for the proposed ten-minute averaging period, are the same as we proposed. See 61 FR at 17433. We did not receive adverse comments.

[244] See discussion in Section VII.D.3 above in the text for the rationale for exempting these feedstreams for monitoring for chlorine content.

v. Minimum Scrubber Liquid Flowrate or Minimum Liquid/Gas Ratio. You must establish an hourly rolling average limits on either minimum scrubber liquid flowrate and maximum flue gas flowrate or minimum liquid/gas ratio based on operations during the comprehensive performance test. The hourly rolling average is established as the average of the test run averages.

Liquid flowrate and flue gas flowrate or liquid/gas ratio are important operating parameters because a high liquid-to-gas-flowrate ratio is indicative of good removal efficiency.

We had proposed to limit the liquid-to-gas ratio only. Commenters suggest that a limit on liquid-to-gas flow ratio would not be needed if the liquid flowrate and flue gas flowrate were limited instead. They reason that, because gas flowrate is already limited, limiting liquid flowrate as well would ensure that the liquid-to-gas ratio is maintained. We agree. During normal operations, the liquid flowrate can only be higher than levels during the performance test, and gas flowrate can only be lower than during the performance test. Thus, the numerator in the liquid flowrate/gas flowrate ratio could only be larger, and the denominator could only be smaller. Consequently, the liquid flowrate/gas flowrate during normal operations will always be higher than during the comprehensive performance test. Consequently, we agree that a limit on liquid-to-gas-ratio is not needed if you establish a limit on liquid flowrate and flue gas flowrate. Establishing limits on these parameters is adequate to ensure that the liquid flowrate/gas ratio is maintained.[245]

c. Dry Scrubbers. A dry scrubber removes hydrochloric acid from the flue gas by adsorbing the hydrochloric acid onto sorbent, normally an alkaline substance like limestone. As proposed, if your combustor is equipped with a dry scrubber, you must establish, continuously monitor, and comply with limits on the following operating parameters: Gas flowrate or kiln production rate; sorbent feedrate; carrier fluid flowrate or nozzle pressure drop; and sorbent specifications. See 61 FR at 17434.

i. Maximum Flue Gas Flowrate or Kiln Production Rate. As proposed, you must establish a limit on maximum flue gas flowrate or kiln production rate as a surrogate. The limit is established and monitored as discussed above for wet scrubbers.

ii. Minimum Sorbent Feedrate. You must establish an hourly rolling average limit on minimum sorbent feedrate based on feedrate levels during the comprehensive performance test. The hourly rolling average is established as the average of the test run averages.

Sorbent feedrate is important because, as more sorbent is fed into the dry scrubber, removal efficiency of hydrochloric acid and chlorine gas increases.[246] Conversely, lower sorbent feedrates tend to cause removal efficiency to decrease.

At proposal, we invited comment on whether a ten-minute rolling average is appropriate for sorbent feedrate (61 FR at 17434). We were concerned that some facilities may not automate their dry scrubbers to add sorbent solutions but instead add batches of virgin sorbent solution. Thus, we were concerned that a ten-minute rolling average may not be practicable in all cases. Some commenters are concerned that a ten-minute limit would be difficult to measure, especially in the case of batch addition of sorbent. Nonetheless, we have determined upon reanalysis that sorbent is not injected into the flue gas in ''batches.'' Although sorbent may be added in batches to storage or mixing vessels, it must be injected into the flue gas continuously to provide continuous and effective removal of acid gases. Thus, ten-minute rolling average limits would be practicable and appropriate for sorbent injection feedrates if ten-minute averages were required in this final rule.[247] However, as discussed in Part Five, Section VII.B, we have decided to not require ten-minute averaging periods on a national basis. Permitting officials may, however, determine that shorter averaging periods are needed to better assure compliance with the emission standard.

iii. Minimum Carrier Fluid Flowrate or Nozzle Pressure Drop. A carrier fluid, normally air or water, is necessary to transport and inject the sorbent into the gas stream. As proposed, you must establish and continuously monitor a limit on either minimum carrier gas or water flowrate or pressure drop across the nozzle to ensure that the flow and dispersion of the injected sorbent into the flue gas stream is maintained. You must base the limit on manufacturer's specifications, and comply with the limit on a one-hour rolling average basis.

Without proper carrier flow to the dry scrubber, the sorbent flow into the scrubber will decrease causing the efficiency to decrease. Nozzle pressure drop is also an indicator of carrier gas flow into the scrubber. At higher pressure drops, more sorbent is carried to the dry scrubber.

iv. Identification of Sorbent Brand and Type or Adsorption Properties. You must either identify the sorbent brand and type used during the comprehensive performance test and continue using that sorbent, or identify the adsorption properties of that sorbent and use a sorbent having equivalent or better properties. This will ensure that the sorbent's adsorption properties are maintained.

We proposed to require sources to continue to use the same sorbent brand and type as they used during the comprehensive performance test or obtain a waiver from this requirement from the Administrator. See 61 FR at 17434. As discussed above in the context of specifying the brand of carbon used in carbon injection systems to control dioxin/furan, we have determined that sources should have the option of using manufacturer's specifications to specify the sorption properties of the sorbent used during the comprehensive performance test. You may use sorbent of other brands or types provided that it has equivalent or better sorption properties. You must include in the operating record written documentation that the substitute sorbent will provide the same level of control as the original sorbent.

6. What Are the Operating Parameter Limits for Particulate Matter?

You must maintain compliance with the particulate matter emission standard by establishing and complying with limits on operating parameters. See § 63.1209(m). The following table summarizes these operating parameter limits. All incinerators must comply with the limit on maximum ash feedrate. Other operating parameter limits apply depending on the type of particulate matter control device you use.

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[245] In fact, complying with limits on liquid flowrate and gas flowrate, rather than complying with a liquid flowrate/gas flowrate ratio, is a more conservative approach to ensure that the performance test ratio is maintained (at a minimum). Thus, we prefer that you establish a limit on liquid flowrate (in conjunction with the limit gas flowrate) in lieu of a limit on the ratio.

[246] We note that sorbent should be fed to a dry scrubber in excess of the stoichiometric requirements for neutralizing the anion component in the flue gas. Lower levels of sorbent, even above stoichiometric requirements, would limit the removal of acid gasses.

[247] We note that flowrate measurement devices are available for ten-minute average times (e.g., those based on volumetric screw feeders which provide instantaneous measurements).

Summary of Particulate Matter Monitoring Requirements

Control Technique	Compliance Using	Limits From	Averaging Period	How Limit Is Established
For Incinerators, Limit on Maximum Ash Feedrate	Sampling and analysis of feedstreams for ash and a continuous monitoring system (CMS) for feedstream flowrate	Comprehensive performance test	12-hour	Avg of the average hourly rolling averages for each run.
Wet Scrubber: High Energy and Ionizing Scrubbers	CMS for maximum flue gas flowrate or kiln production rate	Comprehensive performance test	1-hour	Avg of the maximum hourly rolling averages for each run
	For high energy wet scrubbers only, CMS for minimum pressure drop across scrubber	Comprehensive performance test	1-hour	Avg of the test run averages
	For high energy wet scrubbers only, CMS for limit on minimum scrubber liquid flowrate and maximum flue gas flowrate or CMS for limit on minimum liquid/gas ratio	Comprehensive performance test	1-hour	Avg of the test run averages
All Wet Scrubbers	CMS for limit on minimum blowdown rate plus a CMS for either minimum scrubber tank volume or level, or	Comprehensive performance test	1-hour	Avg of the test run averages
	CMS for solids content of scrubber water, or	Comprehensive performance test	12-hour	Avg of the test run averages
	Manual sampling for solids content of scrubber water[1]	Comprehensive performance test	1-hour	Avg of manual sampling run averages
Fabric Filter[2]	CMS for minimum pressure drop and maximum pressure drop across each cell	Manufacturer's specifications	1-hour	n/a
Electrostatic Precipitator and Ionizing Wet Scrubber[2]	CMS for secondary voltage and current to each field to monitor limits on minimum power input (kVA)	Comprehensive performance test	1-hour	Avg of the test run averages

[1] Unless you elect to comply with a default sampling/analysis frequency for solids content of the scrubber water of once per hour, you must recommend an alternative frequency in the comprehensive performance test plan that you submit for review and approval.

[2] A CMS for gas flowrate or kiln production rate is also required with the same provisions as required for those parameters for wet scrubbers.

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Particulate matter emissions from hazardous waste combustors are controlled by controlling the feedrate of ash to incinerators and using a particulate matter control device. We discuss below the operating parameter limits that apply to each control technique.

a. Maximum Ash Feedrate. As proposed, if you own or operate an incinerator, you must establish a limit on the maximum feedrate of ash from all feedstreams based on the levels fed during the comprehensive performance test. To establish and comply with the feedrate limit, you must sample and analyze, and continuously monitor the flowrate of all feedstreams (including hazardous waste, and other fuels and additives) except natural gas, process air, and feedstreams from vapor recovery systems for ash content.[248] Also as proposed, you must establish a maximum 12-hour rolling average feedrate limit based on operations during the comprehensive performance test as the average of the test run averages. See 61 FR at 17438.

Ash feedrate for incinerators is an important particulate matter control parameter because ash feedrates can relate directly to emissions of particulate matter (i.e., ash contributes to particulate matter in flue gas). We are not requiring an ash feedrate limit for cement or lightweight aggregate kilns because particulate matter from those combustors is dominated by raw materials entrained in the flue gas. The contribution to particulate matter of ash from hazardous waste or other feedstreams is not significant. We discussed this issue at proposal.

A commenter states that ash feedrate limits are not needed for combustors using fabric filters, suggesting that fabric filter pressure drop and opacity monitoring are sufficient for compliance assurance. We discuss previously in this section (i.e., Part Five, Section VII) our concern that neither opacity monitors, nor limits on control device operating parameter, nor limits on the feedrates of constituents that can contribute directly to emissions of hazardous air pollutants comprise an ideal compliance assurance regime. We would prefer the use of a particulate matter CEMS for compliance assurance but cannot achieve that goal at this time. Absent the use of a CEMS and given the limitations of the individual compliance tools currently available, we are reluctant to forgo on a national, generic basis requiring limits on an operating parameter such as ash feedrate that we know can relate directly to particulate emissions. However, you may petition permitting officials under § 63.1209(g)(1) for approval to waive the ash feedrate limit based on data or information documenting that pressure drop across the fabric filter coupled with an opacity monitor would provide equivalent or better compliance assurance than a limit on ash feedrate.

b. Wet Scrubbers. As proposed, if your combustor is equipped with a wet scrubber, you must establish, continuously monitor, and comply with limits on the operating parameters discussed below. High energy wet scrubbers (e.g., venturi, calvert) remove particulate matter by capturing particles in liquid droplets and separating the droplets from the gas stream. Ionizing wet scrubbers use both an electrical charge and wet scrubbing to remove particulate matter. Low energy wet scrubbers that are not ionizing wet scrubbers (e.g., packed bed, spray tower) are only subject to the scrubber water solids content operating parameter requirements for particulate matter control because they are primarily used to control emissions of acid gases and only provide incidental particulate matter control.

i. Maximum Flue Gas Flowrate or Kiln Production Rate. For high energy and ionic wet scrubbers, you must establish a limit on maximum flue gas flowrate or kiln production rate as a surrogate. See 61 FR at 17438. Gas flowrate is a key parameter affecting the control efficiency of a wet scrubber (and any emissions control device). As gas flowrate increases, control efficiency generally decreases unless other operating parameters are adjusted to accommodate the increased flowrate. Cement kilns and lightweight aggregate kilns may establish a limit on maximum production rate (e.g., raw material feedrate or clinker or aggregate production rate) in lieu of a maximum gas flowrate given that production rate directly relates to flue gas flowrate.

As proposed, you must establish a maximum gas flowrate or production rate limit as the average of the maximum hourly rolling averages for each run of the comprehensive performance test.

ii. Minimum Pressure Drop Across the Scrubber. For high energy scrubbers only, you must establish an hourly rolling average limits on minimum pressure drop across the scrubber based on operations during the comprehensive performance test. The hourly rolling average is established as the average of the test run averages. See the discussion in Section VII.D.5.b above for a discussion on the approach for calculating limits from comprehensive performance test data.

iii. Minimum Scrubber Liquid Flowrate or Minimum Liquid/Gas Ratio. For high energy wet scrubbers, you must establish an hourly rolling average limits on either minimum scrubber liquid flowrate and maximum flue gas flowrate or minimum liquid/gas ratio based on operations during the comprehensive performance test. The hourly rolling average is established as the average of the test run averages. See the discussion in Section VII.D.5.b above for a discussion on the approach for calculating limits from comprehensive performance test data.

iv. Maximum Solids Content of Scrubber Water or Minimum Blowdown Rate Plus Minimum Scrubber Tank Volume or Level. For all wet scrubbers, to maintain the solids content of the scrubber water to levels no higher than during the comprehensive performance test, you must establish a limit on either: (1) Maximum solids content of the scrubber water; or (2) minimum blowdown rate plus minimum scrubber tank volume or level. If you elect to establish a limit on maximum solids content of the scrubber water, you must comply with the limit either by: (1) Continuously monitoring the solids content and establishing 12-hour rolling average limits based on solids content during the comprehensive performance test; or (2) periodic manual sampling and analysis of scrubber water for solids content. Under option 1, the 12-hour rolling average is established as the average of the test run averages. Under option 2, you must either comply with a default sampling and analysis frequency for scrubber water solids content of once per hour or recommend an alternative frequency in your comprehensive performance test plan that you submit for review and approval.

Solids content in the scrubber water is an important operating parameter because as the solids content increases, particulate emissions increase. This is attributable to evaporation of scrubber water and release of previously captured particulate back into the flue gas. Blowdown is the amount of scrubber liquid removed from the process and not recycled back into the wet scrubber. As scrubber liquid is removed and not recycled, solids are removed. Thus, blowdown is an operating parameter that affects solids content and can be used as a surrogate for measuring solids content directly. See 61 FR 17438.

The proposed rule would have required continuously monitored limits on either minimum blowdown or a

[248] See discussion in Section VII.D.3 above in the text for the rationale for exempting these feedstreams from monitoring for ash content.

maximum solids content. In response to comments and upon reanalysis of the issues, we conclude that we need to make two revisions to these requirements. First, we are concerned that it may be problematic to continuously monitor the solids content of scrubber water. Consequently, we revised the requirements to allow manual sampling and analysis on an hourly basis, unless you justify an alternative frequency. Second, we are concerned that a limit on blowdown rate without an associated limit on either minimum scrubber water tank volume or level would not be adequate to provide control of solids content. The solids concentration in blowdown tanks could be higher at lower water levels. Therefore, water levels need to be at least equivalent to the levels during the comprehensive performance test. This should not be a significant additional burden. Sources should be monitoring the water level in the scrubber water tank as a measure of good operating practices. Consequently, we revise the requirement to require a minimum tank volume or level in conjunction with a minimum blowdown rate for sources that elect to use that compliance option.

c. Fabric Filter. If your combustor is equipped with a fabric filter, you must establish, continuously monitor, and comply with limits on the operating parameters discussed below.

i. Maximum Flue Gas Flowrate or Kiln Production Rate. As proposed, you must establish a limit on maximum flue gas flowrate or kiln production rate as a surrogate. Gas flowrate is a key parameter affecting the control efficiency of a fabric filter (and any emissions control device). As gas flowrate increases, control efficiency generally decreases unless other operating parameters are adjusted to accommodate the increased flowrate. Cement kilns and lightweight aggregate kilns may establish a limit on maximum production rate (e.g., raw material feedrate or clinker or aggregate production rate) in lieu of a maximum gas flowrate given that production rate directly relates to flue gas flowrate.

As proposed, you must establish a maximum gas flowrate or production rate limit as the average of the maximum hourly rolling averages for each run of the comprehensive performance test.

ii. Minimum Pressure Drop and Maximum Pressure Drop Across the Fabric Filter. You must establish a limit on minimum pressure drop and maximum pressure drop across each cell of the fabric filter based on manufacturer's specifications.

Filter failure is typically due to filter holes, bleed-through migration of particulate through the filter and cake, and small ''pin holes'' in the filter and cake. Because low pressure drop is an indicator of one of these types of failure, pressure drop across the fabric filter is an indicator of fabric filter failure.

We had proposed to establish limits on minimum pressure drop based on the performance test. Commenters indicate, however, that maintaining a pressure drop not less than levels during the performance test will not ensure baghouse performance. We concur. The pressure change caused by fabric holes may not be measurable, especially at large sources with multiple chamber filter housing units that operate in parallel. In addition, operating at high pressure drop may not be desirable because high pressures can create pin holes.

Nonetheless, establishing a limit on minimum pressure drop based on manufacturer's recommendations, as suggested by a commenter, is a reasonable and prudent approach to help ensure fabric filter performance. We have since determined that an operating parameter limit for maximum pressure drop across each cell of the fabric filter, based on manufacturer specifications, is also necessary. As discussed above, a high pressure drop in a cell of a fabric filter may cause small pinholes to form or may be indicative of bag blinding or plugging, which could result in increased particulate emissions. We do not consider this additional provision to be burdensome, especially because both the maximum and minimum pressure drop limits are based on manufacturer specifications on an hourly rolling average. These pressure drop monitoring requirements, in combination with COMS for cement kilns and bag leak detection systems for incinerators and lightweight aggregate kilns, provide a significant measure of assurance that control performance is maintained.

d. Electrostatic Precipitators and Ionizing Wet Scrubbers. As proposed, if your combustor is equipped with an electrostatic precipitator or ionizing wet scrubber, you must establish, continuously monitor, and comply with limits on the operating parameters discussed below.

i. Maximum Flue Gas Flowrate or Kiln Production Rate. You must establish a limit on maximum flue gas flowrate or kiln production rate as a surrogate. Gas flowrate is a key parameter affecting the control efficiency of an emissions control device. As gas flowrate increases, control efficiency generally decreases unless other operating parameters are adjusted to accommodate the increased flowrate. Cement kilns and lightweight aggregate kilns may establish a limit on maximum production rate (e.g., raw material feedrate or clinker or aggregate production rate) in lieu of a maximum gas flowrate given that production rate directly relates to flue gas flowrate.

As proposed, you must establish a maximum gas flowrate or production rate limit as the average of the maximum hourly rolling averages for each run of the comprehensive performance test.

ii. Minimum Secondary Power Input to Each Field. You must establish an hourly rolling average limit on minimum secondary power (kVA) input to each field of the electrostatic precipitator or ionizing wet scrubber based on operations during the comprehensive performance test. The hourly rolling average is established as the average of the test run averages.

Electrostatic precipitators capture particulate matter by charging the particulate in an electric field and collecting the charged particulate on an inversely charged collection plate. Higher voltages improve magnetic field strength, resulting in charged particle migration to the collection plate. High current leads to an increased particle charging rate and increased electric field strength near the collection electrode, increasing collection at the plate, as well. Therefore, maximizing both voltage and current by specifying minimum power input to the electrostatic precipitator is desirable for good particulate matter collection in electrostatic precipitators. For these reasons, the rule requires you to monitor power input to each field of the electrostatic precipitator to ensure that collection efficiency is maintained at performance test levels.

Power input to an ionizing wet scrubber is important because it directly affects particulate removal. Ionizing wet scrubbers charge the particulate prior to it entering a packed bed wet scrubber. The charging aids in the collection of the particulate onto the packing surface in the bed. The particulate is then washed off the packing by the scrubber liquid. Therefore, power input is a key parameter to proper operation of an ionizing wet scrubber.

One commenter suggests that a minimum limit on electrostatic precipitator voltage be used instead of power input because, at low particulate matter loadings, operation at maximum power input is inefficient. Another commenter suggests that neither a limit on voltage or power input is appropriate because a minimum limit would actually cause a potential decrease in operational efficiency (required power input and voltage are strong functions of gas and particulate characteristics, electrostatic precipitator arcing and sparking at high voltage and power requirements, etc.). Alternatively, they recommend that a limit on the minimum number of energized electrostatic precipitator fields be established. We continue to maintain that a minimum limit on power input to each field of the electrostatic precipitator is generally accepted as an appropriate parameter for assuring electrostatic precipitator performance. Consequently, it is an appropriate parameter for a generic, national standard. If you believe, however, that in your situation limits on alternative operating parameters may better assure that control performance is maintained you may request approval to use alternative monitoring approaches under § 63.1209(1).

Another commenter suggests that, in addition to a minimum power input for an ionizing wet scrubber, a limit should be set on the maximum time allowable to be below the minimum voltage. While feasible, we conclude that this limit is not necessary on a national basis because the one hour rolling average requirement limits the amount of time a source can operate below its minimum voltage limit. We acknowledge, however, that a permit writer may find it necessary to require shorter averaging periods (e.g., ten-minute or instantaneous limits) to better control the amount of time a source can operate at levels below its limit.

7. What Are the Operating Parameter Limits for Destruction and Removal Efficiency?

You must establish, monitor, and comply with the same operating parameter limits to ensure compliance with the destruction and removal efficiency (DRE) standard as you establish to ensure good combustion practices are maintained for compliance with the dioxin/furan emission standard. See § 63.1209(j) and the discussion in Section VII.D.1 above. This is because compliance with the DRE standard is ensured by maintaining combustion efficiency using good combustion practices. Thus, the DRE operating parameters are: maximum waste feedrate for pumpable and nonpumpable wastes, minimum gas temperature for each combustion chamber, maximum gas flowrate or kiln production rate, and parameters that you recommend to ensure the operations of each hazardous waste firing system are maintained.[249]

VIII. Which Methods Should Be Used for Manual Stack Tests and Feedstream Sampling and Analysis?

This part discusses the manual stack test and the feedstream sampling and analysis methods required by today's rule.

A. Manual Stack Sampling Test Methods

To demonstrate compliance with today's rule, you must use: (1) Method 0023A for dioxin and furans; (2) Method 29 for mercury, semivolatile metals, and low volatile metals; (3) Method 26A for hydrochloric acid and chlorine; and (4) Method 5 or 5i for particulate matter. These methods are found at 40 CFR part 60, appendix A, and in ''Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods,'' EPA publication.

In the NPRM, we proposed that BIF manual stack test methods currently located in SW–846 be required to demonstrate compliance with the proposed standards. Based on public comments from the proposal, in the December 1997 NODA we considered simply citing the ''Air Methods'' found in appendix A to part 60. Our rationale was that facilities may be required to perform two identical tests, one from SW–846 for compliance with MACT or RCRA and one from part 60, appendix A, for compliance with other air rules using identical test methods simply because one method is an SW–846 method and the other an Air Method. See 62 FR at 67803. To facilitate compliance with all air emissions stack tests, we stated that we would list the methods found in 40 CFR part 60, appendix A, as the stack test methods used to comply with the standards. Later in this section we present an exception for dioxin and furan testing.

In today's rule, we adopt the approach of the December 1997 NODA and require that the test methods found in 40 CFR part 60, appendix A be used to demonstrate compliance with the emission standards of today's rule, except for dioxin and furan. Specifically, today's rule requires you to use Method 0023A in SW–846 for sampling dioxins and furans from stack emissions. As noted by commenters, improvements have been made to the dioxin and furan Method 0023A in the Third Update of SW–846 that have been previously incorporated into today's regulations. See the 40 CFR 63.1208(a), incorporation of SW–846 by reference. However, these have not yet been incorporated into 40 CFR part 60, Appendix A. To capture these improvements to the method, today's rule incorporates by reference SW–846 Method 0023A. We have evaluated both methods. Use of the improved Method 0023A will not affect the achievability of the dioxin and furan standard.

In the proposal, we sought comment on the handling of nondetect values for congeners analyzed using the dioxin and furan method. We also sought comment on whether the final rule should specify minimum sampling times. We proposed allowing facilities to assume that emissions of dioxins and furans congeners are zero if the analysis showed a nondetect for that congener and the sample time for the test method run was at least 3 hours. See 61 FR 17378. Dioxin/furan results may not be blank corrected. We received several comments this proposed approach, which are summarized below.

One commenter believes that a minimum dioxin/furan sampling time of two hours is sufficient. Another commenter believes that a minimum sample time as well as a minimum sample volume should be specified. Several commenters agree that nondetects should be treated as zero (which is consistent with the German standard) and prefer the three hour minimum sample period because this would help eliminate intra-laboratory differences and difficulties with matrix effects in attaining low detection limits. One commenter believes that EPA should specify the required detection limit for each congener analysis, otherwise the provision to assign zeroes to nondetected congeners in the TEQ calculation is open to abuse and could result in an understatement of the true dioxin/furan emissions. This commenter also believes that a source should not be allowed to sample dioxin/ furans for time periods less than three hours, even if they assume nondetects are present at the detection limit.

Upon carefully considering all the above comments, we conclude that the following approach best addresses the nondetect issue. The final rule requires all sources to sample dioxin/furans for a minimum of three hours for each run,

[249] You are required to establish operating requirements only for hazardous waste firing systems because of DRE standard applies only to hazardous waste. Permitting officials may determine on a site-specific basis under authority of § 63.1209(g)(2), however, that combustion of other fuels or wastes may affect your ability to maintain DRE for hazardous waste. Accordingly, permitting officials may define operating requirements for other (i.e., other than hazardous waste) waste or fuel firing systems. Permitting officials may also determine under that provision on a site-specific basis that operating requirements other than those prescribed for DRE (and good combustion practices) may be needed to ensure compliance with the DRE standard.

and requires all sources to collect a flue gas sample of at least 2.5 dscm. We conclude both these requirements are necessary to maintain consistency from source to source, and to better assure that the dioxin/furan emission results are accurate and representative. We conclude that these two requirements are achievable and appropriate [250]. These requirements are consistent with the requirements included in the proposed Portland Cement Kiln MACT rule (see 64 FR at 31898). The final rule also allows a source to assume all nondetected congeners are not present in the emissions when calculating TEQ values for compliance purposes.

We considered whether it would be appropriate to specify required minimum detection limits for each congener analysis in order to better assure that sources achieved reasonable detection limits, as one commenter recommended. Such a requirement would prevent abuse and understatements of the true dioxin/furan emissions. We conclude, however, that it is not appropriate to finalize minimum detection limits in this rulemaking without giving the opportunity to all interested parties to review and comment on such an approach.

However, we are concerned that (1) sources have no incentive to achieve low detection limits; and (2) sources may abuse the provision that allows nondetected congener results to be treated as if they were not present. As explained in the Final Technical Support Document referenced in the preceding paragraph, if one assumes that all dioxin/furan congeners are present at what we consider to be poor detection limits using Method 23A, the resultant TEQ can approach the emission standard. This outcome is clearly inappropriate from a compliance perspective.

As a result, we highly recommend that this issue be addressed in the review process of the performance test workplan. Facilities should submit information that describes the target detection limits for all congeners, and calculate a dioxin/furan TEQ concentration assuming all congeners are present at the detection limit (similar to what is done for risk assessments). If this value is close to the emission standard, both the source and the regulatory official should determine if it is appropriate to either sample for longer time periods or investigate whether it is possible to achieve lower detection limits by using different analytical procedures that are approved by the Agency.

Also, EPA has developed analytical standards for certain mono-through tri-chloro dioxin and furan congeners. We encourage you to test for these congeners in addition to the congeners that comprise today's standards. This can be done at very little increased cost. If you test for these additional congeners, please include the results in your Notification of Compliance. We would like this data so we can develop a database from which to determine which (if any) of these compounds can act as surrogate(s) for the dioxin and furan congeners which comprise the total and TEQ. If easily measurable surrogate(s) can be found, we can then start the development of a CEMS for these surrogates. A complete list of these congeners will be included in the implementation document for this rule and updated periodically through guidance.

One commenter suggests that a source be allowed to conduct one extended dioxin/furan sampling event as opposed to three separate runs with three separate sampling trains because this would minimize the radioactive waste generated for sources that combust mixed waste. We conclude this issue should be handled on a site-specific basis, although an allowance of such an approach seems reasonable. A source can petition the Agency under the provisions of § 63.7(f) for an alternative test method for such a site-specific determination.

The final rule also adopts the approach discussed in the December 1997 NODA for sampling of mercury, semi-volatile metals, and low-volatile metals. Therefore, for stack sampling of mercury, semi-volatile metals, and low-volatile metals, you are required to use Method 29 in 40 CFR part 60, appendix A. No adverse comments were received concerning this approach in the December 1997 NODA.

For compliance with the hydrochloric acid and chlorine standards, today's rule requires that you use Method 26A in 40 CFR part 60, appendix A. Commenters state that we should instead require a method involving the Fourier Transform Infrared and Gas Filter Correlation Infrared instrumental techniques. Commenters contend that Method 26A is biased high at cement kilns because it collects ammonium chloride in addition to the hydrochloric acid and chlorine gas emissions it was designed to report. Commenters also indicate that the Fourier Transform Infrared and Gas Filter Correlation Infrared were validated against Method 26A and that these alternative methods do not bias the results high due to ammonium chloride [251]. The data for today's hydrochloric acid standard was derived using the SW–846 equivalent to Method 26A (Method 0050) as the reference method. Therefore, today's standard accounts for the ammonium chloride collection bias. We reject the idea that we should require other methods. If the commenters are correct, other methods would not sample the ammonium chloride portion, thus making the standard less stringent. You can obtain Administrator approval for using Fourier Transform Infrared or Gas Filter Correlation Infrared techniques following the provisions found in 40 CFR 63.7 if those methods are found to pass a part 63, appendix A, Method 301 validation at the source.

Compliance with the particulate matter standards requires the use of either Method 5 or Method 5i in 40 CFR part 60, appendix A. See a related discussion of Method 5i in Part 5, section VII.C.2.a of the preamble to today's rule. Although Method 5i has better precision than Method 5, your choice of methods depends on the emissions during the performance test. In cases of low levels of particulate matter (*i.e.,* for total train catches of less than 50 mg), we prefer that Method 5i be used. For higher emissions, Method 5 may be used [252]. In practice this will likely mean that all incinerators and most lightweight aggregate kilns will use Method 5i for compliance, while some lightweight aggregate kilns and most cement kilns will use Method 5.

Today's rule also allows the use of any applicable SW–846 test methods to demonstrate compliance with requirements of this subpart. As an example, some commenters noted a preference to perform particulate matter and hydrochloric acid tests together using Method 0050. Today's rule would allow that practice. Applicable SW–846 test methods are incorporated for use into today's rule via reference. See section 1208(a).

B. Sampling and Analysis of Feedstreams

Today's rule does not require the use of SW–846 methods for the sampling and analysis of feedstreams. Consistent with our approach to move toward performance based measurement

[250] See Final Technical Support Document, Volume IV, Chapter 3, for further discussion.

[251] After further review and consideration of the GFCIR Method (322), we will not be promulgating its use in the Portland Cement Kiln NESHAP rulemaking due to problems encountered with the method during emission testing at lime manufacturing plants.

[252] We note that this total train catch is *not* intended to be a data acceptance criteria. Thus, total train catches exceeding 50 mg *do not* invalidate the method.

systems for other than method-defined parameters,[253] today's rule allows the use of any reliable analytical method to determine feedstream concentrations of metals, halogens, and other constituents. It is your responsibility to ensure that the sampling and analysis are unbiased, precise, and representative of the waste. For the waste, you must demonstrate that: (1) Each constituent of concern is not present above the specification level at the 80% upper confidence limit around the mean; and (2) the analysis could have detected the presence of the constituent at or below the specification level at the 80% upper confidence limit around the mean. You can refer to the Guidance for Data Quality Assessment—Practical Methods for Data Analysis, EPA QA/G–9, January 1998, EPA/600/R–96/084 for more information. Proper selection of an appropriate analytical method and analytical conditions (as allowed by the scope of that method) are demonstrated by adequate recovery of spiked analytes (or surrogate analytes) and reproducible results. Quality control data obtained must also reflect consistency with the data quality objectives and intent of the analysis. You can read the January 31, 1996, memorandum from Barnes Johnson, Director of the Economics, Methods, and Risk Assessment Division, to James Berlow, Director of the Hazardous Waste Minimization and Management Division for more information on this topic.

IX. What Are the Reporting and Recordkeeping Requirements?

We discuss in this section reporting and recordkeeping requirements and a provision in the rule for allowing data compression to reduce the recordkeeping burden.

A. What Are the Reporting Requirements?

The reporting requirements of the rule include notifications and reports that must be submitted to the Administrator as well as notifications, requests, petitions, and applications that you must submit to the Administrator only if you elect to request approval to comply with certain reduced or alternative requirements. These reporting requirements are summarized in the following tables. We discuss previously in various sections of today's preamble the rationale for additional or revised reporting requirements to those currently required under subpart A of part 63 for all MACT sources. In other cases, the reporting requirements for hazardous waste combustors are the same as for other MACT sources (e.g., initial notification under existing § 63.9(b). We also show in the tables the reference(s) in the regulations for the reporting requirement.

SUMMARY OF NOTIFICATIONS THAT YOU MUST SUBMIT TO THE ADMINISTRATOR

Reference	Notification
63.9(b)	Initial notifications that you are subject to Subpart EEE.
63.1210(b) and (c).	Notification of intent to comply.
63.9(d)	Notification that you are subject to special compliance requirements.
63.1207(e), 63.9(e) 63.9(g) (1) and (3).	Notification of performance test and continuous monitoring system evaluation, including the performance test plan and CMS performance evaluation plan.
163.1210(d), 63.1207(j), 63.9(h), 63.10(d)(2), 63.10(e)(2).	Notification of compliance, including results of performance tests and continuous monitoring system performance evaluations.
63.1206(b)(6)	Notification of changes in design, operation, or maintenance.
63.9(j)	Notification and documentation of any change in information already provided under § 63.9.

[1] You may also be required on a case-by-case basis to submit a feedstream analysis plan under § 63.1209(c)(3).

SUMMARY OF REPORTS THAT YOU MUST SUBMIT TO THE ADMINISTRATOR

Reference	Report
63.1211(b)	Compliance progress report associated and submitted with the notification of intent to comply.
63.10(d)(4)	Compliance progress reports, if required as a condition of an extension of the compliance date granted under § 63.6(i).
63.1206(c)(3)(vi)	Excessive exceedances reports.
63.1206(c)(4)(iv)	Emergency safety vent opening reports.
63.10(d)(5)(i)	Periodic startup, shutdown, and malfunction reports.
63.10(d)(5)(ii)	Immediate startup, shutdown, and malfunction reports.
63.10(e)(3)	Excessive emissions and continuous monitoring system performance report and summary report.

SUMMARY OF NOTIFICATIONS, REQUESTS, PETITIONS, AND APPLICATIONS THAT YOU MUST SUBMIT TO THE ADMINISTRATOR ONLY IF YOU ELECT TO COMPLY WITH REDUCED OR ALTERNATIVE REQUIREMENTS

Reference	Notification, request, petition, or application
63.1206(b)(5), 63.1213, 63.6(i), 63.9(c)	You may request an extension of the compliance date for up to one year.
63.9(i)	You may request an adjustment to time periods or postmark deadlines for submittal and review of required information.
63.1209(g)(1)	You may request approval of: (1) alternative monitoring methods, except for standards that you must monitor with a continuous emission monitoring system (CEMS) and except for requests to use a CEMS in lieu of operating parameter limits; or (2) a waiver of an operating parameter limit.
63.1209(a)(5), 63.8(f)	You may request: (1) approval of alternative monitoring methods for compliance with standards that are monitored with a CEMS; and (2) approval to use a CEMS in lieu of operating parameter limits.

[253] Feedstream sampling and analysis are not method defined parameters.

SUMMARY OF NOTIFICATIONS, REQUESTS, PETITIONS, AND APPLICATIONS THAT YOU MUST SUBMIT TO THE ADMINISTRATOR ONLY IF YOU ELECT TO COMPLY WITH REDUCED OR ALTERNATIVE REQUIREMENTS—Continued

Reference	Notification, request, petition, or application
63.1204(d)(4)	Notification that you elect to comply with the emission averaging requirements for cement kilns with in-line raw mills.
63.1204(e)(4)	Notification that you elect to comply with the emission averaging requirements for preheater or preheater/precalciner kilns with dual stacks.
63.1206(b)(1)(ii)(A)	Notification that you elect to document compliance with all applicable requirements and standards promulgated under authority of the Clean Air Act, including Sections 112 and 129, in lieu of the requirements of Subpart EEE when not burning hazardous waste.
63.1206(b)(9)(iii)(B)	If you elect to conduct particulate matter CEMS correlation testing and wish to have federal particulate matter and opacity standards and associated operating limits waived during the testing, you must notify the Administrator by submitting the correlation test plan for review and approval.
63.1206(b)(10)	Owners and operators of lightweight aggregate kilns may request approval of alternative emission standards for mercury, semivolatile metal, low volatile metal, and hydrochloric acid/chlorine gas under certain conditions.
63.1206(b)(11)	Owners and operators of cement kilns may request approval of alternative emission standards for mercury, semivolatile metal, low volatile metal, and hydrochloric acid/chlorine gas under certain conditions.
63.1207(c)(2)	You may request to base initial compliance on data in lieu of a comprehensive performance test.
63.1207(i)	You may request up to a one-year time extension for conducting a performance test (other than the initial comprehensive performance test) to consolidate testing with other state or federally-required testing.
63.1209(l)(1)	You may request to extrapolate mercury feedrate limits.
63.1209(n)(2)(ii)	You may request to extrapolate semivolatile and low volatile metal feedrate limits.
63.10(e)(3)(ii)	You may request to reduce the frequency of excess emissions and CMS performance reports.
63.10(f)	You may request to waive recordkeeping or reporting requirements.
63.1211(e)	You may request to use data compression techniques to record data on a less frequent basis than required by § 63.1209.

Some commenters suggest that the rule needs to provide additional reporting of information regarding metals fed to cement kilns, including quarterly reporting of daily average metal feedrates, maximum hourly feedrates, and all testing and analytical information on the toxic metal content of cement kiln dust and clinker product. Also, they suggest that toxic metals that are Toxics Release Inventory pollutants and that are released to the land from cement kiln dust disposal should be reported. While these reports might have some value for other purposes, we must carefully scrutinize all reporting and recordkeeping burdens for a rulemaking and determine whether the reporting and recordkeeping requirements are necessary to ensure compliance with the standards. (We, as an agency, cannot increase overall our reporting and recordkeeping burden.)

We do not believe that these reports are needed to ensure compliance with the standards and therefore are not requiring them. On balance, quarterly filing requirements would be too burdensome. A source must document compliance with all operating parameter limits and emission standards at all times, and its records are subject to inspection at any time. There is no additional need to provide quarterly reports.

One commenter suggests that the proposed rule incorrectly focuses on maximizing data collection as opposed to ensuring performance, thus frustrating the use of better technology and methods. We, of course, are also interested in ensuring performance by all reasonable means, which for example accounts for our continued focus on continuous emission monitors. However, we are not able to sacrifice data collection as a means for ensuring compliance as well as a means to undergird future rulemakings, assess achievability, and determine site-specific compliance limits, where necessary.

B. What Are the Recordkeeping Requirements?

You must keep the records summarized in the table below for at least five years from the date of each occurrence, measurement, maintenance, corrective action, report, or record. See existing § 63.10(b)(1). At a minimum, you must retain the most recent two years of data on site. You may retain the remaining three years of data off site. You may maintain such files on: microfilm, a computer, computer floppy disks, optical disk, magnetic tape, or microfiche.

We discuss previously in various sections of today's preamble the rationale for additional or revised recordkeeping requirements to those currently required under subpart A of part 63 for all MACT sources. In other cases, the recordkeeping requirements for hazardous waste combustors are the same as for other MACT sources (e.g., record of the occurrence and duration of each malfunction of the air pollution control equipment; see existing § 63.10(b)(2)(ii)). We also show in the table the reference(s) in the regulations for the recordkeeping requirement.

SUMMARY OF DOCUMENTS, DATA, AND INFORMATION THAT YOU MUST INCLUDE IN THE OPERATING RECORD

Reference	Document, data, or information
63.1201(a), 63.10 (b) and (c).	General. Information required to document and maintain compliance with the regulations of Subpart EEE, including data recorded by continuous monitoring systems (CMS), and copies of all notifications, reports, plans, and other documents submitted to the Administrator.
63.1211(d)	Documentation of compliance.
63.1206 (c)(3)(vii).	Documentation and results of the automatic waste feed cutoff operability testing.
63.1209 (c)(2)	Feedstream analysis plan.
63.1204 (d)(3)	Documentation of compliance with the emission averaging requirements for cement kilns with in-line raw mills.
63.1204 (e)(3)	Documentation of compliance with the emission averaging requirements for preheater or preheater/precalciner kilns with dual stacks.
63.1206(b)(1)(ii)(B).	If you elect to comply with all applicable requirements and standards promulgated under authority of the Clean Air Act, including Sections 112 and 129, in lieu of the requirements of Subpart EEE when not burning hazardous waste, you must document in the operating record that you are in compliance with those requirements.
63.1206 (c)(2)	Startup, shutdown, and malfunction plan.
63.1206(c)(3)(v).	Corrective measures for any automatic waste feed cutoff that results in an exceedance of an emission standard or operating parameter limit.
63.1206(c)(4)(ii).	Emergency safety vent operating plan.
63.1206 (c)(4)(iii).	Corrective measures for any emergency safety vent opening.
63.1206 (c)(6)	Operator training and certification program.
63.1209 (k)(6)(iii), 63.1209 (k)(7)(ii), 63.1209 (k)(9)(ii), 63.1209 (o)(4)(iii).	Documentation that a substitute activated carbon, dioxin/furan formation reaction inhibitor, or dry scrubber sorbent will provide the same level of control as the original material.

Some commenters are concerned that the specification of media on which these files may be maintained unnecessarily limits the options to facilities, especially those not equipped with computer or other electronic data gathering equipment. We conclude, however, that the options listed under § 63.10(b)(1) seem to provide the greatest flexibility possible, including the reasonable management of paper records through the use of microfilm or microfiche. We encourage the use of computer and electronic equipment, however, for logistical reasons (retrieval and inspection can be easier) and as a means to enhance dissemination to the local community to foster an atmosphere of full and open disclosure about facility operations.

C. How Can You Receive Approval to Use Data Compression Techniques?

You may submit a written request to the Administrator under § 63.1211(f) for approval to use data compression techniques to record data from CMS, including CEMS, on a frequency less than that required by § 63.1209. You must submit the request for review and approval as part of the comprehensive performance test plan. For each CEMS or operating parameter for which you request to use data compression techniques, you must provide: (1) A fluctuation limit that defines the maximum permissible deviation of a new data value from a previously generated value without requiring you to revert to recording each one-minute average; and (2) a data compression limit defined as the closest level to an operating parameter limit or emission standard at which reduced recording is allowed.

You must record one-minute average values at least every ten minutes. If after exceeding a fluctuation limit you remain below the limit for a ten-minute period, you may reinitiate your data compression technique provided that you are not exceeding the data compression limit.

The fluctuation limit should represent a significant change in the parameter measured, considering the range of normal values. The data compression limit should reflect a level at which you are unlikely to exceed the specific operating parameter limit or emission standard, considering its averaging period, with the addition of a new one-minute average.

We provide the following table of recommended fluctuation and data compression limits as guidance. These are the same limits that we discussed in the May 1997 NODA.

RECOMMENDED FLUCTUATION AND DATA COMPRESSION LIMITS

CEMS or control technique and parameter	Fluctuation limit (±)	Data compression limit
Continuous Emission Monitoring System:		
Carbon monoxide	10 ppm	50 ppm.
Hydrocarbon	2 ppm	60% of standard.
Combustion Gas Temperature Quench: Maximum inlet temperature for dry particulate matter control device or, for lightweight aggregate kilns, temperature at kiln exit.	10°F	Operating parameter limit (OPL) minus 30°F.
Good Combustion Practices:		
Maximum gas flowrate or kiln production rate	10% of OPL	60% of OPL.
Maximum hazardous waste feedrate	10% of OPL	60% of OPL.
Maximum gas temperature for each combustion chamber	20°F	OPL plus 50°F.
Activated Carbon Injection:		
Minimum carbon injection feedrate	5% of OPL	OPL plus 20%.
Minimum carrier fluid flowrate or nozzle pressure drop	20% of OPL	OPL plus 25%.
Activated Carbon Bed: Maximum gas temperature at inlet or exit of the bed	10°F	OPL minus 30°F.
Catalytic Oxidizer:		
Minimum flue gas temperature at entrance	20°F	OPL plus 40°F.
Maximum flue gas temperature at entrance	20°F	OPL minus 40°F.
Dioxin Inhibitor: Minimum inhibitor feedrate	10% of OPL	60% of OPL.
Feedrate Control:		

RECOMMENDED FLUCTUATION AND DATA COMPRESSION LIMITS—Continued

CEMS or control technique and parameter	Fluctuation limit (±)	Data compression limit
Maximum total metals feedrate (all feedstreams)	10% of OPL	60% of OPL.
Maximum low volatile metals feedrate, pumpable feedstreams	10% of OPL	60% of OPL.
Maximum total ash feedrate (all feedstreams)	10% of OPL	60% of OPL.
Maximum total chlorine feedrate (all feedstreams)	10% of OPL	60% of OPL.
Wet scrubber:		
Minimum pressure drop across scrubber	0.5 inches water	OPL plus 2 inches water.
Minimum liquid feed pressure	20% of OPL	OPL plus 25%.
Minimum liquid pH	0.5 pH unit	OPL plus 1 pH unit.
Maximum solids content in liquid	5% of OPL	OPL minus 20%.
Minimum blowdown (liquid flowrate)	5% of OPL	OPL plus 20%.
Minimum liquid flowrate or liquid flowrate/gas flowrate ratio	10% of OPL	OPL plus 30%.
Dry scrubber:		
Minimum sorbent feedrate	10% of OPL	OPL plus 30%.
Minimum carrier fluid flowrate or nozzle pressure drop	10% of OPL	OPL plus 30%.
Fabric filter: Minimum pressure drop across device	1 inch water	OPL plus 2 inches water.
Electrostatic precipitator and ionizing wet scrubber: Minimum power input (kVA: current and voltage).	5% of OPL	OPL plus 20%.

Data compression is the process by which a facility automatically evaluates whether a specific data point needs to be recorded. Data compression does not represent a change in the continuous monitoring requirement in the rule. One-minute averages will continue to be generated. With data compression, however, each one-minute average is automatically compared with a set of specifications (i.e., fluctuation limit and data compression limit) to determine whether it must be recorded. New data are recorded when the one-minute average value falls outside these specifications.

We did not propose data compression techniques in the April 1996 NPRM. In response to the proposed monitoring and recording requirements, however, commenters raise concerns about the burden of recording one-minute average values for the array of operating parameter limits that we proposed. Commenters suggest that allowing data compression would significantly reduce the recordkeeping burden while maintaining the integrity of the data for compliance monitoring. We note that data compression should also benefit regulatory officials by allowing them to focus their review on those data that are indicative of nonsteady-state operations and that are close to the operating parameter limit or, for CEMS, the emission standard.

In response to these concerns, we presented data compression specifications in the May 1997 NODA. Public comments on the NODA are uniformly favorable. Therefore, we are including a provision in the final rule that allows you to request approval to use data compression techniques. The fluctuation and data compression limits presented above are offered as guidance to assist you in developing your recommended data compression methodology.

We are not promulgating data compression specifications because the dynamics of monitored parameters are not uniform across the regulated universe. Thus, establishing national specifications would be problematic. Various data compression techniques can be successfully implemented for a monitored parameter to obtain compressed data that reflect the performance on a site-specific basis. Thus, the rule requires you to recommend a data compression approach that addresses the specifics of your operations. The fluctuation and data compression limits presented above are offered solely as guidance and are not required.

The rule requires that you record a value at least once every ten minutes to ensure that a minimum, credible data base is available for compliance monitoring. If you operate under steady-state conditions at levels well below operating parameter limits and CEMS-monitored emission standards, data compression techniques may enable you to achieve a potential reduction in data recording up to 90 percent.

X. What Special Provisions Are Included in Today's Rule?

A. What Are the Alternative Standards for Cement Kilns and Lightweight Aggregate Kilns?

In the May 1997 NODA, we discussed alternative standards for cement kilns and lightweight aggregate kilns that have metal or chlorine concentrations in their mineral and related process raw materials that might cause an exceedance of today's standard(s), even though the source uses MACT control. (See 62 FR 24238.) After carefully considering commenters input, we adopt a process that allows sources to petition the Administrator for alternative mercury, semivolatile metal, low volatile metal, or hydrochloric acid/chlorine gas standards under two different sets of circumstances. One reason for a source to consider a petition is when a kiln cannot achieve the standard, while using MACT control, because of raw material contributions to their hazardous air pollutant emissions. The second reason is limited to mercury, and applies when mercury is not present at detectable levels in the source's raw material. These alternative standards are discussed separately below.

1. What Are the Alternative Standards When Raw Materials Cause an Exceedance of an Emission Standard? See sections 1206(b) (10) and (11)

a. What Approaches Have We Publicly Discussed? We acknowledge that a kiln using properly designed and operated MACT control technologies, including control of metals levels in hazardous waste feedstocks, may not be capable of achieving the emission standards (i.e., the mercury, semivolatile metal, low volatile metal, and/or hydrochloric acid/chlorine gas standards). This can occur when hazardous air pollutants (i.e., metals and chlorine) contained in the raw material volatilize or are entrained in the flue gas such that their contribution to total metal and chlorine emissions cause an exceedance of the emission standard.

Our proposal first acknowledged this possible situation. In the April 1996 NPRM, we proposed metal and chlorine standards that were based, in part, on specified levels of hazardous waste feedrate control as MACT control. To address our concern that kilns may not be able to achieve the standards when using MACT control technologies, given raw material contributions to emissions, we performed an analysis. Our analysis estimated the total emissions of each kiln including emissions from raw materials, while also assuming the source was using MACT hazardous waste feedrate and particulate matter control. Results of this analysis, which were discussed in the proposal, indicated that there may be several kilns that would not be able to achieve the proposed emission standards while using MACT control, due to levels of metals and chlorine in raw material and/or conventional fuel. (See 61 FR at 17393–17406.) Commenters requested that we provide an equivalency determination to allow sources to comply with a control efficiency requirement (e.g., a minimum metal system removal efficiency) in lieu of the emission standard. (See response below.)

In the May 1997 NODA, we discussed revised standards that defined MACT control, in part, based on hazardous waste metal and chlorine feedrate control—as did the NPRM. (See 62 FR 24225–24235.) However, our revised approach did not define specific levels of hazardous waste metal and chlorine feedrate control, therefore, making it difficult to attribute a kiln's failure to meet emission standards to metals levels in raw materials.[254] In response to a commenter's request, we discussed, in the May 1997 NODA, an alternative approach to address raw material contributions. Our approach did not subject a source to the MACT standards if the source could document that metal or chlorine concentrations in their hazardous waste, and any nonmineral feedstock, is within the range of normal industry levels. The purpose of this requirement was to ensure that metal and chlorine emissions attributable to nonmineral feedstreams were roughly equivalent to those from sources achieving the MACT emission standards. The use of an industry average, or normal metal and chlorine level, was to serve as a surrogate MACT feedrate control level for the alternative standard because we did not define a specific level of control as MACT. We also requested comment on how best to determine normal hazardous waste metal and chlorine levels.

Today's final rule uses a revised standard setting methodology that defines specific levels of hazardous waste metal and chlorine feedrates as MACT control.[255] As a result, we do not need to define normal, or average, metal and chlorine levels for the purposes of this alternative standard provision.

b. What Comments Did We Receive on Our Approaches? There were many comments supporting and many opposing the concept of allowing alternative standards. Several commenters focus on the Agency's legal basis for this type of alternative standard. Some, supporting an alternative standard, wrote that feedrate control of raw materials at mineral processing plants is not a permissible basis for MACT control. In support of their position, some directed our attention to the language found in the Conference Report to the 1990 CAA amendments.[256] However, as we noted in the April 1996 NPRM and as was mentioned by many commenters[257], the Conference Report language is not reflected in the statute. Section 112(d)(2)(A) of the statute states, without caveat, that MACT standards may be based on ''process changes, substitution of materials or other modifications.''

As noted above, our MACT approach in today's rule relies on metal and chlorine hazardous waste feedrate control as part of developing MACT emission standards. It should be noted, that we do not directly regulate raw material metal and chlorine input under this approach, although there is no legal bar for us to do so. Since raw material feedrate control is not an industry practice, raw material feedrate control is not part of the MACT floor. In addition, we do not adopt such control as a beyond-the-floor standard. We conclude it is not cost-effective to require kilns to control metal and chlorine emissions by substituting their current raw materials with off-site raw materials. (See metal and chlorine emission standard discussions for cement kilns and lightweight aggregate kilns in Part Four, Sections VII and VIII.)[258]

Although today's rule offers a petition process, we considered varying levels of metal and chlorine emissions attributable to raw material in identifying the metal and chlorine emission standards through our MACT floor methodology. This consideration helps to ensure that the emission standards are achievable for sources using MACT control. Therefore, we anticipate very few sources, if any, will need to petition the Administrator for alternative standards. However, it is possible that raw material hazardous air pollutant levels, at a given kiln location, could vary over time and preclude kilns from achieving the emission standards. We believe, therefore, that it is appropriate to adopt a provision to allow kilns to petition for alternative standards so that future changes in raw material feedstock will not prevent compliance with today's emission standards.

Other commenters believe that alternative standards are not necessary because there are kilns with relatively high raw material metal concentrations already achieving the proposed standards. To address this point, and to reevaluate the ability of kilns to achieve the emission standards without new control of metals and chlorine in raw material and conventional fuel, we again estimated the total metal and chlorine emissions, assuming each kiln fed metal and chlorine at the defined MACT feedrate control levels.[259]

The following table summarizes the estimated achievability of the emission standards assuming kilns used MACT control. Our analysis determined achievability both at the emission standard and at the design level—70 percent of the standard. (To ensure compliance most kilns will ''design'' their system to operate, at a minimum, 30 percent below the standard.) The table describes the number of test conditions in our data base that would not meet the emission standard or meet the design level by estimating total emissions. For example, all cement kiln test conditions achieve the mercury emission standard, assuming all cement

[254] We could not estimate a cement kiln's total emissions (i.e., to determine emission standard achievability) based on the assumption that the kiln is feeding metals in the hazardous waste at the MACT control feedrate levels.

[255] As explained earlier, the emission standards for metals and chlorine reflect the performance of MACT control, which includes control of metals and chlorine in the hazardous waste feed materials. As further explained, sources are not required to adopt MACT control. Sources must, however, achieve the level of performance which MACT control achieves. Therefore, sources are not required to control metals and chlorine hazardous waste feedrates to the same levels as MACT control in order to comply with the standards for metals and chlorine. Rather, the source can elect to achieve the emission standard by any means, which may or may not involve hazardous waste feedrate control semivolatile metal and low volatile metal emissions by limiting particulate matter emissions, and did not adopt beyond-the-floor standards based on raw material metal and chlorine feedrate control—see 64 FR 31898.

[256] H.R. Rep. No. 101–952, at p. 339, 101st Cong., 2d Sess. (Oct. 26, 1990).

[257] See 62 FR 24239, May 2, 1997.

[258] The nonhazardous waste Portland Cement Kiln MACT rulemaking likewise controls

[259] When estimating emissions, the Agency assumed the kiln was feeding metals and chlorine in its hazardous waste at the lower of the MACT defining maximum theoretical emission concentration levels or the level actually demonstrated during its performance test. See Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume II: Selection of MACT Standards and Technologies, July 1999, for further discussion.

kilns used MACT control. On the other hand, the table also indicates that four cement kiln test conditions out of 27 do not achieve the design level for mercury. In our analysis, if all test conditions achieved both the standard and the design level, we concluded that there is no reason to believe raw material contributions to metal and chlorine emissions might cause a compliance problem.

CEMENT KILN AND LIGHTWEIGHT AGGREGATE KILN EMISSION STANDARD ACHIEVABILITY RESULTS

Source category	Mercury	Semivolatile metal	Low Volatile metal	Total chlorine
No. of cement kiln test conditions in MACT data base not achieving standard	[1]0/27	[1]1/38	[1]1/39	[1]2/42
No of cement kiln test conditions in MACT data base not achieving 70 % design level	4/27	6/38	3/39	3/42
No of lightweight aggregate kiln test conditions in MACT data base not achieving standard	0/17	5/22	2/22	3/18
No of lightweight aggregate kiln test conditions in MACT data base not achieving 70% design level	0/17	5/22	4/22	10/18

*Number after slash denotes total number of test conditions.

Our analysis illustrates that, subject to the assumptions made, some lightweight aggregate kilns and cement kilns have raw material hazardous air pollutant levels that could affect their ability to achieve the emission standard if no additional emission controls were implemented (e.g., additional hazardous waste feedrate control, or better air pollution control device efficiency). Nevertheless, we conclude that it is difficult to determine whether raw material hazardous air pollutant contributions to the emissions result in unachievable emission standards because of the difficulty associated with differentiating raw material hazardous air pollutant emissions from hazardous waste pollutant emissions. This uncertainty has led us to further conclude that it is appropriate to allow kilns to petition for alternative standards, provided that they submit site-specific information that shows raw material hazardous air pollutant contributions to the emissions prevent the kiln from complying with the emission standard even though the kiln is using MACT control.

Many commenters dislike the idea of an alternative standard. They wrote that regulation of raw material metal content may be necessary to control semivolatile metal and low volatile metal emissions at hazardous waste burning kilns because: (1) These kilns have relatively high chlorine levels in the flue gas (which predominately originate from the hazardous waste); and (2) chlorine tends to increase metal volatility. We agree that increased flue gas chlorine content from hazardous waste burning operations may result in increased metals volatility, which then could result in higher raw material metal emissions.[260] The increased presence of chlorine at hazardous waste burning kilns presents a concern. To address this concern, we require kilns to submit data or information, as part of the alternative standard petition, documenting that increased chlorine levels associated with the burning of hazardous waste, as compared to nonhazardous waste operations, do not significantly increase metal emissions attributable to raw material. This requirement is explained in greater detail later in this section.

Many commenters also point out that the alternative standard, at least as originally proposed, could result in metal and chlorine emissions exceeding the standard to possible levels of risk to human health and the environment. We agree that this potential could exist; however, the RCRA omnibus process serves as a safeguard against levels of emissions that present risk to human health or the environment. Therefore, sources operating pursuant to alternative standards may likely be required to perform a site-specific risk assessment to demonstrate that their emissions do not pose an unacceptable risk. The results of the risk assessment would then be used to develop facility-specific metal and chlorine emission limits (if necessary), which would be implemented and enforced through omnibus conditions in the RCRA permit.[261]

c. How Do I Demonstrate Eligibility for the Alternative Standard? To demonstrate eligibility, you must submit data or information which shows that raw material hazardous air pollutant contributions to the emissions prevent you from complying with the emission standard, even though you use MACT control for the standard from which you seek relief. To allow flexibility in implementation, we do not mandate what this demonstration must entail. However, we believe that a demonstration should include a performance test while using MACT control or better (i.e., the hazardous waste feedrate control and air pollution control device efficiencies that are the basis of the emission standard from which you seek an alternative). If you still do not achieve the emission standards when operating under these conditions, you may be eligible for the alternative standard (provided you further demonstrate that you meet the additional eligibility requirements discussed below). If you choose to conduct this performance test after your compliance date, you should first obtain approval to temporarily exceed the emission standards (for testing purposes only) to make this demonstration, otherwise you may be subject to enforcement action.

In addition, you must make a showing of adequate system removal efficiency to be eligible for an alternative standard for semivolatile metal, low volatile metal, or hydrochloric acid/chlorine gas. This requirement provides a check to ensure that you are exceeding the emission standard solely because of raw material contributions to the emissions, and not because of poor system removal efficiency for the hazardous air pollutants for which you are seeking relief. (It is possible that poor system removal efficiencies for these hazardous air pollutants result in emissions that are higher than the emission standards, even though the particulate matter emission standard is met.) This check could be done without the expense of a second performance test. The system removal efficiency achieved in the performance test described above could be calculated for the hazardous air pollutants at issue. You would then

[260] The potential for increased metal emissions is stronger for semivolatile metals (lead, in particular), but low volatile metal emissions still have potential to increase with increased flue gas chlorine concentrations. See Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume II: Selection of MACT Standards and Technologies, July 1999, for further discussion.

[261] RCRA permits for hazardous waste combustors address total emissions, regardless of the source of the pollutant due to the nexus with the hazardous waste treatment activities. See *Horsehead* v *Browner*, 16 F. 3d 1246, 1261–63 (D.C. Cir. 1994)(Hazardous waste combustion standards may address hazardous constituents attributable to raw material inputs so long as thee is a reasonable nexus with the hazardous waste combustion activites).

multiply the MACT control hazardous waste feedrate level (or the feedrate level you choose to comply with)[262] for the same hazardous air pollutant by a factor of one minus the system removal efficiency. This estimated emission value would then be compared to the emission standard, and would have to be below the standard for you to qualify for the alternative standard.

As discussed in the next section, this alternative standard requires you to use MACT control as defined in this rulemaking. For lightweight aggregate kilns, MACT control for chlorine is feedrate control and use of an air pollution control system that achieves a given system removal efficiency for chlorine. Thus, lightweight aggregate kilns that petition the Administrator for an alternative chlorine standard must also demonstrate, as part of a performance test, that it achieves a specified minimum system removal efficiency for chlorine. This eligibility requirement is identical to the above-mentioned eligibility demonstration that requires sources to make a showing of adequate system removal efficiency, with the exception that here we specify the system removal efficiency that must be achieved.[263]

For an alternative mercury standard, you do not have to perform a performance test demonstration and evaluation. We do not require this test because the mandatory hazardous waste mercury feedrate specified in § 63.1206(b)(10) and (11) ensures that your hazardous waste mercury contribution to the emissions will always be below the mercury standard.[264]

Finally, if you apply for semivolatile metal or low volatile metal alternative standards, you also must demonstrate, by submitting data or information, that increased chlorine levels associated with the burning of hazardous waste, as compared to nonhazardous waste operations, do not significantly increase metal emissions attributable to raw material. We expect that you will have to conduct two different emission tests to make this demonstration (although the number of tests should be determined on a site-specific basis). The first test is to determine metal emission concentrations when the kiln is burning conventional fuel with typical chlorine levels. The second test is to determine metal emissions when chlorine feedrates are equivalent to allowable chlorine feedrates when burning hazardous waste. You should structure these tests so that metal feedrates for both tests are equivalent. You would then compare metal emission data to determine if increased chlorine levels significantly affects raw material metal emissions.

d. What Is the Format of the Alternative Standard? The alternative standard requires that you use MACT control, or better, as applicable to the standard for which you seek the alternative. MACT control, as previously discussed, consists of hazardous waste feed control plus (for all relevant hazardous air pollutants except mercury) further control via air pollution control devices. Cement kilns and lightweight aggregate kilns will first have to comply with a specified hazardous waste metal and chlorine feedrate limit, as defined by the MACT defining maximum theoretical emission concentration level for the applicable hazardous air pollutant or hazardous air pollutant group. This work practice is necessary because there is no other reliable means of measuring that hazardous air pollutants in hazardous waste are controlled to the MACT control levels, i.e., that hazardous air pollutants in raw material are the sole cause of not achieving the emission standard. (See CAA section 112(h).) To demonstrate control of hazardous air pollutant metals emissions to levels reflecting the air pollution control device component of MACT control, you must be in compliance with the particulate matter standard. Finally, we require lightweight aggregate kilns to use an air pollution control device that achieves the specified MACT control total chlorine removal efficiency. This work practice is necessary because there is no other way to measure whether the failure to achieve the chlorine emission standard is caused by chlorine levels in raw materials.[265] See § 63.1206(b)(10) and (11) for a list of the maximum achievable control technology requirements for purposes of this alternative standard.[266]

There may be site-specific circumstances which require other provisions, imposed by the Administrator, in addition to the mandatory requirement to use MACT control. These provisions could be operating parameter requirements such as a further hazardous waste feedrate limitation. For instance, a kiln that petitions the Administrator for an alternative semivolatile emission standard may need to limit its hazardous waste chlorine feedrate to better assure that chlorine originating from the hazardous waste does not significantly affect semivolatile metal emissions attributable to the raw material. As discussed above, a kiln must demonstrate that increased chlorine levels from hazardous waste do not adversely affect raw material metal emissions to be eligible for this alternative standard. For this scenario, the alternative standard would be in the form of a semivolatile metal hazardous waste feedrate restriction which would require you to use MACT control, in addition to a hazardous waste chlorine feedrate limit.

Additional provisions also could include emission limitations that differ from those included in today's rulemaking. For example, the Administrator may determine it appropriate to require you to comply with metal or chlorine emission limitations that are than the standards in this final rulemaking. The emission limitation would likely consider the elevated levels of metal or chlorine in your raw material. This type of emission limitation would be no different, except for the numerical difference than the emission limitations in today's rule because it would limit total metal and chlorine emissions while at the same time ensuring MACT control is used. If the Administrator determines that such an emission limitation is appropriate, you must comply with both a hazardous waste feedrate restriction, which requires you to use MACT control, and an emission limitation. A potential method of determining an appropriate emission limitation would be to base the limit on levels demonstrated in the comprehensive performance test.

e. What Is the Process for an Alternative Standard Petition? If you are seeking alternative standards because raw materials cause you to exceed the standards, you must submit a petition request to the Administrator that includes your recommended alternative

You may choose to comply with a hazardous waste feedrate limit that is lower than the MACT control levels required by this alternative standard.

[263] The requirement to achieve an 85.0% and 99.6% chlorine system removal efficiency for existing and new lightweight aggregate kilns, respectively, together with the requirement to comply with a hazardous waste chlorine feedrate limitation, ensures that chlorine emissions attributable to hazardous waste are below the standards.

[264] The MACT defining maximum theoretical emission concentration for mercury is less than mercury standard itself, thus hazardous waste mercury contributions to the emissions will always be below the standard.

[265] There is no corresponding chlorine air pollution control device efficiency requirement for cement kilns since air pollution control is not the basis for MACT control of cement kiln chlorine emissions.

[266] See also ''Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume IV: Selection of MACT Standards and Technologies'', Chapter 11, July 1999, for further discussion on how the maximum achievable control technologies were chosen for the hazardous air pollutants.

standard provisions. At a minimum, your petition must include data or information which demonstrates that you meet the eligibility requirements and that ensure you use MACT control, as defined in today's rule.

Until the authorized regulatory agency approves the provisions of the alternative standard in your petition (or establishes other alternative standards) and until you submit a revised NOC that incorporates the revised standards, you may not operate under your alternative standards in lieu of the applicable emission standards found in §§ 63.1204 and 63.1205. We recommend that you submit a petition well in advance of your scheduled comprehensive performance test, perhaps including the petition together with your comprehensive performance test plan. You may need to submit this petition in phases to ultimately receive approval to operate pursuant to the alternative standard provisions, similar to the review process associated with performance test workplans and performance test reports. After initial approval, alternative standard petitions should be resubmitted every five years for review and approval, concurrent with subsequent future comprehensive performance tests, and should contain all pertinent information discussed above.

You may find it necessary to complete any testing associated with documenting your eligibility requirements prior to your comprehensive performance test to determine if in fact you are eligible for this alternative standard, or you may choose to conduct this testing at the same time you conduct your comprehensive performance test. This should be determined on a site-specific basis, and will require coordination with the Administrator or Administrator's designee.

2. What Special Provisions Exist for an Alternative Mercury Standard for Kilns?

See § 63.1206(b)(10) and (11).

a. What Happens if Mercury Is Historically Not Present at Detectible Levels? Situations may exist in which a kiln cannot comply with the mercury standard pursuant to the provisions in § 63.1207(m) when using MACT control and when mercury is not present in the raw material at detectable levels.[267] As a result, today's rule provides a petition process for an alternative mercury standard which only requires compliance with a hazardous waste mercury feedrate limitation, provided that historically mercury not been present in the raw material at detectable levels.

We received comments from the lightweight aggregate kiln industry expressing concern with the stringency of the mercury standard. Commenters oppose stringent mercury standards, in part, because of the difficulty of complying with day-to-day mercury feedrate limits. One potential problem cited pertains to raw material mercury detection limits. Commenters point out that if a kiln assumed mercury is present in the raw material at the detection limit, the resulting calculated uncontrolled mercury emission concentration could exceed, or be a significant percentage of, the mercury emission standard. This may prevent a kiln from complying with the mercury emission standard pursuant to the provisions of § 63.1207(m), even though MACT control was used.

We agree with commenters that this is a potential problem. In addition, it is not appropriate to implement a mercury standard compliance scheme that is relatively more burdensome for kilns with no mercury present in raw material, as compared to kilns with high levels of mercury in their raw material.[268] Because we establish provisions that provide alternatives to kilns with high levels of mercury in the raw material, we are doing the same for those kilns which do not have mercury present in raw material at detectable levels.

b. What Are the Alternative Standard Eligibility Requirements? To be eligible for this alternative mercury standard, you must submit data or information which demonstrates that historically mercury has not been present in your raw material at detectable levels. You do not need to show that mercury has never been present at detectable levels. The determination of whether your data and information sufficiently demonstrate that mercury has not historically been present in your raw material at detectable levels will be made on a site-specific basis. To assist in this determination, you also should provide information that describes the analytical methods (and their associated detection limits) used to measure mercury in the raw material, together with information describing how frequently you measured raw material mercury content.

If you are granted this alternative standard, you will not be required to monitor mercury content in your raw material for compliance purposes. However, after initial approval, this alternative standard must be reapproved every five years (see discussion below). Therefore, you should develop a raw material mercury sampling and analysis program that can be used in future alternative mercury standard petition requests for the purpose of demonstrating that mercury has not historically been present in raw material at detectable levels.

c. What Is the Format of Alternative Mercury Standard? The alternative standard requires you to use MACT control for mercury (i.e., the level of hazardous waste feedrate control specified in today's rule). This alternative standard for mercury is conceptually identical to the emission standards in this final rule, because it requires the use of an equivalent level of hazardous air pollutant MACT control as compared to the MACT control used to determine the emission standards.

The mercury feedrate control level will differ for new and existing sources, and will differ for cement kilns and lightweight aggregate kilns. See § 63.1206(b) (10) and (11) for a list of the mercury hazardous waste feedrate control levels for purposes of this alternative standard.[269]

d. What Is the Process for The Alternative Mercury Standard Petition? If you are seeking this alternative mercury standard, you must submit a petition request to the Administrator that includes the required information discussed above. You will not be allowed to operate under this alternative standard, in lieu of the applicable emission standards found in §§ 63.1204 and 63.1205, unless and until the Administrator approves the provisions of this alternative standard and until you submit a revised NOC that incorporates this alternative standard.

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[267] The provisions in § 63.1207(m) waive the requirement for you to conduct a performance test, and the requirement to set operating limits based on performance test data, provided you demonstrate that uncontrolled mercury emissions are below the emission standard (see Part 4, Section X.B). These provisions allow you to assume mercury is present at half the detection limit in the raw material, when a feedstream analysis determines that mercury is not present at detectable levels, when calculating your uncontrolled emissions.

[268] Kilns that comply with alternative mercury standards because of high mercury levels in their raw material are not required to monitor the mercury content of their raw material unless the Administrator requires this as an additional alternative standard requirement. Thus, absent the alternative mercury standard discussed in this section, a source that does not have mercury present in their mercury at detectable levels would be subject to more burdensome raw material feedstream analysis requirements.

[269] Also see Final Technical Support Document for Hazardous Waste Combustor MACT Standards, Volume IV: Selection of MACT Standards and Technologies, Chapeter 11, July 1999, for further discussion on how the maximum achievable control technologies were chosen for mercury.

We recommend that you submit these petitions well in advance of your scheduled comprehensive performance test, perhaps including the petition together with your comprehensive performance test plan. After initial approval, alternative standard petitions should be resubmitted every five years for review and approval, concurrent with subsequent future comprehensive performance tests, and should contain all pertinent information discussed above.

B. Under What Conditions Can the Performance Testing Requirements Be Waived? See § 63.1207(m).

In the April 1996 NPRM, we proposed a waiver of performance testing requirements for sources that feed low levels of mercury, semivolatile metal, low volatile metal, or chlorine (see 61 FR at 17447). Under the proposed waiver, a source would be required to assume that all mercury, semivolatile metal, low volatile metal, or chlorine (dependent on which hazardous air pollutant(s) the source wishes to petition for a waiver) fed to the combustion unit, for all feedstreams, is emitted from the stack. The source also would need to show that these uncontrolled emission concentrations do not exceed the associated emission standards, taking into consideration stack gas flow rate. The above requirements would apply for all periods that a source elects to operate under this waiver and for which the source is subject to the requirements of this rulemaking. All comments received on this topic support this approach, and no commenters suggest alternative procedures to implement this provision. Today's rule finalizes the proposed performance test waiver provision, with one minor change expected to provide industry with greater flexibility when demonstrating compliance without compromising protectiveness.

1. How Is This Waiver Implemented?

The April 1996 proposal identified two implementation methods to document compliance with this waiver provision. In today's rule we finalize both proposed methods and add another implementation method to provide greater flexibility when demonstrating compliance with the provisions of this performance test waiver. As proposed, the first approach allows establishment and continuous compliance with one maximum total feedstream feedrate limit for mercury, semivolatile metal, low volatile metal, or chlorine and one minimum stack gas flow rate. The combined maximum feedrate and minimum stack gas flow rate must result in uncontrolled emissions below the applicable mercury, semivolatile metal, low volatile metal, or chlorine emission standards. Both limits would be complied with continuously; any exceedance would require the initiation of an automatic waste feed cut-off.

Also as proposed, the second approach accommodates operation under different ranges of stack gas flow rates and/or metal and chlorine feedrates. Today's rule allows establishment of different modes of operation with corresponding minimum stack gas flow rate limits and maximum feedrates for metals or chlorine. If you use this approach, you must clearly identify in the operating record which operating mode is in effect at all times, and you must properly adjust your automatic waste feed cutoff levels accordingly.

The third approach, which is an outgrowth of our proposed approaches, allows continuous calculation of uncontrolled stack gas emissions, assuming all metals or chlorine fed to combustion unit are emitted out the stack. If you use this approach, you must record these calculated values and comply with the mercury, semivolatile metal, low volatile metal, or chlorine emission standards on a continuous basis. This approach provides greater operational flexibility, but increases recordkeeping since the uncontrolled emission level must be continuously recorded and included in the operating record for compliance purposes.

If you claim this waiver provision, you must, in your performance test workplan, document your intent to use this provision and explain which implementation approach is used. Other than those limits required by this provision, you will not be required to establish or comply with operating parameter limits associated with the metals or chlorine for which the waiver is claimed. Your NOC also must specify which implementation method is used. The NOC must incorporate the minimum stack gas flowrate and maximum metal and chlorine feedrate as operating parameter limits, or include a statement which specifies that you will comply with emission standard(s) by continuously recording your uncontrolled metal and chlorine emission rate.

If you cannot continuously monitor stack gas flow rate, for the purpose of demonstrating compliance with the provisions of this waiver, you may use an appropriate surrogate in place of stack gas flow rate (e.g., cement kiln production rate). However, if you use a surrogate, you must provide in your performance test workplan data that clearly and reasonably correlates the surrogate parameter to stack gas flow rate.

2. How Are Detection Limits Handled Under This Provision?

We did not address in April 1996 NPRM how nondetect metal and chlorine feedstream results are handled when demonstrating compliance with the feedrate limits or when calculating uncontrolled emission concentrations under this provision. Commenters likewise did not offer suggestions of how to handle nondetect data for this provision. After careful consideration, for the purposes of this waiver, we require that you must assume that the metals and chlorine are present at the full detection limit value when the analysis determines the metals and chlorine are not detected in the feedstream (except as described in the following paragraph). Because performance testing is waived under this provision, it is appropriate to adopt a more conservative assumption that metals and chlorine are present at the full detection limit for the purposes of this waiver. (In other portions of today's rule we make the assumption that 50 percent presence is appropriate given the different context involved). Assuming full detection limits provides an additional level of assurance that resulting emissions still reflect MACT and do not pose a threat to human health and the environment. If you cannot demonstrate compliance with the provisions of this waiver when assuming full detection limits, then you should not claim this waiver and should conduct emissions testing to demonstrate compliance with the emission standard.

Based on the comments and as discussed in the previous section (Section A.2.a), we conclude it is not appropriate, for purposes of this performance test waiver provision, to require a kiln to assume mercury is present at the full detection limit in its raw material when the feedstream analysis determines mercury is not present at detectable levels. As a result, we allow kilns to assume mercury is present at one-half the detection limit in raw materials when demonstrating compliance with the performance test waiver provisions whenever the raw material feedstream analysis determines that mercury is not present at detectable levels.

C. What Other Waiver Was Proposed, But Not Adopted?

Waiver of the Mercury, Semivolatile Metal, Low Volatile Metal, or Chlorine Standard

We proposed not to subject sources to one or more of the mercury, semivolatile metal, low volatile metal, or chlorine emission standards (and other requirements)[270] if their feedstreams did not contain detectable levels of that associated metal or chlorine (e.g., if their feedstreams did not contain a detectable level of chlorine, the hydrochloric acid/chlorine gas standard would be waived—see 61 FR at 17447). As part of this waiver, a feedstream sampling and analysis plan would be developed and implemented to document that feedstreams did not contain detectable levels of the metals or chlorine.

Several commenters supported this waiver, stating that it is of no benefit to human health or the environment to require performance testing, monitoring, notification, and record-keeping of constituents not fed to the combustion unit. However, commenters were divided in their support of the need to set minimum feedstream detection limits. Those supporting specified detection limits wrote that detection limits are needed to ensure that appropriate analytical procedures are used and needed to provide consistency between sources. Those opposing specified detection limits believed that detection limits are highly dependent on feedstream matrices. Therefore, to impose a detection limit that applies to all sources and all feedstreams would not be practicable. One commenter questioned basing this waiver on nondetect values because a feedstream analyses that detects, at any time, a quantity of the metal or chlorine just above the detection limit may be considered to be out of compliance.

We agree that little or no environmental benefit may be gained by requiring performance testing, monitoring, notification, and record keeping for a constituent not fed to the combustion unit. However, based on our careful analysis of comments and on our reevaluation of the practical implementation issue inherent in this type of waiver, we find that it may not always be practicable to use detection limits to determine if a waste does or does not contain metals or chlorine. We are concerned that facility-specific detection limits may vary, from source to source, at levels such that sources with detection limits in the high-end of the distribution (due to their complex waste matrix) have the potential for significant metal or chlorine emissions. Under the facility-specific detection limit approach, a high-end detection limit source with relatively high emissions could qualify for the waiver; however, a source with a simpler feedstream matrix with significantly lower amounts of metals in the feedstream (but just above the detection limit) would not qualify. This not only turns the potential benefit of a waiver provision on its head, but raises serious questions of national consistency, fairness, and evenness of environmental protection to surrounding communities. We also conclude that it is impractical to set one common detection limit for each hazardous air pollutant as part of this waiver because, as commenters stated, detection limits are matrix dependent.

Due to these issues, we were unable to devise an implementable and acceptable nondetect waiver provision, and therefore do not adopt one in today's final rule. As is described in the previous section (Section B), however, we do provide a waiver of performance testing requirements to sources that feed low levels of mercury, semivolatile metal, low volatile metal, or chlorine. Although this waiver provision does not waive the emission standard, monitoring, notification, recordkeeping, and reporting requirements, it does waive emission tests and compliance with operating parameter limits for the associated metals or chlorine.

D. What Equivalency Determinations Were Considered, But Not Adopted?

In response to comments we received from the April 1996 NPRM, we included in the May 1997 NODA a discussion of an allowance of a one-time compliance demonstration for hydrocarbon and carbon monoxide at cement kilns equipped with temporary midkiln sampling locations. (See 62 FR 24239.) This equivalency determination required that alternative, continuously monitored, operating parameters be used in lieu of continuous monitoring of hydrocarbon/carbon monoxide. As discussed below, we conclude that the shortcomings associated with the proposed alternative operating parameters created sufficient uncertainties, for implementation and overall environmental protection, that we are not adopting an equivalency determination option in this rulemaking. However, cement kilns have the opportunity to petition the Administrator under § 63.8(f) and 63.1209(g)(1) to make a site-specific case for this type of equivalency determination.

In response to the April 1996 NPRM, we received comments indicating that some kilns would need to either operate at inefficient back-end temperatures (to oxidize hydrocarbons desorbed from the raw material) or be required to install and maintain a midkiln sampling system to demonstrate compliance with the hydrocarbon/carbon monoxide standards. Commenters believe that this may not be feasible for some kilns because: (1) Raising back end temperatures may increase dioxin formation; (2) most long kilns are not equipped to sample emissions at the midkiln location; (3) costs associated with retrofit and maintenance may be considered high; and (4) maintenance problems associated with the sampling duct are difficult to overcome.

We received numerous comments on the proposed hydrocarbon/carbon monoxide equivalency approach described in the May 1997 NODA. Many cement kilns support the option and defend the use of alternative operating parameters in lieu of continuous carbon monoxide and hydrocarbon monitors. Many commenters oppose using any parameters other than carbon monoxide or hydrocarbon as a combustion efficiency indicator and as surrogate emission standards for the nondioxin organic hazardous air pollutants. We have found that a number of factors suggest that a special provision allowing use of alternative operating parameters, in lieu of carbon monoxide and/or hydrocarbon, is neither necessary nor appropriate to include in this rulemaking.

The alternative operating parameters associated with a one-time demonstration would have to assure that compliance with the carbon monoxide/hydrocarbon standard is maintained at the midkiln location on a continuous basis. We considered adopting several different operating parameters in lieu of hydrocarbon/carbon monoxide monitoring to achieve this goal. Maximum production rate was considered as a continuous residence time indicator. Minimum combustion zone temperature, continuously monitored destruction and removal efficiency using sulphur hexafluoride, and minimum effluent NO_X limits were also examined to ensure adequate temperature is continuously maintained in the combustion zone. To ensure adequate turbulence, we considered using minimum kiln effluent oxygen concentration. Commenters did not suggest additional alternative operating parameters.

Each of these operating parameters have potential shortcomings, and we are not convinced that use of these parameters, even in combination, provides a combustion efficiency indicator as reliable as continuous

[270] Ancillary performance testing, monitoring, notification, record keeping, and reporting requirements.

hydrocarbon/carbon monoxide monitoring. We have identified the following potential problems with these alternative operating parameters: (1) Effluent kiln oxygen concentration may not correlate well to carbon monoxide/hydrocarbon produced from oxygen deficient zones in the kiln;[271,272] (2) pyrometers, or other temperature monitoring systems, may not provide direct and reliable measurements of combustion zone temperature;[273] (3) some combustion products of sulphur hexaflouride are toxic and regulated hazardous air pollutants;[274] (4) there are no demonstrated performance specifications for continuous sulphur hexaflouride monitors; and (5) it is contrary to other air emission limitations (in principle) to require minimum (not maximum) NO_X limits.

On balance, the lack of adequate documentation allowing us to resolve these uncertainties and potential problem areas prevents us from further considering this type of hydrocarbon/carbon monoxide equivalency determination provision for inclusion in today's final rule. As stated above, however, cement kilns have the opportunity to petition the Administrator under § 63.8(f) to make a site-specific case for this type of equivalency determination.

As is explained in Part Four, Section VII.C(9)(c), today's rulemaking subjects newly constructed hazardous waste burning cement kilns at greenfield sites to a main stack hydrocarbon standard of either 20 or 50 ppmv. We clarify that this standard applies to these sources even if they applied and received approval for an alternative monitoring approach described above, because the intent of this hydrocarbon standard is to control organic hazardous air pollutants desorbed from raw material and not to control combustion efficiency.

[271] An oxygen deficient zone in the kiln due to inadequate mixing, which could potentially result in the emission of significant amounts of carbon monoxide and organic hazardous air pollutants, could be well mixed with excess air by the time it reaches the kiln exit, where oxygen is monitored. Thus the oxygen monitor may not record any oxygen concentration change and would not serve as an adequate control to ensure proper combustion turbulence.

[272] We do not have, nor did commenters submit, data which show whether effluent kiln oxygen concentration adequately correlates with carbon monoxide/hydrocarbon produced from oxygen deficient zones in the kiln.

[273] See Part Five, Section VII.D.(2)(b)(iii), for further discussion on combustion zone temperature measurements.

[274] Hydrofluoric acid, a CAA hazardous air pollutant, is a possible combustion byproduct of sulphur hexafluoride.

E. What are the Special Compliance Provisions and Performance Testing Requirements for Cement Kilns with In-line Raw Mills and Dual Stacks?

Preheater/precalciner cement kilns with dual stacks and cement kilns with in-line raw mills require special compliance provisions and performance testing requirements because they are unique in design.

Preheater/precalciner kilns with dual stacks have two separate air pollution control systems. As discussed in Section F below, emission characteristics from these separate stacks could be different. As a result, these kilns must conduct emission testing in both stacks to document compliance with the emission standards[275] and must establish separate operating parameter limits for each air pollution control device. See § 63.1204(e)(1).

Cement kilns with in-line raw mills either operate with the raw mill on-line or with the raw mill off-line. As discussed in Section F below, these two different modes of operation could have different emission characteristics. As a result, cement kilns with in-line raw mills must conduct emission testing when the raw mill is off-line and when the raw mill is on-line to document compliance with the emission standards and must establish separate operating parameters for each mode of operation. These kilns must document in the operating record each time they change from one mode of operation to the alternate mode. They must also begin calculating new rolling averages for operating parameter limits and comply with the operating parameter limits for that mode of operation, after they officially switch modes of operation. If there is a transition period associated with changing modes of operation, the kiln operator has the discretion to determine when, during this transition, the kiln has officially switched to the alternate mode of operation and when it must begin complying with the operating parameter limits for that alternate mode of operation. See 63.1204(d)(1).

Preheater/precalciner kilns with dual stacks that also have in-line raw mills do not have to conduct dioxin/furan testing in the bypass stack to demonstrate compliance with the standard when the raw mill is off-line. We have concluded that dioxin/furan emissions in the bypass stack are not dependent on the raw mill operating status because dioxin/furan emissions are primarily dependent on temperature control. A kiln may assume that when the raw mill is off-line, the dioxin/furan emissions in the bypass stack are identical to the dioxin/furan emissions when the raw mill is on-line and may comply with the bypass stack dioxin/furan raw mill on-line operating parameters for both modes of operation. See § 63.1204(d)(1).

[275] This does not apply to the hydrocarbon and carbon monoxide standard. See discussion in Part Four, Section VII.D on hydrocarbon and carbon monoxide standards for cement kilns.

F. Is Emission Averaging Allowable for Cement Kilns with Dual Stacks and In-line Raw Mills?

In the April 1996 NPRM, we did not subdivide cement kilns by process type when setting emission standards (see 61 FR at 17372–17373). As a result, we received many comments from the cement kiln industry indicating that preheater/precalciner cement kilns with dual stacks and cement kilns with in-line raw mills have unique design and operating procedures that necessitate the use of emission averaging when demonstrating compliance with the emission standards. We addressed these comments in the May 1997 NODA by discussing an allowance for emission averaging (for all standards except for hydrocarbon/carbon monoxide) at preheater/precalciner cement kilns with dual stacks when demonstrating compliance with the emission standards (see 62 FR at 24240). We also discussed allowing cement kilns with in-line raw mills to demonstrate compliance with the emission standards on a time-weighted average basis to account for different emission characteristics when the raw mill is active as opposed to when it is inactive. In light of the favorable comments received, and the lack of significant concerns to the contrary, we adopt these emission averaging provisions in today's rule.

1. What Are the Emission Averaging Provisions for Cement Kilns with In-line Raw Mills?

See § 63.1204(d).

As explained in the May 1997 NODA, emissions of hazardous air pollutants can be different when the raw mill is active versus periods of time when the mill is out of service. We received many comments on this issue, all in favor of an emissions averaging approach to accommodate these different modes of operation. As a result, we adopt a provision that allows cement kilns that operate in-line raw mills to average their emissions on a time-weighted basis to show compliance with the metal and chlorine emission standards.

Emission averaging for in line raw mills will not be allowed when they demonstrate compliance with the hydrocarbon/carbon monoxide standard because hydrocarbon and carbon monoxide are monitored continually and serve as a continuous indicator of combustion efficiency. No commenter states that emission averaging is needed for hydrocarbon/carbon monoxide. Emission averaging for particulate matter will not be allowed because this standard is based on the New Source Performance Standards found in § 60.60 subpart F. We interpret these standards to apply regardless if the raw mill is on or off. (Note that this is consistent with the proposed Nonhazardous Waste Portland Cement Kiln Rule. See 56 FR 14188). In addition, emission averaging for dioxin/furan will not be allowed because cement kilns with in-line raw mills are expected to control temperature during both modes of operation to comply with the standard. No commenter stated that emission averaging was needed for dioxin/furan.

a. What Is the Averaging Methodology? In the May 1997 NODA, we did not specify an averaging methodology. As a result, commenters suggested that the following equation would adequately calculate the time-weighted average concentration of a regulated constituent when considering the length of time the in-line raw mill is on-line and off-line:

$$C_{total} = \left\{\left(C_{mill\text{-}off}\right) \times \left(T_{mill\text{-}off} / \left(T_{mill\text{-}off} + T_{mill\text{-}on}\right)\right)\right\} + \left\{\left(C_{mill\text{-}on}\right) \times \left(T_{mill\text{-}on} / \left(T_{mill\text{-}off} + T_{mill\text{-}on}\right)\right)\right\}$$

Where:

C_{total} = time-weighted average concentration of a regulated constituent considering both raw mill on time and off time.

$C_{mill\text{-}off}$ = average performance test concentration of regulated constituent with the raw mill off-line.

$C_{mill\text{-}on}$ = average performance test concentration of regulated constituent with the raw mill on-line.

$T_{mill\text{-}off}$ = time when kiln gases are not routed through the raw mill.

$T_{mill\text{-}on}$ = time when kiln gases are routed through the raw mill.

We agree that this equation properly calculates the time-weighted average concentration of the regulated constituent when considering both raw mill operation and raw mill down time and are adopting it in today's rule.

b. What Is Required During Emission Testing? As discussed, sources that use this emission averaging provision must conduct performance testing for both modes of operation (with the raw mill both on-line and off-line), demonstrating appropriate operating parameters during both test conditions. One commenter suggests that the Agency allow sources to demonstrate both raw mill on-line and off-line operations within the same test runs. This would allow a test under one condition instead of two and would give more flexibility by ensuring identical operating parameters for raw mill on-line operations as opposed to off-line operations. This also could theoretically result in fewer automatic waste feed cutoffs when transitioning from one mode of operation to another. Although this approach may have some benefit, we conclude that it is necessary to demonstrate, through separate emission testing, the comparison of emissions when operating with the raw mill on-line as opposed to the raw mill off-line. The separate emission testing is necessary to demonstrate whether emissions are higher or lower when the raw mill is not active to assure compliance with the emission standards on a time-weighed basis.[276]

c. How Is Compliance Demonstrated? In the May 1997 NODA, we did not discuss specific compliance provisions of an emission averaging approach. After careful consideration, however, we determine that to use this emission averaging provision, you must document and demonstrate compliance with the emission standards on an annual basis by using the above equation. Shorter averaging times were considered, but were not chosen since it may be difficult for a kiln with an in-line raw mill to comply with a short averaging period if the raw mill must be off-line for an extended period of time. Therefore, you must annually document in your operating record that compliance with the emission standard was demonstrated for the previous year's operation by calculating your estimated annual emissions with the above equation. The one-year block average begins on the day you submit your NOC. You must include all hazardous waste operations in that one year block period, and you also must include all nonhazardous waste operations that you elect to comply with hazardous waste MACT standards, when demonstrating annual compliance.[277]

d. What Notification Is Required? Again, in the May 1997 NODA, we did not discuss specific notification requirements. After careful consideration, we determined that if you use this emission averaging provision, you must notify the Administrator of your intent to do so in your performance test workplan. Several commenters favor allowing time-weighted emissions averaging, so long as historical data are submitted to justify allowable time weighting factors (explained below). We agree with these comments and require that you submit historical raw mill operation data in your performance test workplan. These data should be used to estimate the future down-time the raw mill will experience. You must document in your performance test workplan that estimated emissions and estimated raw mill down-time will not result in an exceedance of the emission standard on an annual basis. You also must document in your NOC that the emission standard will not be exceeded based on the documented emissions from the compliance test and predicted raw mill down-time.

2. What Emission Averaging Is Allowed for Preheater or Preheater-Precalciner Kilns with Dual Stacks? (See § 63.1204(e).)

As explained in the May 1997 NODA, and in an earlier section of this preamble (see Part Four, Section V.II.B), emissions of hazardous air pollutants can be different in a preheater or preheater-precalciner cement kiln's main stack as opposed to the bypass stack. We received many comments on this issue, all in favor of the emissions averaging approach discussed in the NODA to accommodate the different emission characteristics in these stacks. Therefore, we today finalize a provision to allow preheater or preheater-precalciner cement kilns with dual stacks to average emissions on a flow-weighted basis to demonstrate compliance with chlorine and metal emission standards.

Emission averaging to demonstrate compliance with the hydrocarbon/carbon monoxide standard is not

[276] The Agency does not have, nor did commenters submit, sufficient data to determine whether emissions will be higher or lower when the raw mill is inactive.

[277] Today's rulemaking allows a hazardous waste source, when not burning hazardous waste, to either comply with the hazardous waste cement kiln MACT standards or the non hazardous waste cement kiln standards (see Part Five, Section I).

needed at preheater and preheater-precalciner cement kilns with dual stacks since today's rule requires these kilns to monitor hydrocarbon or carbon monoxide in the bypass stack only.[278] Emission averaging for particulate matter is no longer needed since the format of the standard (0.15 kg/Mg dry feed) implicitly requires the kiln to consider mass emissions from both stacks to demonstrate compliance with the emission standard. In addition, emission averaging for dioxin/furan will not be allowed because cement kilns with dual stacks are expected to control temperature in both air pollution control systems to comply with the standard. No commenter stated that emission averaging was needed for dioxin/furan.

a. What Is the Average Methodology? In the May 1997 NODA, we did not specify an averaging methodology. However, commenters suggested that the following is an appropriate equation to calculate the flow-weighted average concentration of a regulated constituent when considering emissions from both stacks:

$$C_{tot} = \left\{ (C_{main}) \times \left(Q_{main} / \left(Q_{main} + Q_{bypass} \right) \right) \right\} + \left\{ (C_{bypass}) \times \left(Q_{bypass} / \left(Q_{main} + Q_{bypass} \right) \right) \right\}$$

Where:

C_{tot} = flow-weighted average concentration of the regulated constituent

C_{main} = average performance test concentration demonstrated in the main stack

C_{bypass} = average performance test concentration demonstrated in the bypass stack

Q_{main} = volumetric flowrate of main stack effluent gas

Q_{bypass} = volumetric flowrate of bypass effluent gas

We agree that this equation properly calculates the flow-weighted average concentration of the regulated constituent when considering emissions from both stacks and it is adopted in today's rule.

b. What Emissions Testing and Compliance Demonstrations Are Necessary? To use this emission averaging provision, you must simultaneously conduct performance testing in both stacks during your comprehensive performance test to compare emission levels of the regulated constituents (as proposed). These emission data must be used as inputs to the above equation to demonstrate compliance with the emission standard.

You must develop operating parameter limits, and incorporate these limits into your NOC, that ensures your emission concentrations, as calculated with the above equation, do not exceed the emission standards on a twelve-hour rolling average basis. These operating parameters should limit the ratio of the bypass stack flowrate and combined bypass and main stack flowrate such that the emission standard is complied with on a twelve-hour rolling average basis. Whereas this was not proposed, we conclude that this provision is necessary to assure compliance with the standards since the ratio of stack gas flowrate and bypass stack flowrate could deviate from the levels demonstrated during the performance test.

c. What Notification Is Required? In the May 1997 NODA, we did not discuss specific notification requirements. After careful consideration, however, we determine that to use this emission averaging provision, you must notify the Administrator of your intent to do so in your performance test workplan. The performance test workplan must include, at a minimum, information that describes your proposed operating limits. You must document your use of this emission averaging provision in your NOC and document the results of your emissions averaging analysis after estimating the flow weighted average emissions with the above equation. You must also incorporate into the NOC the operating limits that ensures compliance with emission standards on a twelve-hour rolling average basis.

G. What Are the Special Regulatory Provisions for Cement Kilns and Lightweight Aggregate Kilns that Feed Hazardous Waste at a Location Other Than the End Where Products Are Normally Discharged and Where Fuels Are Normally Fired? (§ 63.1206(b)(12) and (b)(8)(ii))

As discussed in Part Four, Section IV.B., the Agency is allowing you to comply with either a carbon monoxide or hydrocarbon standard. However, we have concluded that this option to comply with either standard should not apply if you operate a cement kiln or lightweight aggregate kiln and feed hazardous waste at a location other than the end where products are normally discharged and where fuels are normally fired these other locations include, at the mid kiln or the cold, upper end of the kiln. Consistent with the Boilers and Industrial Furnace regulations (see § 266.104(d)), we are today requiring you to comply with the hydrocarbon standard, and are not giving you the option to comply with the carbon monoxide standard, if you feed hazardous waste in this manner. This is because we are concerned that hazardous waste could be fired into a location such that nonmetal compounds in the waste may be merely evaporated or thermally cracked to form pyrolysis byproducts rather than be completely combusted.[279] If this occurs, there is the potential that little carbon monoxide will be generated even though significant hydrocarbons are being emitted. Carbon monoxide monitoring would thus not ensure that organic hazardous air pollutant emissions are being properly controlled. We do not anticipate this requirement to be overly burdensome, since it is a current requirement of the Boilers and Industrial Furnace regulation.

We have also concluded that it would not be appropriate for you to comply with the hydrocarbon standard in the bypass duct if you operate a cement kiln and feed hazardous waste into a location downstream of your bypass sampling location relative to flue gas flow direction. Such operation would result in hazardous waste combustion that would not be monitored by a hydrocarbon monitor. Today's rulemaking thus requires you to comply with the main stack hydrocarbon standard of 20 ppmv if you feed hazardous waste in this manner. This is also consistent with the Boilers and Industrial Furnace regulations, which do not allow you to monitor hydrocarbons in the bypass duct if you operate a short kiln and if you feed hazardous waste in the preheater or precalciner (see § 266.104(f)(1)).

In addition to the above requirements, if you operate a cement kiln or

[278] New kilns at greenfield locations must also comply with a main stack hydrocarbon standards. For these sources, emission averaging for hydrocarbons would not appropriate because the purpose of the main stack hydrocarbon standard is to control organic hazardous air pollutants that originate from the raw material.

[279] See Final Rule, Burning of Hazardous Waste in Boilers and Industrial Furances, February 21, 1991, 56 FR at 7158.

lightweight aggregate kiln and feed hazardous waste at a location other than the end where products are normally discharged and where fuels are normally fired, you are also required to demonstrate compliance with the destruction and removal efficiency standard every five years as opposed to a one-time destruction and removal demonstration We require you to do this because the unique design and operation of such a waste firing system necessitates a compliance demonstration for this standard every five years (see previous discussion in part Four, Section IV.A.3.).

H. What is the Alternative Particulate Matter Standard for Incinerators? See § 63.1206(b)(15).

As discussed in Part Four, Section II.A.2, today's rule establishes a particulate matter standard of 0.015 gr/dscf for incinerators as a surrogate to control nonenumerated metal hazardous air pollutants (i.e., antimony, cobalt, manganese, nickel, selenium). Of course, particulate matter air pollution control devices also exert control on other metals (except highly volatile species such as mercury), including the enumerated metals. (The enumerated metal hazardous air pollutants are those CAA metal hazardous air pollutants regulated directly via individual emission standards in today's rule, i.e., mercury, semivolatile metals, low volatile metals). A number of commenters, primarily incinerator operators, assert that a particulate matter standard should not be used as a surrogate control for metals in situations where the particulate matter does not contain any metal hazardous air pollutants (i.e., situations when the waste does not contain any metals, except perhaps mercury and the resulting ash contains only relatively benign ash or soot). These commenters argue that the cost associated with reducing particulate matter levels below 0.015 gr/dscf would be excessive and that some type of alternative standard (reflecting superior metal feedrate control) be created.

After considering these comments and another type of particulate matter control technology, we conclude that it is appropriate to offer an alternative particulate matter standard of 0.03 gr/dscf for incinerators that have de minimis levels of hazardous air pollutant metals in their feedstreams, and we have adopted a petition process to allow incinerators to seek this alternative standard. An alternative particulate matter standard is within the scope of our overall preamble discussions of the control of particulate matter and metal emissions, the ways in which the Agency was considering feedrate as part of its MACT analysis, our approaches to enumerated and non-enumerated CAA hazardous air pollutant metals, and the presentation of options for compliance testing when only de minimis levels of metals are present.

1. Why is this Alternative Particulate Matter Standard Appropriate under MACT?

An alternative particulate matter floor level of 0.030 gr/dscf is appropriate for an incinerator that can demonstrate it has de minimis levels of CAA hazardous air pollutant metals (except mercury), as defined below, in its feedstreams. As discussed in other portions of this preamble and in our technical background documents for this rulemaking, control of metals (other than mercury) is a function, in a practical sense, of both the feedrate of those metals into the combustion device as well as the design, operation, and maintenance of a source's air pollution control devices for particulate matter. Given the intertwined relationship between these two factors, the Agency has concluded that a particulate matter floor control level of 0.015 gr/dscf is not warranted for sources using superior feedrate control (i.e. beyond MACT) to reduce metal emissions, which in this case would be shown by having non-detectable levels of metals in their feedstreams (discussed in more detail below).[280]

We also conclude that the floor control for this alternative standard is the use of a venturi scrubber or the use of the same, but less sophisticated, particulate matter control technologies that were established for the 0.015 gr/dscf standard.[281] These floor technologies, including venturi scrubbers, were the basis of our particulate matter floor standard of 0.029 gr/dscf which was published for comment in the May 1997 NODA. See 62 FR at 24221. Although we have since determined that 0.015 gr/dscf is a technically achievable and appropriate MACT floor control level for incinerators based on a suite of technologies that does not include venturi scrubbers, we conclude that an alternative floor level of 0.030 gr/dscf that includes venturi scrubbers in the floor is appropriate for sources using superior metal feedrate control. Put another way, we view the average of the 12 percent best performing incinerators as including incinerators with venturi scrubbers when the incinerator is exercising beyond-MACT feed control of hazardous air pollutant metals.[282] We also note that the final rule for medical waste incinerators establishes a particulate matter standard of 0.030 gr/dscf for medium sized existing sources and small new sources that is based on medium efficiency venturi scrubbers. See 62 FR at 48348. The alternative floor level of 0.030 gr/dscf that is adopted in this final rulemaking is appropriate when we include venturi scrubbers as an alternative floor control technology when superior feed rate control is being employed.[283]

Particulate matter control below 0.030 gr/dscf is still necessary to control metal emissions at sources with de minimis levels of hazardous air pollutant metals in their feedstreams for several reasons. Even if an incinerator obtains non-detect analytical results for one or more metals in its feedstream, this does not conclusively prove that metals are absent. Rather, all that such laboratory results mean is that the metals are not contained in the feedstream above the detection limit used in the analysis. This detection limit may be low but it can also be fairly high depending on the waste matrix. As previously discussed in Part Five, Section X.C.1, commenters have indicated that feedstream metal detection limits are highly dependent on the feedstream matrix.

Given that our prerequisite for the alternative standard is that de minimis levels of metals are present, we must take into account this phenomenon of matrix-dependent detection limits. We are unwilling simply to allow facilities upon a showing of non-detectable levels of metals to avoid particulate matter controls entirely, especially given the complementary controls in practice provided by both feedrate control and

[280] We do not require you to document that your feedstreams have de minimis mercury levels to qualify for this alternative standard because mercury is a volatile metal and is generally not controlled with particulate matter control technologies.

[281] As discussed in Part Four, Section VI.C.4.a, particulate matter floor control for hazardous waste incinerators is defined as the use of either fabric filters, electrostatic precipitators (dry or wet), or ionizing wet scrubbers (sometimes in combination with venturi, packed bed, or spray tower scrubbers) that achieve particulate matter emission levels of 0.015 gr/dscf or less.

[282] See Final Technical Support Document, Volume 3, Chapter Four, July, 1999, for further discussion.

[283] The cement kilns and lightweight aggregate kilns that are also covered by today's final rule have feedrates of metals far above any de minimis threshold. See Final Technical Support Document, Volume 3, Chapter Four, July, 1999, for further discussion. Therefore, in light of the commenters requesting alternative standards and in light of the feedstream levels of metals going into the kilns, we have elected to offer an alternative particulate matter standard only to incinerators.

particulate matter air pollution control devices. On the other hand, it would be overly narrow to give essentially no credit for superior feedrate control (shown by non-detectable levels of metals) by requiring these incinerators to meet 0.015 gr/dscf. It appears, therefore, to be an appropriate balance to allow facilities with non-detectable levels of metals (other than mercury) to meet a standard of 0.030 gr/dscf. This will assure control reflecting performance of the best performing plants that use superior (i.e., beyond MACT) feedrate control, especially in the event that detection limits for a particular waste matrix are unusually high. Because we are moving to a Performance Based Measurement System (PBMS) we cannot rely upon previously approved EPA standard methods as a means to predict detection levels in various matrices. Therefore, we are retaining a particulate matter standard 0.030 gr/dscf to offset the potential for high detection limits.

2. How Do I Demonstrate Eligibility for the Alternative Standard?

Although we adopt a particulate matter standard as a surrogate to control nonenumerated metal hazardous air pollutants, particulate matter control is an integral part of the semivolatile and low volatile metal emission standards as well, as discussed above. See Part Four, Section II.A.1, for further discussion. We therefore conclude that you must document that not only the nonenumerated metals meet the de minimis criteria explained below, but that the semivolatile and low volatile metals do as well. This provides assurance that superior feedrate control is being achieved for all hazardous air pollutant metals, which in turn allows us to provide you with the opportunity to use the alternative particulate matter standard.

To demonstrate eligibility, you must document that you meet two qualification requirements. First, you must document that your feedstreams do not contain detectable levels of CAA hazardous air pollutant metals, apart from mercury (i.e., antimony, cobalt, manganese, nickel, selenium, lead, cadmium, chromium, arsenic and beryllium). This requirement is necessary to ensure that you have de minimis levels of metals in your feedstreams, and assures us that you are using superior feedrate control. You must conduct feedstream analyses at least annually to document that your feedstreams do not contain detectable levels of these metals. Permitting officials may, on a site-specific basis, require more frequent feedstream analyses to better ensure that you comply with this eligibility requirement.

Second, you must document that your calculated uncontrolled metal emissions, i.e., no system removal efficiency, are below the numerical semivolatile and low volatile metal emission standards. When calculating these uncontrolled emissions, you must assume metals are present at one-half the detection limit and are categorized into their appropriate volatility grouping for purposes of this requirement. The one-half detection limit assumption provides a relatively, but not overly, conservative way assuring that de minimis determinations are not given to sources with very high detection limits.

For example, the combined uncontrolled emissions for lead, cadmium and selenium, when assuming these metals are present at one-half the detection limit, must be below 240 µg/dscm. The combined uncontrolled emissions for antimony, cobalt, manganese, nickel, chromium, arsenic and beryllium, when assuming these metals are present at one-half the detection limit, must be below 97 µg/dscm. We require this second eligibility requirement because (1) it ensures you have de minimis levels of metals in your feedstreams even though metals can be present at levels below the detection limit, and (2) it encourages you to obtain reasonable detection limits.

3. What Is the Process for the Alternative Standard Petition?

If you are seeking this alternative particulate matter standard, you must submit a petition request to the Administrator, or authorized regulatory Agency, that includes the documentation discussed above. You will not be allowed to operate under this alternative standard until the Administrator determines that you meet the above qualification requirements. Although we are not requiring that you include this petition as part of the comprehensive performance test workplan, we strongly recommend that you do so. This approach has several advantages: (1) It will clarify which PM standard you are complying with as of your documentation of compliance, and avoid potential confusion about your state of compliance; (2) it will help ensure that the planned performance tests cover all of the relevant parameters and standards and will facilitate interpretation of performance test results; (3) it will help avoid costs of having to conduct a separate performance test to show compliance with the alternative standard, which would include re-testing and re-establishment of many of the same parameters as would be covered in the initial comprehensive performance test; and (4) it will help maximize the time that the regulatory agency needs to evaluate your demonstration of the prerequisite, non-detect levels of metals in your feed, including the time needed for you to respond to any additional information that may be requested by the agency. Agency approval of a comprehensive performance test workplan that also includes this petition request will be deemed as approval for you to operate pursuant to this alternative standard. In our implementation of today's final rule, we will address as appropriate various considerations related to processing these petitions, including the timing of the submittal, review and approval. We fully expect that Agency permit officials will act expeditiously on these petitions so that both the source and the reviewing official know what particulate matter level the comprehensive performance test must show is being achieved.

XI. What Are the Permitting Requirements for Sources Subject to this Rule?

As indicated in Part One, we intend the requirements of this rule to meet our obligations for hazardous waste combustor air emission standards under two environmental statutes, the Clean Air Act and the Resource Conservation and Recovery Act. The overlapping air emission requirements of these two statutes have historically resulted in some duplication of effort. In developing a permitting scheme that accommodates the requirements of both statutes, with regard to the new air emissions limitations and standards being promulgated in this rule, our goal is to avoid any such duplication to the extent possible. This goal is consistent with the RCRA statutory directive of section 1006(b)(1) to ''integrate all provisions of (RCRA) for purposes of administration and enforcement and (* * *) avoid duplication, to the maximum extent practicable, with the appropriate provisions of the Clean Air Act.'' [284] It also is consistent with our objectives to streamline requirements and follow principles that promote ''good government.''

[284] See also CAA section 112(n)(7) (requirements of section 112 should be consistent with those of RCRA Subtitle C to the maximum extent practicable).

A. What Is the Approach to Permitting in this Rule?

1. In General What Was Proposed and What Was Commenters' Reaction?

In the April 1996 NPRM, we proposed placing the MACT air emissions standards in the CAA regulations at 40 CFR part 63 and proposed to reference the standards in the RCRA regulations at 40 CFR parts 264 and 266. (see 61 FR 17451, April 19, 1996). At that time, we believed that placing the standards in both the CAA and RCRA regulations would provide maximum flexibility to regulatory authorities at the Regional, State, or local levels to coordinate permitting and enforcement activities in the manner most appropriate for their individual circumstances.[285] We also believed that this approach would alleviate the potential for duplicative requirements across permitting programs.

In addition, we presented two examples of ways for permitting hazardous waste combustors subject to the new MACT standards. These examples reflected, in part, the proposed approach of incorporating the new MACT standards into both RCRA and CAA implementing regulations.[286] (See 61 FR 17451, April 19, 1996.) In the first example, the two permitting programs would work together to issue one permit, under joint CAA and RCRA authority, that would meet all the requirements of both programs. In the second example, the two permitting programs would coordinate their efforts with each program issuing a separate permit; the items common to both (e.g., the air emissions standards) would be included in one permit and incorporated by reference into the other permit.

Comments on the April 1996 NPRM expressed widespread support for providing flexibility for regulatory agencies to implement common sense permitting schemes that fit their organization and resources. However, commenters disagreed as to which approach would best provide such flexibility. A few commenters thought that the April 1996 NPRM approach, placing the standards in both CAA and RCRA regulations, would both provide flexibility to choose which program would issue permits and therefore avoid duplication.

On the other hand, we received several comments challenging our assumption that placement of the standards in both CAA and RCRA regulations would optimize flexibility for regulatory agencies. These commenters believed that the regulatory agencies would be, in fact, more limited. They noted that both the RCRA and CAA programs would be responsible for incorporating the standards, to some extent, into their permits, even if just by referencing the other. Commenters also were concerned with the potential for conflicting conditions between the two permits, particularly with regard to testing, monitoring, and certification requirements. In addition, they felt that the conditions common to both permits might be subject to separate decision-making processes. For example, they might potentially be subject to two different administrative or judicial appeals procedures and two permit modification procedures. If this happened, the Agency would not achieve its stated objective of avoiding duplication between the two programs. Additionally, our example pointing to close coordination between programs to avoid duplication was countered by commenters examples where such coordination has not occurred, either due to logistical problems within regulatory agencies or to differences in administrative processes between the two programs.

Commenters also expressed concern about the potential for enforcement of the same requirement under two different statutes that they believed the proposed approach would create. Since the requirements would have to be incorporated into both RCRA permits and CAA title V permits, sources would have to comply with both. Although we stated in the proposal that we did not expect to take enforcement action under both permits (see 62 FR 17452), commenters noted that this would not restrain State or local authorities from initiating dual enforcement actions. In addition, commenters pointed out that they would be vulnerable to citizen suits under both statutes.

The majority of the commenters voiced a desire for the Agency to avoid duplicate requirements or redundant processes. We received several suggestions for alternative approaches, which can be grouped in three ways: (1) Requiring regulatory agencies to develop a separate permitting program to cover elements common to both CAA and RCRA (i.e., air emissions and related operating requirements) while maintaining separate permits for the other elements; (2) Developing a single multi-media permit to cover all RCRA and CAA requirements applicable to hazardous waste combustors; and (3) placing the standards only in CAA regulations and incorporation only into the title V permits.

The first alternative, i.e., requiring a separate permitting program for air emissions and related parameters, is a very different approach that would likely require the development of more new regulations. However, duplication may be avoided without promulgation of an ''independent'' permitting scheme just for the elements common to both RCRA and CAA programs. Other alternatives would not involve the time and effort needed to craft and adopt a new regulatory scheme, such as that suggested.

We believe that the second alternative, pursuing multi-media permits, had some merit. As commenters pointed out, the Agency's Permits Improvement Team expressed support for multimedia permits in its ''Concept Paper.'' The Permits Improvement Team also acknowledged, however, that true multimedia permits have been difficult to develop. We still support multimedia permitting, and this rule does not preclude this approach. Nevertheless, we do not believe that, at this point, we can rely on multimedia permitting as an overall approach to implementing this rule. Some States have successfully piloted multi-media permitting or implemented ''one-stop'' permits that address both RCRA and CAA requirements. We encourage States to continue these efforts and to apply them to hazardous waste combustor permitting to the extent possible. Even for States that do not currently pursue multimedia or one-stop permits, this rule presents unique opportunities to start moving in that direction.

The third alternative had a couple of variations. The straightforward version was simply to place the MACT air emission standards in the CAA regulations, incorporate them into title V permits, and continue to issue RCRA permits for other RCRA-regulated aspects of the combustion unit, as well as of the rest of the facility (e.g., corrective action, general facility standards, other combustor-specific concerns such as materials handling, risk-based emissions limits and operating requirements, as appropriate, and other hazardous waste management units). A variation of this was to develop a RCRA permit-by-rule provision to defer to title V permits. The straightforward approach was favored by the majority of the commenters. Some offered, as further support for this

[285] When referring to permitting under the CAA, we mean operating permits under title V of the CAA. The regulations governing state and federal title V permit programs are codified in 40 CFR parts 70 and 71, respectively.

[286] The possibility of issuing only one EPA permit under either CAA or RCRA authority, and the ensuing legal barriers rendering that approach infeasible, also were discussed in the preamble for the proposed rule (61 FR 17451, April 19, 1996).

position, a reference to the recommendation put forth by the Permit Improvement Team's Alternatives to Individual Permits Task Force that called for permitting air emissions from hazardous waste combustors under the CAA. The variation of developing a RCRA permit-by-rule provision is not as responsive to commenters' concerns because, among other things, that approach would not avoid the potential for dual enforcement. Although the permit-by-rule has the effect of deferring to the title V permit, the facility is still considered to have a RCRA permit for the combustor's air emissions.

2. What Permitting Approach Is Adopted in Today's Rule?

We found the arguments for the straightforward approach (i.e., placing the standards only in the CAA regulations and relying on the title V permitting program) persuasive. Based on the comments we received, and our subsequent analysis, we narrowed our options for how to permit hazardous waste combustors subject to the new MACT standards and elaborated on our preferred approach in the May 1997 NODA (see 62 FR 24249). In the NODA, we described an approach to place the MACT emissions standards only in the CAA regulations at 40 CFR part 63 Subpart EEE, and rely on implementation through the air program, including operating permit programs developed under title V. Under this approach, which we are adopting in today's final rule, MACT air emissions and related operating requirements are to be included in title V permits; RCRA permits will continue to be required for all other aspects of the combustion unit and the facility that are governed by RCRA (e.g., corrective action, general facility standards, other combustor-specific concerns such as materials handling, risk-based emissions limits and operating requirements, as appropriate, and other hazardous waste management units).

Placement of the emissions standards solely in part 63 appears to be the most feasible way to avoid duplicative permitting requirements. We agree with the commenters' views that placement of the standards in both RCRA and CAA regulations would require both permits to address air emissions. Permitting authorities would not be able to choose which program would be responsible for implementing the requirements. Placing the standards in both sets of regulations would obligate both programs to address the standards in permits issued under their respective authorities. Simply put, permitting authorities would not be free to incorporate the new standards into either CAA title V permits or RCRA permits; rather, they would need to incorporate the new standards, to some degree, into both permits.[287] Having determined that placement of the standards in both sets of regulations is not desirable, we revisited the question of whether one program could defer to the other. The CAA does not provide authority to defer to other environmental statutes,[288] so we could not place the MACT standards solely in RCRA regulations, which would have consequently allowed them to be incorporated only into a RCRA permit. On the other hand, RCRA does provide authority to forego RCRA emissions standards in favor of MACT standards imposed under the CAA. As stated above in Part One, Section I, under the authority of RCRA section 3004(a), it is appropriate to eliminate these RCRA standards because they would only be duplicative and so are no longer necessary to protect human health and the environment. Also as discussed there, RCRA section 1006(b) provides further authority for the Administrator to eliminate the existing RCRA air emissions standards in order to avoid duplication with the new MACT standards. Thus, we use our authority to defer RCRA controls on the air emissions to the part 63 MACT standards, which ultimately are incorporated into title V permits issued under the CAA.

The majority of the comments received following publication of the May 1997 NODA supported our preferred approach to permitting the hazardous waste combustors. Several commenters expressed appreciation for this effort, and concluded that our approach would avoid duplication and have the RCRA and title V permits work to complement each other rather than potentially contradict each other. Although sources will still have two permits, the scope and subject matter of each will be distinguishable. The title V permit will focus on the operation of the combustion unit (e.g., air emissions and related parameters) while the RCRA permit will continue to focus on basic hazardous waste management at the facility (e.g., general facility standards, corrective action, other units, and so on). The only time there might be conditions in both RCRA and title V permits that address the same hazardous waste combustor operating requirements and limits is when there is a need to impose more stringent risk-based conditions, e.g., under RCRA ''omnibus'' authority, in the RCRA permit. The RCRA permitting authority would add terms and conditions based on the omnibus clause only if it found, at a specific facility, that the MACT standards were not sufficient to protect human health or the environment. This issue is discussed in greater detail in Part III, Section IV (RCRA Decision Process). In those limited cases, sources and permitting agencies may agree to identify the RCRA limit in the title V permit. Since one goal of the title V program is to clarify a source's compliance obligations, it will be beneficial, and convenient, to acknowledge the existence of more stringent limits or operating conditions derived from RCRA authority for the source in the title V permit, even though the requirements would not reflect CAA requirements. We strongly encourage Regional, State, and local permitting authorities to take advantage of this beneficial option.

Some commenters continued to maintain that flexibility to choose which program would permit air emissions would only be provided if we were to promulgate the standards in both CAA and RCRA regulations. They reiterated the position they had taken in their comments on the initial proposal that this approach would not result in duplication across the programs; they discounted concerns over duplicative requirements or dual enforcement scenarios by saying that it was basically not in a permitting authority's best interests to issue duplicate permits. We found the contrary, that placement of the standards in both sets of regulations does not provide flexibility for a regulatory agency to choose one permit program or another. Such an approach would obligate both permits to cover air emissions and related operating requirements. This result does not achieve our or the commenters' objective of avoiding duplication across programs. Although the actual burden on permit writers may not be significant if, for example, the title V permit were to just cross-reference the appropriate sections of the RCRA permit, the requirements would still be enforceable under both vehicles, and would go through dual administrative processes. As mentioned above, EPA would like to

[287] As discussed earlier, states may be able to develop combined permits that address both RCRA and CAA requirements. Such permits would have to cite the appropriate authority (CAA or RCRA) for each condition, and have to be signed by the appropriate officials of each program. Permit conditions would continue to be enforced under their respective authorities as well.

[288] Although CAA section 112(n)(7) is directed at harmonizing requirements with RCRA, it does not provide a jurisdictional basis for deferral (i.e., nonpromulgation of mandated section 112(d) MACT standards in light of the existence of RCRA standards).

avoid this type of dual enforcement and dual process scenario in implementing the new standards.

3. What Considerations Were Made for Ease of Implementation?

Our approach in the final rule does not limit the options available to state permitting authorities for implementing the new standards. The primary concern about which program (RCRA or CAA) assumes lead responsibility for administering air emissions requirements appears to revolve around resource issues. The RCRA program has been the lead program for permitting hazardous waste combustors for many years, consequently, RCRA program staff have developed a great deal of expertise in this area. They are familiar with source owners and operators, the combustion units, and special considerations associated with permitting hazardous waste combustion activities. Some commenters are concerned that by deferring regulation of air emissions standards to the CAA, that expertise will no longer be available. They express doubt about the ability of air toxics implementation programs and title V programs to take on these sources, given the complexity of hazardous waste combustor operations and the volume of title V permits that need to be issued over the next several years.[289]

In response to these comments, we note that many State Air programs currently play key roles in permitting hazardous waste combustors under RCRA. Furthermore, States may find that much of the expertise used to regulate other air sources is directly applicable to regulating the hazardous waste combustor sources subject to the new MACT standards, and that the resources in their air programs are sufficient to handle these additional sources. If, however, a State shares commenters' concerns that its air program, as it currently exists, may not be able to take on these sources, the State may continue using the resources and expertise of its RCRA program even though the new standards are being promulgated as part of the CAA regulations.

In the May 1997 NODA, we discussed the flexibility afforded to States by codifying the standards under only one statute (see 62 FR 24246). Two potential options were described in the NODA for how this might be achieved: (1) A State could simply have its RCRA staff implement the hazardous waste combustor MACT standards; or (2) a State could formally incorporate the standards into its State RCRA program. In response to the NODA, some State environmental agencies commented that, as a matter of State law, they would not be able to incorporate the new standards into their authorized hazardous waste programs unless they are included in federal RCRA regulations. We acknowledge, therefore, that some States may not be able to pursue the second option. In any case, we recommend against this option because, as discussed below, it would perpetuate having duplication between two permits. The first option would, however, still be feasible. For example, the States could explore the flexibility provided through Performance Partnership Agreements [290] if they would like to have their RCRA program staff continue their work with the hazardous waste combustors.

If a State chooses to use either of the above options to continue applying RCRA expertise to hazardous waste combustors, we anticipate that RCRA program staff would be responsible for many of the implementation activities, such as reviewing documents submitted by the source (e.g., the Notice of Intent to Comply, the progress report, and the performance test plan), and working with the source to resolve any differences (e.g., on anticipated operating requirements or on results of comprehensive performance tests).

Where the process issues would start to diverge between the two options is at the actual permitting stage. Under the first option (RCRA staff implementing CAA regulations), the standards would be incorporated only into title V permits. Title V permits cover a wide range of applicable requirements under the CAA; the hazardous waste combustor MACT standards are likely to be just one piece.[291] We believe that the RCRA permit writer would draft the hazardous waste combustor portion of the title V permit, and would coordinate with the title V permit writer in the CAA program who has responsibility for the source's overall permit to ensure that the hazardous waste combustor portion is properly incorporated. In short, the RCRA permit writer would simply be developing a component of a title V permit instead of developing a component of a RCRA permit. State permitting authorities that wish to continue using their RCRA expertise will undoubtedly explore this approach.

If a State pursues the second option of incorporating the new hazardous waste combustor MACT standards into its State RCRA program, there may still be a need to incorporate the standards into both title V and RCRA permits. The CAA does not provide authority to defer title V permitting to other environmental programs. Thus, the source would still be subject to title V requirements (i.e., a RCRA permit could not ''replace'' a title V permit). Furthermore, an EPA Region or a State who chooses to obtain authorization for the hazardous waste combustor MACT standards under RCRA would also have to start implementing the new standards under CAA authority (including title V permitting requirements) even as the State begins efforts to incorporate the standards into its State RCRA program.

Although close cooperation between the RCRA and title V permit writers could minimize duplicative efforts in developing permits and avoid conflicting conditions in the two permits (for example, by putting the conditions in one permit and just referencing them in the other), this approach still results in the potential for enforcement and citizen suits under both permits. [292] As discussed above, we intend to avoid duplicate permitting and enforcement scenarios for hazardous waste combustor MACT standards; thus, we strongly encourage States that choose to pursue this approach to develop implementation schemes that minimize the potential for such duplication to the extent practicable.

B. What Is the Applicability of the Title V and RCRA Permitting Requirements?

This section briefly summarizes the applicability of both title V and RCRA permitting requirements under the permitting scheme discussed in Section XI. A. above. It also discusses the relationship of this permitting scheme to both the proposed revisions to combustion permitting procedures from June 1994 and to the RCRA preapplication meeting requirements. Our decision to subject hazardous waste combustors that are considered area

[289] Title V permits are required for many more sources than those subject to the HWC MACT standards. Currently, there are approximately 20,000 sources that are subject to title V; there are only about HWCs subject to today's rule.

[290] Within negotiated agreements, there is flexibility in Performance Partnership Grants to strategically move funds, and flexibility in Performance Partnership Agreements found in the National Environmental Performance Partnership System to strategically integrate programs.

[291] If the HWC MACT standards are the only applicable CAA requirements, however, then there would be no other components of a title V permit for the source.

[292] Some States have successfully issued ''one-stop'' multimedia permits which include provisions from both the CAA and RCRA programs in a single permit. However, it is EPA's understanding that these permits cite both the RCRA and CAA authority; thus, the potential for enforcement under both statutes still remains.