

emissions (e.g., operating practices, worker training, proper maintenance, pollution control device type, etc).

D. Format of Standards

1. Thermal Emissions

EPA proposed, and is finalizing standards for HAP metals and chlorine (the HAPs amenable to hazardous waste feed control) emitted by energy recovery units (cement kilns, lightweight aggregate kilns, and liquid fuel boilers) expressed in terms of pounds of HAP attributable to the hazardous waste fuel per million british thermal units (BTUs) of hazardous waste fired. 69 FR at 21219–20. EPA received many comments on this issue to which we respond below and in the Response to Comment Document. Some initial discussion of the issue is appropriate, however.

a. *Expressing Standards in Terms of a Normalizing Parameter is Reasonable.* First, using a thermal emissions form of a standard is an example of expressing standards in terms of a normalizing parameter. EPA routinely normalizes emission standards either by expressing them as stack HAP concentrations or by expressing the standards in units of allowable mass emissions per amount of production or raw material processed. Emission concentration-based standards normalize the size of each source by accounting for volumetric gas flowrate, which is directly tied to the amount of raw material each source processes (and subsequently the amount of product that is produced). Metal and particulate matter emission standards for commercial and industrial solid waste incinerators are expressed in emission concentration format. See § 60.2105. The particulate matter standard for Portland cement kilns is expressed as mass of allowable emissions per mass of raw material processed. See § 63.1342. The particulate matter, mercury, and hydrogen chloride standards for nonhazardous waste industrial boilers are expressed as pounds of allowable emissions per million British thermal units (BTUs). See § 63.7500.

Technology-based standards typically normalize emissions because such a format assures equal levels of control across sources per amount of raw material that is processed, and allows EPA to equally assess source categories that comprise units that differ in size. By normalizing the emissions standard we better ensure the same percentage of emission reduction per unit of raw material processed by each source.¹⁰¹

¹⁰¹ A more familiar example of normalization is the Earned Run Average (ERA), which normalizes a baseball pitchers' earned runs on the basis of nine

See *Weyerhaeuser v. Costle*, 590 F. 2d 1011, 1059 (D.C. Cir. 1978) (technology-based standards are typically expressed in terms of volume of pollutants emitted per volume of some type of unit of production).

There is no legal bar to this approach since the statute does not directly address the question of whether a source emitting 100 units of HAP per unit of production but 100 units of HAP overall is a better performer (or, for new sources, better controlled) than a source emitting 10 units of HAP per unit of production but emitting 101 units overall.¹⁰² One commenter appeared to suggest that we should assess performance on mass feedrates and mass emission rates, without normalizing. Such an approach would yield nonsensical results because the best performing sources would more likely be the smallest sources in the source category (smaller sources generally have lower mass emission rates because they process less hazardous waste). This would likely yield emission standards that would not be achievable by the larger sources that more likely are better controlled sources based on a HAP removal efficiency basis.¹⁰³ Normalization by unit of production is another way of expressing unit size, so that normalizing on this basis is a reasonable alternative to subcategorization on a plant size-by-plant size basis. See section 112(d)(1) (size is an enumerated basis for subcategorizing).

b. *Using Hazardous Waste Thermal Input as the Normalizing Parameter is Permissible and Reasonable.*

Normalization of standards based on thermal input is analogous. For energy recovery units (in this rule, kilns and most liquid fuel boilers), normalizing on the basis of thermal input uses a key feed input as the normalizing parameter, allowing comparison of units with different inputs rather than separately evaluating these units by size and type (see section 112(d)(1)). Again, this approach is legally permissible. The statute does not answer the question of which source is better performing, the source emitting 100 pounds of HAP per million BTUs hazardous waste but 100 pounds of HAP overall or the source emitting 10 pounds of HAP per million

innings pitched in order to make comparisons among pitchers possible.

¹⁰² Or, put another way, the statute does not directly address the question of whether a small source that emits 10 units of HAP is better than a much larger source with better back-end control (but feeding the same raw material at a higher mass feedrates) that emits 100 units of HAP.

¹⁰³ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 6.0.

BTUs hazardous waste but emitting 101 pounds overall.

The approach also is reasonable. First, as with other standards expressed in normalized terms, by normalizing the emissions standard we ensure the same percentage of emission reduction per unit of raw material processed by each source, thus allowing meaningful comparison among sources. For example, emission concentration-based standards normalize the size of each source by accounting for volumetric gas flowrate, which is directly tied to the amount of raw material each source processes (and subsequently to the amount of product that is produced), and assures equal levels of control per amount of product. Normalization on the basis of HAP amount in hazardous waste per BTU level in the hazardous waste similarly assures equal levels of control across sources per amount of raw material that is processed. Here, the raw material is the hazardous waste fuel, expressed as units of energy. It is reasonable to regard a hazardous waste fuel as a raw material to an energy recovery device. Indeed, fuels are the only input to boilers, so fuels are necessarily such units' sole raw material.^{104 105} Hazardous waste burning cement kilns and lightweight aggregate kilns produce a product in addition to recovered energy and so process other raw materials. However, the reason these units use hazardous waste as inputs is typically to recover usable energy from the wastes. Hence, the hazardous waste fuel is reasonably viewed as a raw material to these devices.

In this regard, we note that our choice of normalizing parameter essentially says that best performers with respect to hazardous waste fuel burned in energy recovery units are those using the lowest HAP feedrate (for metals and chlorine) per amount of energy

¹⁰⁴ EPA thus has expressed the MACT standards for particulate matter, mercury, and hydrogen chloride for nonhazardous waste industrial boilers as pounds of allowable emissions per million BTUs. § See 63.7500. This normalization considers the total heat input into the combustion device. Normalizing by total heat input would not be appropriate for hazardous waste combustors for metals and chlorine because this would implicitly account for, and in turn require the use of, feed control of HAP in non hazardous waste fuels. This is inappropriate for the reasons discussed in Section III.B of this Part.

¹⁰⁵ We distinguish (i.e., subcategorize) liquid fuel boilers that process hazardous waste with heating values less than 10,000 BTU/lb from those processing hazardous wastes with heating content greater than 10,000 BTU/lb. Although boilers that process hazardous waste with heating values less than 10,000 BTU/lb are still considered to be energy recovery units, we conclude a thermal emissions normalization approach for these sources is not appropriate. See Part Four, Section VI.D.

recovered.¹⁰⁶ This approach accords well with the requirement in section 112(d)(2) that EPA take energy considerations into account in developing MACT, and also that the Agency consider front-end means of control such as input substitution (section 112(d)(2)(A)). In addition, our choice furthers the RCRA goal of encouraging properly conducted recycling and reuse (RCRA section 1003(b)(6)), which is of relevance here in that Congress directed EPA to consider the RCRA emission controls for hazardous waste combustion units in developing MACT standards for these units, and to ensure “to the maximum extent possible, and consistent with [section 112]” that section 112 standards are “consistent” with the RCRA scheme. CAA section 112(n)(7).¹⁰⁷ Conversely, emission concentration-based standards, the methodology that otherwise would be used to calculate emission concentration-based standards, may result in standards that are biased against sources that recover more energy from hazardous waste. This may discourage sources from recovering energy from hazardous waste because such standards do not normalize each source’s allowable emissions based on the amount of hazardous waste it processes for energy recovery purposes. See 69 FR at 21219 and responses below.

Second, use of this normalizing parameter makes it much more likely that hazardous waste feed controls will be utilized by these devices as an aspect of emissions control. See section 112(d)(2)(A) (use of measures reducing the volume of pollutants emitted through “substitution of materials”); *CKRC*, 255 F. 3d at 865 (EPA to consider means of control in addition to back-end pollution control technology when establishing MACT floors). As explained in our discussion of the SRE/Feed methodology, the MACT floor level for metals and chlorine reflects the best combination of hazardous waste feedrate, and total HAP removal efficiency. See section III.B. However, if standards for energy recovery units are expressed in terms of mass of HAP per volume of stack gas, then it would be relatively easy for these energy recovery

devices to achieve a standard, without decreasing concentrations of HAP in their hazardous waste fuels, by diluting the HAP contribution of hazardous waste with emissions from fossil fuel. A thermal emissions format prevents this type of dilution from happening because it ignores additions of stack gases attributable to burning fossil fuels. *Weyerhaeuser*, 590 F. 2d at 1059 (use of production of a unit as a normalizing parameter serves “the commendable purpose” of preventing plants from achieving emission limitations via dilution).

For example, assume there are two identical energy recovery units with identical back-end control devices (that reflect the performance of the average of the best performing sources). Source A fulfills 25% of its energy demand from the combustion of hazardous waste; source B fulfills 50% of its energy demand from the combustion of hazardous waste. Also assume that the hazardous waste for these two sources have equivalent energy contents. If these sources were required to comply with an emission concentration based-standard (e.g., µg/dscm), source A would be allowed to feed hazardous waste containing twice the metal content (on a mass concentration basis, e.g., ppm), and would be allowed to emit metal HAP at the same mass emission rate relative to source B. This is because this source is effectively diluting its emissions with the emissions that are being generated by the fossil fuels.¹⁰⁸ A thermal emissions standard format does not allow sources to dilute their emissions with the emissions from fossil fuel inputs because it directly regulates the emissions and feeds associated with the hazardous waste fuel. Under a thermal emissions format both sources would be required to feed hazardous waste with the same thermal feed concentrations (on a lb HAP per million BTU hazardous waste basis), and source A would be required to process hazardous waste with an equivalent concentration of metal HAP (on a mass basis) and also be required to emit half as much metal HAP (on a mass emission rate basis) relative to source B, because source A is processing half as much hazardous waste fuel, thus vindicating the hazardous waste feed control aspect of the standard (see also note below regarding the likelihood of sources using hazardous waste feed control). Further, the thermal feed concentration with which these sources must comply reflects the feed control of the average

performance of the best performing sources (on a mass of HAP per million BTU basis). Such a requirement assures that these sources are processing the cleanest hazardous waste fuels to recover energy and are reducing HAP emissions to MACT levels.

We note that it would not be appropriate to express the emission standards for incinerators, hydrochloric acid production furnaces, and solid fuel boilers in terms of thermal emissions. As just explained, the choice of a normalizing parameter is fitted to the nature of the device to which it is applied in order to allow the most meaningful comparisons between devices of like type. We therefore conclude that a thermal emissions format (i.e., normalizing parameter) for incinerators is not appropriate because the primary function of incinerators is to thermally treat hazardous waste (as opposed to recovering energy from the hazardous waste). See 67 FR at 17362 (April 19, 1996). Our database indicates that most incinerators processed hazardous waste during their emissions tests that had, on average, heating values below 10,000 BTU/lb.¹⁰⁹ We have emission test hazardous waste heating value information for 62 incinerators in our database. Of these 62 sources, 40 sources processed hazardous waste with an average heating value of less than 10,000 BTU/lb. The other 22 sources processed hazardous waste with heating values greater than 10,000 BTU/lb in at least one test condition, although we note that 14 of these 22 sources also processed hazardous waste in different test conditions with heating values lower than 10,000 BTU/lb.¹¹⁰

We assessed whether we should subcategorize incinerators, similar to how we subcategorize liquid fuel boilers, based on the BTU content of the hazardous waste. Incinerators do recover energy from processing high BTU wastes. Some incinerators are equipped with waste heat boilers, and high BTU hazardous waste can displace fossil fuels that otherwise would have to be burned to thermally treat low BTU wastestreams. However, such energy recovery is considered to be a secondary product because their primary function is to thermally treat hazardous waste. A

¹⁰⁶ As explained earlier, the ultimate ranking of best performers then further evaluates system removal efficiency, best performers then being defined in terms of the combination of hazardous waste thermal feed and system removal efficiency. See USEPA, “Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards”, September 2005, Section 7.3.

¹⁰⁷ EPA would adopt the thermal format for the standards, however, whether or not the approach furthered RCRA objectives.

¹⁰⁸ This example assumes there are no HAP emissions attributable to the fossil fuels.

¹⁰⁹ As discussed later, the heating values of hazardous wastes processed at cement kiln and lightweight aggregate kilns are primarily 10,000 BTU/lb or greater.

¹¹⁰ These data are based on a compilation of heating contents for every incinerator test condition in the database where the source reported such heating content, and include both the most recent test conditions as well as older test conditions. Incinerator test condition heating values range from a low of 790 to a high of 19,800 BTU/lb, with a median value of 7800 BTU/lb.

thermal emissions normalization approach for incinerators that combust hazardous wastes with heating values greater than 10,000 BTU/lb would therefore not be appropriate because the normalized parameter would not be tied to the primary production output that results from the processing of hazardous waste (i.e., treated hazardous waste). In confirmation, no commenters suggested that we apply a thermal emissions format to incinerators.

We also conclude that a thermal emission format is inappropriate for hydrochloric acid production furnaces. These devices recover chlorine, an essential raw material in the process, from hazardous waste. The classic normalizing parameter of amount of product (HCl) produced is therefore the obvious normalizing parameter for these sources. It is true that some hydrochloric acid production furnaces recover energy from high BTU hazardous wastes. See 56 FR at 7141/1 and 7141-42 (Feb. 21, 1991). Some sources are equipped with waste heat boilers, and high BTU wastes help sustain the combustion process, which is necessary to liberate the chlorine from the wastestreams prior to recovering the chlorine in the scrubbing systems. Again, energy recovery is not the primary function of these types of sources.¹¹¹ Hydrochloric acid production furnace hazardous waste heating values range from 1,100 to 11,000 BTU/lb (the median energy content for these sources is slightly above 6,000 BTU/lb). The range of hazardous waste heating contents from these sources is much lower than the ranges for cement kilns, lightweight aggregate kilns, and liquid fuel boilers, supporting the premise that energy recovery is of secondary importance. In addition, and critically, the hazardous waste that is processed in these units contains high concentrations of chlorine, confirming that the wastes serve as feedstock for hydrochloric acid production, even if the wastes also have

¹¹¹ EPA notes that when first adopting RCRA air emission standards for hydrochloric acid recovery furnaces (then called 'halogen acid furnaces'), EPA indicated that those furnaces designed as boilers would be subject to the emission standards for boilers. 56 FR at 7040. This determination did not have regulatory consequence, since all hydrochloric acid production furnaces were subject to the same emission standards whether they were classified as boilers or as industrial furnaces. Thus, EPA was not concluding that some hydrochloric acid furnaces existed for the primary purpose of recovering energy in the 1991 rulemaking. 56 FR at 7139 ("[Hydrochloric acid recovery furnaces] are typically modified firetube boilers that process secondary waste streams containing 20 to 70 percent chlorine or bromine to produce a halogen acid product by scrubbing acid from the combustion gases").

energy value.¹¹² No commenters suggested that we apply a thermal emissions format to hydrochloric acid production furnaces.

We consider the processing of hazardous waste in solid fuel boilers to be more reflective of energy recovery (relative to incinerators and hydrochloric acid production furnaces) because these sources directly recover the heat that is released from the combustion of the waste streams. However, as stated at proposal, not all these sources are processing hazardous wastes for energy recovery. 69 FR at 21220. These boilers are generally not commercial units, and so tend to burn whatever hazardous wastes are generated at the facility where they are located. Heating values for this source category range from 1,300 to 10,500 BTU/lb, with a median value of 8,000 BTU/lb. We therefore conclude that thermal emission standards for these sources are not appropriate because most of these sources are processing hazardous waste with energy content lower than 10,000 BTU/lb. As discussed in section VI.D, we conclude that 10,000 BTU/lb is an appropriate level that distinguishes whether thermal emission standards or mass emission concentration-based standards are appropriate. We also note that no commenters suggested that we apply a thermal emissions format to solid fuel boilers.

Comment: Commenters state that thermal emission standards are inappropriate because sources burning hazardous waste with a higher energy content or higher percent hazardous waste firing rate (i.e., one that fulfills a greater percentage of its total energy demand from the hazardous waste) would be allowed to emit more HAP.

Response: Part of this comment would apply regardless of what normalizing parameter is used. Technology-based standards (including MACT standards) are almost always expressed in terms of some type of normalizing parameter, i.e., "X" amount of HAP may be emitted per unit of normalizing parameter. This allows a meaningful comparison between units of different size and production capacity. A consequence is that the overall mass of HAP emissions varies, but the rate of control remains

¹¹² Hazardous waste chlorine feedrates that are included in our database (expressed as MTECs) range from a low of 46,000,000 µg/dscm to a high of 294,000,000 µg/dscm. On a mass chlorine percentage basis, these wastes range from 17% to 82%, noting that these percentages did not include the chlorine that was also spiked during the emissions tests). See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards", September 2005, Section 15.

constant per the normalizing unit. As explained in the introduction to this section, this approach is both routine and permissible.

Cement kilns, lightweight aggregate kilns, and liquid fuel boilers combust hazardous waste to recover valuable energy. Recovering energy is an integral part of their production process. As discussed at proposal, emission concentration-based standards (and the methodology that otherwise would be used to calculate emission concentration-based standards) may result in standards that are biased against sources that recover more energy from hazardous waste. 69 FR at 21219. This may discourage sources from recovering energy from hazardous waste because such standards do not normalize each source's allowable emissions based on the amount of hazardous waste it processes for energy recovery purposes. A source that fulfills 100 percent of its energy demand from hazardous waste would be required to limit its mass HAP emissions to the same levels as an identical source that satisfies, for example, only 10 percent of its energy demand from hazardous waste and 90% from coal. This would inappropriately discourage the safe recovery of energy from hazardous waste, and could in turn result in greater consumption of valuable fossil fuels that otherwise would be consumed.

Sources which fulfill a greater percentage of their energy demand from hazardous waste (either by processing hazardous wastes that are higher in energy content, or by simply processing more hazardous waste) will be allowed to emit more HAP (on a mass emission rate basis) than an identical source that satisfies less of its total energy demand from hazardous waste. This is appropriate because: (1) The source fulfilling a greater percentage of its energy demand from hazardous waste is processing more raw material than the other source (the raw material being the energy content of the waste); and (2) The source fulfilling a lower percentage of its energy demand requirements from hazardous waste would not be allowed to dilute its emissions with nonhazardous waste fuels, and we would thus assure that all sources implement hazardous waste feed control to levels consistent with MACT.¹¹³ This

¹¹³ Although the rule does not require use of feed control (or any particular means of control to achieve a standard), the rule assures that all sources' emissions will reflect the emissions of the sources with the best hazardous waste feedrates expressed in terms of amount of HAP per BTU of hazardous waste. Because this format eliminates

was illustrated in the example provided in the introduction to this comment response section.

Similarly, two sources that combust hazardous waste with the same energy content and the same metal concentrations (on both a thermal concentration and mass-based concentration basis), but at different hazardous waste firing rates, would be required to achieve identical back-end control device operating efficiencies to comply with a thermal emissions-based standard. Holding these factors constant, thermal emission standards require sources to achieve identical percent reductions of the HAP that is processed within the combustor via removal with an air pollution control device. A thermal emission standard format is thus equally stringent for these sources on a percent HAP removal basis, irrespective of the amount of hazardous waste it processes for energy recovery, and better assures that sources burning smaller amounts of hazardous waste (from an energy recovery perspective) are also controlling emissions as well as the average of the best performing sources.

Sources processing higher energy content hazardous wastes would be allowed to feed hazardous wastes with higher metal and chlorine mass-based concentrations relative to other sources combusting lower energy content wastes. To illustrate this, assume there are two sources (named C and D) with identical back-end control systems and identical mass feedrates of hazardous waste. Also assume the hazardous waste of source C has twice the energy content as compared to the hazardous waste processed by source D. A thermal emission standard will allow Source C to feed a hazardous waste that has twice the metals concentration (as measured on a mass basis) as compared to source D, even though both sources would be required to comply with equivalent thermal feed rates limitations. Notably, however: (1) Source C is displacing (*i.e.*, not using) twice as much valuable fossil fuel as the source with the lower energy content hazardous waste, and is feeding twice as much raw material—the raw material being energy content contained in the hazardous waste; (2) source C cannot exceed the feed control levels (expressed on a lbs of HAP per million BTU basis) that was achieved by the average of the best performing sources (assuming its back-end control efficiency is equivalent to the average

consideration of stack gas attributable to fossil fuel emissions, and thus eliminates the dilutive effect of these emissions, the likelihood that sources will in fact use hazardous waste feed control as part of their control strategy is great.

performance demonstrated by the best performing sources); and (3) source D is required to have lower mass concentrations of metals in its hazardous waste because it is firing poorer quality hazardous waste fuel (from an energy recovery perspective) and because it is feeding less of the same raw material (measured by energy content). Thus, the thermal emissions format appropriately encourages and promotes the processing of clean, high energy content hazardous waste fuels (consistent with evaluating hazardous waste feed control as an aspect of MACT, and not just relying on control solely through use of back end technology), and does so equally for all sources because it normalizes the allowable emissions based on the amount of energy each source recovers from the hazardous waste. Put another way, source C in the above example is controlling HAP emissions to the same extent as the average of the best performing sources per every BTU of hazardous waste fuel it processes (as is source D).

We note that this is a hypothetical example. In practice the average energy content of hazardous waste processed at cement kilns does not vary significantly across sources. Cement kilns burn hazardous wastes with relatively consistent energy contents because that is what their production process necessitates. This is supported by our database and by comments received from the Cement Kiln Recycling Coalition.¹¹⁴ Heating values of hazardous wastes processed at cement kilns during compliance tests (information which is included in our database) range from 10,300 to 17,600 BTU/lb, with a median value of 12,400 BTU/lb. We note that these are snapshot representations of hazardous waste heating content from these sources that originate from compliance tests. We also have long term average hazardous waste heating measurements from cement kilns indicating that the heating content of the hazardous wastes on average range from 9,900 to 12,200 BTU/lb, with a median value of 11, 500 BTU/lb. We thus conclude that the commenter's concern regarding sources being allowed to emit more HAP if they process hazardous waste with higher

energy content is overstated for these sources.

Energy content of hazardous wastes processed in liquid fuel boilers and lightweight aggregate kilns varies more than energy content of hazardous wastes processed by cement kilns, and sources with higher energy content wastes would be allowed to emit more metals than identical sources burning identical volumes of lower energy content wastes (although the degree of control is identical per BTU of hazardous waste fuel processed).¹¹⁵ Again, these are hypothetical examples. Each energy recovery unit will have an upper bound on the amount of energy it can process from the hazardous waste. Sources that process higher energy content hazardous wastes would not necessarily feed the same volume of hazardous waste as compared to sources processing lower energy content hazardous wastes because they cannot exceed the thermal capacity of their combustion unit. Under a thermal emission standard format, the mass emission rates that would be allowed for identical sources that fulfill 100 percent of their energy demand from hazardous waste and that have differing hazardous waste energy contents would be identical. Although the source with the higher energy content hazardous waste would have a higher allowable mass-based hazardous waste feed concentration, this source would have to process less hazardous waste (on a mass basis) to remain within its thermal capacity. This helps to ensure that its mass HAP emission rate is similar to other sources that process lower energy content hazardous waste.

One commenter's apparent concern with thermal emissions seems to center on an assertion that sources will intentionally blend nonhazardous, high heating value wastes or fuels with low energy, high metal bearing hazardous wastes in order to increase the energy content of these metal bearing wastes so that they will be subject to higher allowable emissions via thermal emission standards. We specifically address that comment later as it relates to commercial energy recovery units (lightweight aggregate kilns and cement kilns). We note here, however, that we do not consider that comment to be of practical concern for liquid fuel boilers

¹¹⁴ See comment submitted by the Cement Kiln Recycling Coalition, USEPA, "Comment Response Document to the Proposed HWC MACT Standards, Volume 1: MACT Standards," September 2005, Section 3.3. Also see USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 23.

¹¹⁵ The hazardous waste heating values of liquid fuel boilers range from 2,200 to 21,000 BTU/lb, with a median value of 14,800. Heating values of lightweight aggregate kilns range from 4,900 to 16,900 BTU/lb, with a median value of 14,800. We note that the low end heating value for lightweight aggregate kilns reflects one source and is not typical of heating values used by the other commercial lightweight aggregate kiln facilities, and are similar to the heating values of cement kilns.

because they do not engage in commercial fuel blending practices.

Comment: A commenter states that EPA's assessment of thermal emissions to identify the relevant best sources is inappropriate because thermal emissions are not emission levels, but rather a ratio of emissions to the heat content in a source's hazardous waste.

Response: This comment challenges the basic idea of normalization, since the comment would be the same regardless of the normalizing parameter being used. Thermal emissions are emission levels that are normalized to account for the amount of energy (*i.e.*, raw material) these sources recover by processing hazardous waste. Similarly, a mass emission concentration (*i.e.*, $\mu\text{g}/\text{dscm}$) is a ratio of the emissions to the volume of combustion gas that is generated, which normalize emissions to account for differences in the size of the combustion units (as well as differences in production capacity). This rulemaking assesses performance and expresses emission standards in both of these formats; both formats normalize the emissions so that we may better assess emission control efficiencies equally across sources based on the percent of HAP in the feed (whether thermal feed or feed normalized based on combustor size)¹¹⁶ that is controlled or removed from the stack gas prior to being emitted into the atmosphere. As discussed above, technology-based standards have historically assessed performance after normalizing emissions based on the amount of raw material processed by the given industry sector. Thermal emissions normalize each source's emissions based on the amount of raw material (hazardous waste fuel) it processes, and are therefore appropriate to assess and identify the relevant best performers. Finally, as previously explained, this approach is consistent with both the language of section 112 (d) (2) and (3), and the purpose of these provisions.

Comment: A commenter states that EPA's assessment of thermal emissions to identify the relevant best sources is inappropriate because it ignores HAP emissions attributable to the nonhazardous fuel and raw material.

Response: Thermal emission standards do not directly control HAP emissions attributable to the fossil fuels and raw material, in the sense that we did not assess feed control of fossil fuels or raw materials. However, this issue is

not related to our choice to use thermal content of hazardous waste as a normalizing parameter. Rather, the issue is whether feed control of fossil fuels and raw materials is a feasible means of control at all. We have determined that it is not, and that only back-end control (expressed as system removal efficiency) is feasible. Moreover, today's rule controls emissions from HAP in raw material and fossil fuels. All non-mercury metal HAP emissions attributable to fossil fuels or raw material are effectively and efficiently controlled to the level of the average of the best performing sources with the surrogate particulate matter standard, as well as the system removal efficiency component of the SRE/Feed methodology.

Comment: EPA has failed to document sources' actual feedrates. Feedrates are presented either as MTECs (where hazardous waste HAP feedrates are divided by gas flow rates) or as thermal feedrates, (where feedrate is expressed as the mass of HAP per million BTUs of hazardous waste fired). This is impermissible, since it does not measure actual feed levels.

Response: This comment essentially takes the position that it is legally impermissible to normalize standards, *i.e.*, express standards on a common basis. EPA rejects this comment for the reasons stated in the introduction to this section.

Comment: A commenter states that an increasing number of fuel blenders are producing fuels with a minimum heating content and maximum metals content in order to maximize revenues because high metal bearing wastes command a higher revenue on the commercial waste market. The commenter states that thermal emission standards are not appropriate because they are based on the implicit assumption that energy recovery entails metals feed.

Response: Contrary to what the commenter suggests, the thermal emissions format will more likely discourage the alleged practice of fuel blenders producing fuels with a minimum heat content and maximum metals content because the standard limits the allowable metal emissions based on the amount of energy contained in the hazardous waste. Thus, a source with a lower energy waste would have to ensure that the mass concentration of metals is also lower to comply with the thermal emission formatted standard. The source would consequently emit less metals (on a mass basis) because of the lower metal mass concentration in the waste fuel. Thermal emission standards reflect the

reality that the hazardous waste fuels that are currently processed safely and efficiently in energy recovery units to displace valuable fossil fuel do in fact contain metal HAP. From a feed control perspective, the thermal emissions format appropriately requires sources to process high energy content hazardous waste fuels that reflect the thermal feed control levels achieved by the average of the best performing sources, and does so equally for all sources because it normalizes the allowable emissions based on the amount of energy each source recovers from the hazardous waste.

Comment: A commenter states that EPA should be concerned that fuel blenders and kilns will use the thermal emission standard format to increase the allowable metals feedrates for their units. The commenter claims that sources could inappropriately convert non-hazardous waste fuel to hazardous waste fuel by simply putting coal in a bunker in which hazardous waste was once stored, or mixing nonhazardous waste fuel oil with hazardous waste. The commenter states that a facility with a low hazardous waste firing rate, and relatively low allowable emissions can become a facility with a high hazardous waste percent firing rate, with higher allowable emissions, simply by 'creative' use of the hazardous waste mixture rule. The commenter suggests that EPA clearly state that the hazardous waste thermal emission standards apply only to the hazardous waste portion of the fuel blend mixture. The commenter further suggests that EPA require fuel blenders to report the amount of nonhazardous waste fuel that is contained in the fuel blend, and that cement kilns use this to determine allowable metal feed rates based on the original hazardous waste energy content.

Response: We do not believe hazardous waste combustors will engage in the practice of redesignating their fossil fuels, *i.e.*, coal, as hazardous wastes with creative use of the mixture rule in order to increase their allowable metal HAP emission rate. That would require large quantities of coal to be newly classified as hazardous waste. The coal, and the unit where the coal is stored, would subsequently become subject to all applicable subtitle C requirements, which include storage and closure/post closure requirements. We believe this disincentive will discourage this hypothetical practice.

Moreover, as previously discussed, today's rule does not allow cement kiln or lightweight aggregate kiln emissions to exceed the interim standards. The fact that we are issuing emission

¹¹⁶ For emission concentration-based standards we normalize hazardous waste feed control levels by calculating what we call maximum theoretical emission concentrations, which are equivalent to the HAP mass feed rate divided by gas flow rate.

standards for some pollutants in the thermal emissions standard format will not encourage fuel blenders to send more metals to these commercial energy recovery sources because their allowable emission concentrations are, by definition, either equivalent to or more stringent than the current limitations with which they are complying. Thus, even if the fuel blenders and energy recovery units engaged in this practice, they could not emit more metals than they are currently allowed to emit. We therefore conclude that it is not necessary to promulgate complicated regulatory provisions that would increase the reporting and recordkeeping requirements of fuel blenders and energy recovery units in order to address a hypothetical scenario that likely would never occur.

Finally, we note that combustion of certain high HAP metal content wastes is already prohibited under RCRA rules. See 40 CFR 268.3. Such wastes remain prohibited from combustion even if they are mixed with fossil fuel so that the mixture has a higher energy content. *U.S. v. Marine Shale Processors*, 81 F. 3d 1361, 1366 (5th Cir. 1996) (an unrecyclable hazardous waste is not recycled when it is mixed with a usable non-waste and the mixture is processed). Thus, the dilution prohibition in § 268.3 serves as a further guard against the commenter's concern.

Comment: A commenter states that the thermal emissions format may be problematic because it is based on a flawed assumption that metal HAP from the cement kiln raw material and hazardous waste partition in equal proportions to the total stack gas emissions. The commenter believes that metal retention in the raw materials is higher than the hazardous waste, suggesting that thermal emission standards allow an arbitrary increase in allowable hazardous waste metals emissions. The commenter suggests that EPA require that compliance demonstrations be conducted only under conditions where the metals content in the hazardous waste is significantly higher than the metal content in the raw material to minimize this bias.

Response: The commenter has not provided any emissions data to support this claim, nor does the EPA know of data available that reaches this conclusion. We do not believe there is a significant difference in the partitioning rates of these metals in a cement kiln.¹¹⁷ Even if there is a

difference, this would not result in an arbitrary increase of allowable hazardous waste metals emissions. The thermal emission standards were calculated using thermal emissions data that are based on each source's compliance test. These tests were conducted at hazardous waste feed control levels that represented the upper bound of feed control levels these sources see on a day-to-day basis. To accomplish this, sources spiked metals into the hazardous waste prior to combusting the wastes. The amount of metals that were contained in the hazardous waste streams, after accounting for these spiked metals, far exceeded the metal levels that were contained in the raw material. Thus the differences in partitioning, if any, would likely be overshadowed by the fact that the majority of the metals were contained in the hazardous waste.

Notably, any partitioning bias that that may be present would also have been present during these compliance tests. As a result, this potential bias would be built into the emission standard and thus would not result in an arbitrary increase in allowable hazardous waste metals emissions because these sources will again demonstrate compliance under testing conditions similar to those used to generate the data used to calculate the MACT floors. We conclude that it is not necessary to provide additional prescriptive regulatory language that would require sources to demonstrate system removal efficiencies under testing conditions that exhibit a high ratio of hazardous waste metal content to raw material metal content because the regulations implicitly require sources to demonstrate hazardous waste metal feed control levels that represent the upper range of their allowable feed control levels.¹¹⁸

Comment: A commenter states that compliance with standards expressed in a thermal emissions format is problematic because the measurement of energy content of hazardous waste fuel blends is subject to significant variability due to the nature of the test. The commenter also claims that heating value measurements of waste streams

very point. See USEPA, "Comment Response Document to the Proposed HWC MACT Standards, Volume 1: MACT Standards," September 2005, Section 3.3. We have evaluated these comments and find them persuasive on this issue.

¹¹⁸ Although today's final rule allows sources to extrapolate their allowable hazardous waste feed control levels to levels that are higher than the level demonstrated in the comprehensive performance test, sources must still spike metals into the hazardous waste during the test in order to assure that the system removal efficiency used for the extrapolation procedure is reliable and accurate.

that are mixtures of solids and liquids tend to be biased high, which would inappropriately give these sources higher allowable metal emission limitation.

Response: There are standard ASTM procedures that reliably measure the energy content of the hazardous waste. Any parameter that is measured for compliance purposes is subject to method imprecision and variability. We do not believe that hazardous waste energy content measurements result in imprecision and variability above and beyond the measurement methods that are currently used to assure compliance with emission concentration-based standards.

The commenter did not provide evidence that supports the claim that energy content measurement and/or sampling methods consistently result in a positive bias. If a bias were consistently present for these types of wastes, then one would expect it to be also reflected in the measured data for which we based the emission standards, which would fully address the commenter's concern. Nonetheless, we note that all hazardous waste sampling and analysis procedures must be prescribed in each source's feedstream analysis plan, which can be reviewed by the permitting authority upon request. These feedstream analysis plans must ensure that sampling and analysis procedures are unbiased, precise, and that the results are representative of the feedstream. See § 63.1208(b)(8). More information on obtaining a representative samples can be found in EPA's SW-846 publication.¹¹⁹ These procedures involve acquiring several sub-samples that provide integration over the breadth, depth and surface area of the waste container and obtaining replicate samples (see Ch. 13.3.1 of SW-846).

Comment: A commenter states that BTU measurements can be reported as either a higher heating value or a lower heating value, and suggests that EPA require sources to use the lower heating value calculation when determining allowable hazardous waste feed control levels. The commenter seems to imply that use of higher heating values will inappropriately result in higher allowable metal feed rates for fuel blends that contain aqueous waste.

Response: The BTU data in our database that we use to calculate the emission standards reflect higher heating values. It is standard practice in the incineration/combustion industry to report the gross heat of combustion (or

¹¹⁷ We reference comments submitted by the cement kiln recycling coalition that address this

¹¹⁹ SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods."

higher heating value). We conclude that sources should use the higher heating value rather than the lower heating value for all compliance determinations because these are method-based emission standards. Fuel blends that contain aqueous wastes will not be inappropriately rewarded with higher allowable feed rates because any fuel mixture that contain aqueous mixtures will have lower reported heating values, irrespective of whether they are reported as higher heating values or lower heating values.¹²⁰

E. Standards Can Be No Less Stringent Than the Interim Standards

Comment: Several commenters oppose EPA's position in the proposed rule that the replacement standards can be promulgated at a level no less stringent than the interim standards for incinerators, cement kilns, and lightweight aggregate kilns. In instances where the calculated replacement standard is less stringent than the interim standard, the commenters oppose EPA's position of "capping" the replacement standard at the level of the interim standard to prevent backsliding from those levels. Instead, commenters recommend that EPA calculate and finalize the existing and new source floor levels without regard to the interim standards. One commenter also notes that the interim standards are simply a placeholder without the necessary statutory basis to qualify as emission limitations for purposes of establishing MACT floors. Another commenter, however, supports EPA's position to prevent backsliding to levels less stringent than the interim standards.

Response: We maintain that the replacement standards can be no less stringent than existing standards, including the interim standards under §§ 63.1203–1205, for incinerators, cement kilns, and lightweight aggregate kilns. These standards were promulgated on February 13, 2002, and sources were required to comply with them no later than September 30, 2003, unless granted a one-year extension (see § 63.1206(a)). Thus, all hazardous waste combustors are currently complying with the interim standards. The comment that the standards lack some type of requisite statutory pedigree misses the central point of our interpretation of the statute: motivation for achieving a standard (be it regulatory compulsion, statutory requirement, or

some other reason) is irrelevant in determining levels of MACT floors. *National Lime v. EPA*, 233 F. 3d at 640. What matters is the level of performance, not what motivated that level.

As a result, the replacement standards promulgated today ensure that sources will emit HAP at levels no higher than levels achieved under current regulations. We do this in this rule, when necessary, by either capping a calculated floor level by the interim standard (when both the calculated floor level and interim standard are expressed in the same format of the standard) or by adopting dual standards in cases where formats of the standard vary (so that comparison of stringency cannot be uniformly determined (as for cement kilns and lightweight aggregate kilns, as explained in the preceding section above and in the following response). In this case, the sources are subject to both the replacement and interim standards.

Comment: One commenter states that some proposed standards expressed in a thermal emissions format would allow some sources to emit semivolatile metals at levels higher than the interim standard. The commenter states that EPA reached incorrect conclusions when making relative stringency comparisons between standards expressed in a thermal emissions and mass concentrations format because, in part, EPA assumed an average F-factor (e.g., semivolatile metals for cement kilns).¹²¹ In addition, the commenter notes that the actual relationship between standards expressed in terms of thermal emissions and mass concentrations is complex and depends on a number of factors. As a result, the commenter urges EPA to adopt dual standards (*i.e.*, promulgate the MACT standard as both the standard expressed in a thermal emissions format and also the interim standard expressed in a mass concentration format) to prevent backsliding.

Response: Even though a source may operate in compliance with a standard expressed in a thermal emission format, a source may or may not also be in compliance with the corresponding mass concentration interim standard (e.g., the semi- and low volatile metal emission standards for cement and lightweight aggregate kilns of §§ 63.1204

and 63.1205, respectively). As reflected in the comment, making a judgment as to whether a replacement standard is more stringent than the interim standard for the HAP is not always a straightforward calculation. As we discussed in the proposed rule¹²² and echoed by the commenter, comparing standards in the thermal emissions format to those in a mass concentration format involves assumptions that vary on a site-specific basis and can vary over time, including the hazardous waste fuel replacement rate, contributions to emissions from nonhazardous waste inputs such as raw materials and nonhazardous waste fuels such as coal, how close to the standard a source elects to comply, the system removal efficiency demonstrated during testing, and the type and composition, including heating value, of fuels burned.

To ensure that sources operating under standards expressed in a thermal emissions format will not emit HAP metals at levels higher than currently achieved under the interim standards, we adopt a dual standard to prevent emissions increasing to levels higher than the interim standards. The dual standard structure includes both the standard expressed in a thermal emissions format and the interim standard, which is expressed in a mass concentration format. We apply this concept to several standards including semivolatile metals, low volatile metals, and mercury¹²³ for cement kilns and semivolatile metals and low volatile metals for lightweight aggregate kilns. This approach ensures that sources are not emitting HAP metals above the levels of the interim standards because we cannot reliably determine that emissions under a standard expressed in a thermal emissions format would not exceed the interim standard for all sources in the category. See §§ 63.1220(a)(2)–(a)(4), and (b)(2)–(b)(4) and 63.1221(a)(3)–(a)(4) and (b)(3)–(b)(4).

We evaluated the relative stringency of the standards expressed in the thermal emissions format compared to the interim standards for the entire source category in order to determine if the dual standard scheme could be avoided. We determined that we could not. For some HAP groups we found that many sources in the category would have the potential to exceed the interim

¹²⁰ The difference between the higher heating value and lower heating value of an aqueous waste is insignificant relative to the difference in heating value between an aqueous waste and an organic liquid waste fuel.

¹²¹ An F-factor is an estimate of the amount of combustion gas volume that is generated per fuel heat input for a given type of fuel, expressed in units, for example, cubic feet of combustion gas per million British thermal units (BTU) of fuel burned. In the proposal, EPA used F-factors to convert the emission standards expressed on a thermal basis to mass concentrations in order to make a judgment as to the relative stringency of the proposed MACT standards relative to the interim standards.

¹²² For example, see 69 FR at 21255–258, 267–271.

¹²³ Although the mercury standard promulgated for cement kilns is not expressed using a thermal emission format basis, the same concept applies because the mercury standard is a hazardous waste feed concentration standard, which is a different format than the interim standard.

standards for that HAP.¹²⁴ In this case, we considered simply “capping” the standard expressed in the thermal emission format by the interim standard (*i.e.*, the promulgated standard would only be expressed in a mass concentration format). However, we conclude that this approach would not be appropriate because the standard expressed in a thermal emission format would likely be more stringent than the mass concentration for some sources, and the statute requires that MACT floors reflect this superior level of performance.

In other cases we found that the standards expressed in the thermal emissions format would not likely exceed the interim standards by the majority of sources operating under typical conditions.¹²⁵ While our analysis (based on information in our data base) shows in these cases that the emission standard expressed in a thermal emission format would not likely result in an exceedance of the interim standard, this conclusion may not be true because the assumptions may not be valid for a particular source or site-specific factors may change in future operations. For example, HAP metal emissions could increase over time due to increases in HAP contributions from raw materials or alternative raw materials. Given this potential, we adopt dual standards for the HAP metal standards in order to ensure that standards expressed in a thermal emissions format will not exceed emission levels achieved under the interim standards.¹²⁶

Comment: Several commenters state that the interim standards do not reflect the average performance of the best sources, and so cannot be the basis for floor levels.

¹²⁴ An example for each category is semivolatile metals thermal emissions standard for existing cement and lightweight aggregate kilns. See USEPA, “Final Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards,” Section 23.1, September 2005.

¹²⁵ An example is the emission standards for low volatile metals for existing and new cement kilns and new lightweight aggregate kilns. See USEPA, “Final Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards,” Section 23.1, September 2005.

¹²⁶ In response to a comment regarding the implementation of dual standards, we note the promulgation of a new provision allowing sources to petition the Administrator to waive the HAP metal feedrate operating parameter limits for either the emissions standards expressed in a thermal emissions format (or the mercury feed concentration standard for cement kilns) or the interim standards based on documentation that the feedrate operating parameter limit is not needed to ensure compliance with the relevant standard on a continuous basis. See new § 63.1209(g)(1)(iv) and Comment Response Document, Volume I, Section 3.5.

Response: In those few situations where we have established floor levels at the level of the interim standards, we have done so as the best means of estimating performance of the best performing sources. Based on the available data to us, the average of the best performing sources exceeds the level of the interim standards in a few instances. Under these circumstances, the binding regulatory limit becomes the best means available to us to estimate performance. See *Mossville*, 370 F. 3d at 1241–42 (accepting regulatory level as a floor standard where sources’ measured performance is not a valid means of determining floor levels, and where such data contains results as high as those regulatory levels).

F. How Can EPA’s Approach to Assessing Variability and its Ranking Methodologies Be Reasonable When They Result in Standards Higher Than the Interim Standards?

A commenter argued that EPA’s floor methodologies, in particular its consideration of variability beyond that demonstrated in single test conditions, the SRE/feed and Air Pollution Control Device methodologies, must be arbitrary because in a few instances projected standards using these approaches were higher than the current interim standards, a level every source (not just the best performers) are achieving. Commenters also noted that one of the new source standards calculated under these approaches was higher than an existing source standard, another arbitrary result.

EPA believes that these seeming anomalies (which are infrequent) result from the database used to calculate performance and standards, rather than from the approaches to assessing variability or the two questioned floor methodologies. The data base is from test results which preceded EPA’s adoption of the interim standards. Thus, the level of performance required by the later rule is not necessarily reflected in pre-rule test data. In confirmation, some of the standards computed using straight emission approaches also are higher than the interim standards. Other anomalies arise simply due to scarcity of data (floor levels for certain HAP emitted by lightweight aggregate kilns especially, where there are only nine sources total). In these situations there is a greater likelihood that one or more of the best performing sources will have relatively high emissions because we are required to use data from five sources to comprise the MACT pool whenever we have data from fewer than 30 sources,

and a small amount of data can skew the result. See § 112(d)(3)(B).¹²⁷

For example, many of the calculated new source chlorine floors were slightly higher than the calculated existing source standards because we assumed all sources with measured emissions below 20 ppmv were in fact emitting at 20 ppmv (see part four, section I.C). We generally are unable to differentiate a single best performing source among these best performers because many/all of the best performing sources emissions are adjusted to the same emission level. The calculated new source floor can be slightly higher than the existing source floor because the variability factor that is applied to the single best performing source is based on only one test condition (with three emission test runs). This results in a higher level of uncertainty relative to the existing source standard, which is based on a compilation of emissions data from several sources that have essentially the same projected emissions as a result of the method bias correction factor. The variability factor that is applied to the emissions of the single best performing source is therefore higher than the variability factor for the existing source floor because there are fewer degrees of freedom in the statistical analysis.¹²⁸ Likewise, many of the calculated solid fuel boiler new source standards were slightly higher than the calculated existing source standards because, as discussed above, there are fewer degrees of freedom when assessing the variability from a single best performing source. The solid fuel boiler “anomalies” also occur using a straight emissions methodology. See USEPA, “Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards,” September, 2005, Section 19, for further discussion that summarizes and explains these so-called anomalies.

¹²⁷ See USEPA, “Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards,” September 2005, Section 19, for further discussion.

¹²⁸ For a single test condition the t factor used in variability factor calculation has n–1 degrees of freedom where n is the number of runs for that condition. For the MACT floor calculation the t factor has X–N degrees of freedom where X is the total number of runs from all sources in the MACT pool and N is the number of sources in the pool. See USEPA, “Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards,” September, 2005, Section 7.1 for more information on the floor calculation procedure.

IV. Use of Surrogates

A. Particulate Matter as Surrogate for Metal HAP

Comment: A commenter states that EPA's use of particulate matter as a surrogate for nonenumerated metals is unlawful and arbitrary and capricious because although particulate matter emissions may provide some indication of how good a source's end-of stack control of such metals is, it does not indicate what its actual metal emission levels are.¹²⁹ The commenter states that emissions of these metals can vary based on metal feed rate without having any appreciable effect on particulate matter emission levels. Thus a particulate matter standard does not necessarily ensure that metal emissions are reduced to the metal emission levels achieved by the relevant best performing sources. To support this assertion, the commenter states that EPA is on record saying "low particulate matter emissions do not necessarily guarantee low metal HAP emissions, especially in instances where the hazardous waste feeds are highly concentrated with metal HAP." 69 FR at 21221.

Response: The final rule uses a particulate matter standard as a surrogate to control: (1) Emissions of nonenumerated metals that are attributable to all feedstreams (both hazardous waste and remaining inputs); and (2) all nonmercury metal HAP emissions (both enumerated and nonenumerated metal HAP) from the nonhazardous waste process feeds at cement kilns, lightweight aggregate kilns, and liquid fuel boilers (e.g., emissions attributable to coal and raw material at a cement kiln, and emissions attributable to fuel oil for liquid fuel boilers). Incinerators, liquid and solid fuel boilers may elect to comply with an alternative to the particulate matter standard that would limit emissions of all the semivolatile metal HAPs and low volatile metal HAPs. See § 63.1219(e).

The particulate matter standard is a necessary, effective, and appropriate surrogate to control nonmercury metal HAPs. The record demonstrates overwhelmingly that when a hazardous waste combustor emits particulate matter, it also emits nonmercury HAP metals as part of that particulate matter,

and that when particulate matter is removed from emissions the nonmercury HAP metals are removed with it.¹³⁰ Nonmercury metal HAP emissions are therefore reduced whenever particulate matter emissions are reduced. The particulate matter standard thus is an effective and appropriate surrogate that assures sources are controlling these metal HAP with an appropriate back-end control technology. *National Lime v. EPA*, 233 F. 3d at 639. The nonenumerated metal HAP are no different than other semivolatile or low volatile metals in that they also will be effectively controlled with a back-end particulate matter air pollution control device.

We also considered the possibility of developing a standard for nonenumerated HAP metals instead of a PM standard (*i.e.*, regulating these metals directly, rather than through use of a surrogate). We conclude for several reasons, however, that issuing emission standards for these nonenumerated metals in lieu of a particulate matter standard would not adequately control nonmercury metal HAPs to levels achieved by the relevant best performing sources.

We generally lack sufficient compliance test emissions data for the nonenumerated metals to assess the relevant best performing sources, because, as discussed below, most of these metals were not directly regulated pursuant to RCRA air emission standards.¹³¹ Although we have more emissions data for these metals that are based on (so called) normal operations, we still lack sufficient emissions data to establish nonenumerated metal standards for all the source categories. Use of normal data may also be problematic because of the concern raised by the cement kiln and lightweight aggregate kiln stakeholders that our normal metals emissions data obtained from compliance tests are not representative of the range of actual emissions at their sources. Cement kiln and lightweight aggregate kiln stakeholders submitted long-term

hazardous waste mercury feed control data that support their assertion. Although these stakeholders did not submit long-term normal hazardous waste feed control data for the nonenumerated metals, we can still see that use of the normal nonenumerated metal snapshot emissions in our database to determine MACT floors could raise similar concerns with respect to whether the normal data in fact represents average emissions at these sources, and their level of performance.

Use of particulate matter emissions data to assess the relevant best performers for nonenumerated metal HAP is therefore more appropriate for two reasons. Compliance test data better account for emissions variability and avoid the normal emissions bias discussed above. We also have much more particulate matter emissions data from more sources, which better allows us to evaluate the true range of emissions from all the sources within the source category and to assess and identify the relevant top performing 12 percent of the sources.

It would be inappropriate to assess total stack gas emissions of nonenumerated metals for cement kiln and lightweight aggregate kilns when determining the relevant best performers because these emissions would, in part, reflect the metal feed levels in these sources' nonhazardous waste process feedstreams. This is not appropriate because nonhazardous process feedstream control is not a feasible means of control. See part four, section III.B.1. A potential solution to this problem would be to identify the relevant best performers by assessing each source's hazardous waste thermal emissions for these nonenumerated metals (given that hazardous waste thermal emissions exclude by definition emissions attributable to inputs other than hazardous waste, *i.e.* raw materials and fossil fuels). This, however, would be problematic because, aside from the data limitation issues, the majority of the nonenumerated metals data reflect normal emissions which often do not contain the highest feed rates used by the source. As a result, we cannot assess performance on a thermal emissions basis because of the uncertainty associated with system removal efficiencies at such low metal feedrates. Furthermore, even if we could issue hazardous waste thermal emissions standards for these metals, a particulate matter emission standard would still be necessary to control nonmercury metal HAP emissions from the nonhazardous waste process feedstreams.

¹²⁹ "Enumerated" metals are those HAP metals directly controlled with an emission limit, *i.e.*, lead, cadmium, chromium, arsenic and beryllium. The remaining nonmercury metal HAP (*i.e.*, antimony, cobalt, manganese, nickel, and selenium) are called "nonenumerated" metal HAP (note that arsenic and beryllium are nonenumerated metals for liquid fuel boilers because the low volatile metal emission standard applies only to chrome).

¹³⁰ This statement is equally true for any emitting source, not just hazardous waste combustors. It is well established that semivolatile and low volatile metals exist in solid particulate form at typical air pollution control device operating temperatures. This is supported by (1) known operating temperature ranges of air pollution control devices used by hazardous waste combustors; (2) known metal volatility equilibrium relationships; and (3) extensive technical literature. See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 3.1.

¹³¹ At best, we may have enough compliance test data for antimony and selenium to adequately assess relevant best performers for only incinerators and lightweight aggregate kilns.

Emission standards for these nonenumerated metals could require sources to implement hazardous waste feed control (for these metals) to comply with the standard.¹³² We are less assured that these sources were implementing hazardous waste feed control for these nonenumerated metals at the time they conducted the emissions tests (which serve as the basis for floor calculations) because most of these metals were never directly regulated pursuant to the RCRA emission standards.¹³³ This means that sources tended to optimize (or at least concentrate their efforts on) control of the metals that are regulated. Although these metals were being controlled with each source's back-end control device, sources may not have been controlling these metal feedrates because they probably were not subject to specific feedrate limitations (feed control of the enumerated metal HAP does not ensure feed control of these nonenumerated metal HAP). Furthermore, simultaneous feed control of all these metals, when combined with enumerated semivolatile and low volatile metals, may not be possible because the best performing sources for all these metals may collectively represent a hazardous waste feedstream that does not exist in practice (from a combined metal concentration perspective) because there likely would be different best performers for each of the metal HAP or metal HAP groups.¹³⁴ We thus conclude that back-end control as measured and assessed by each source's particulate matter emissions is the appropriate floor technology to assess when identifying

¹³² Sources that otherwise would be equipped with what is considered to be a MACT back-end control devices (*i.e.*, a control device achieving the final rule particulate matter standard) may not be able to achieve these metal emissions standards due to varying metal feed levels (both within sources and across sources). Such an outcome may require a source to limit the amount of metal that is fed into the combustion unit to achieve the standard.

¹³³ Antimony is the only nonenumerated metal that is directly regulated pursuant to the boilers and industrial furnace regulations. See § 266.106.

¹³⁴ We generally cannot combine these nonenumerated metals into the associated semivolatile or low volatile metal volatility groupings promulgated in this final rule for purposes of establishing "grouped" emission standards because we cannot mix compliance test data with normal emissions data when calculating floors (the majority of the standards included in this final rule are based on compliance test data, and the majority of the data we have for nonenumerated metals being normal). Furthermore, if we were to separately group the normal nonenumerated metal emission data into their associated semivolatile or low volatile metal group, we may encounter data limitation issues because each source would need to have measured each of the nonenumerated metals in that associated metal volatility group in order for us to conclude that the emission data adequately represents the sources combined emissions of semivolatile or low volatile metals.

the relevant best performers for nonenumerated HAP metals and estimating these sources' level of performance.

Comment: A commenter states that EPA's rationale for use of particulate matter as a surrogate for nonenumerated metals is flawed because EPA has provided no data in the proposal to justify its hypothesis that particulate matter is an appropriate surrogate for non-enumerated metal HAP. The commenter also states that the proposed emission standards for particulate matter for existing sources discriminate against boilers and process heaters that burn clean (*i.e.*, little or very low concentrations of HAP metals) hazardous waste fuels. The commenter suggests that if there are sufficient data, EPA should consider developing an alternative emission standard for total HAP metals for new and existing liquid fuel boilers, as was done for the Subpart DDDDD National Emission Standards for Hazardous Air Pollutants for Industrial/Commercial/Institutional Boilers and Process Heaters.

Response: As previously discussed in this section, particulate matter reflects emissions of nonmercury metal HAPs because these compounds comprise a percentage of the particulate matter (provided these metals are fed into the combustion unit). The technologies that have been developed and implemented to control particulate matter also control nonmercury metal HAP. Since nonmercury metal HAP is a component of particulate matter, we can use particulate matter as a surrogate for these metals. Further justification for the use of particulate matter as a surrogate to control metal HAP is included in the technical support document.¹³⁵

We conclude that we do not have enough nonenumerated metal emissions data to calculate alternative total metal emission floors for liquid fuel boilers. The most problematic of these metals are manganese and cobalt, where we have emission data from only three sources. We have much more compliance test particulate matter emissions data from liquid fuel boilers, and thus conclude that the particulate matter standard best reflects the emission levels achieved by the relevant best performers.

Similar to the above discussion, calculating an alternative total metal emissions floor raises questions regarding the method used to calculate such floors. Hazardous waste combustor

metal emissions have traditionally been regulated in volatility groupings because the volatility of the metal affects the efficiency of back-end control (*i.e.*, semivolatile metals are more difficult to control than low volatile metals because they volatilize in the combustor and then condense as small particulates prior to or in the emission control device). When identifying the best performing sources, we previously have, in general, only evaluated sources that have metal emissions information for every metal in the volatility grouping. This approach could prove to be problematic since it is not likely many sources will have emissions data for all the metals.

Although we could not calculate alternative total metal emission floor standards based on the available emissions data we have, we agree with the commenters' view that sources that burn hazardous waste fuels with low levels of nonenumerated metals should be allowed to comply with a metals standard rather than the particulate matter standard. We proposed an alternative to the particulate matter standard (see 69 FR at 21331) for incinerators, liquid, and solid fuel boilers that was a simplified version of the alternative particulate matter standard that is currently in effect for incinerators pursuant to the interim standards (see § 63.1206(b)(14)). We received no adverse comment and are promulgating this alternative as proposed. The alternative metal standards apply to both enumerated and nonenumerated metal HAP, excluding mercury. For purposes of these alternative requirements, each nonenumerated metal is classified as either a semivolatile or a low volatile metal and subsequently grouped with the associated semivolatile and low volatile enumerated metals. The semivolatile and low volatile metals standards under this alternative are the same as those that apply to other liquid fuel boilers, but the standard would apply to all metal HAP, not just those enumerated in the generic low volatile metal and semivolatile metal standards. See §§ 63.1216(e), 63.1217(e) and 63.1219(e).

B. Carbon Monoxide/Hydrocarbons and DRE as Surrogates for Dioxin/Furan

Comment: One commenter states that the dioxin/furan floors for new and existing solid fuel boilers is unlawful and arbitrary and capricious. EPA established the floor for dioxin/furan for these sources as compliance with the carbon monoxide or hydrocarbon standard and the destruction and removal efficiency (DRE) standard. The

¹³⁵ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 3.1.

commenter states that EPA has not shown that carbon monoxide or hydrocarbon emissions correlate to dioxin/furan emissions, and, accordingly, has not shown that the carbon monoxide or hydrocarbon standard, together with the DRE standard, are valid surrogates.

This commenter also states that it is inappropriate for EPA to use carbon monoxide or hydrocarbons and DRE as surrogates to establish dioxin/furan floors for liquid fuel boilers with wet or no air pollution control devices and for hydrochloric acid production furnaces. The commenter believes EPA inappropriately justifies these surrogates by claiming that a numerical dioxin/furan floor would not be replicable by the best sources or duplicable by the others. The commenter states that EPA has no discretion to avoid setting floors for a HAP just because it believes that HAP is not controlled with a technology. Rather, EPA must set floors reflecting the relevant best sources' actual performance. Such floors necessarily will be duplicable by the relevant best sources themselves. That they cannot be replicated by other sources is irrelevant according to the commenter.

In addition, the commenter states that EPA does not claim or demonstrate that the carbon monoxide and hydrocarbon floors for solid fuel boilers reflect the average emission levels achieved by the relevant best sources.

Finally, the commenter also notes that EPA appears to argue that its carbon monoxide or hydrocarbon standard and DRE standard could be viewed as work practice standards under section 112(h) which allows EPA to establish work practice standards in lieu of emission standards only if it is not be feasible to set the former. Because EPA has made no such demonstration, setting work practice standards to control dioxin/furan emissions from boilers would be unlawful according to the commenter.

Response: The commenter raises four issues: (1) Are the carbon monoxide/hydrocarbon standard and the DRE standard adequate surrogate floors to control dioxin/furan; (2) floors for existing sources must be established as the average emission limitation achieved by the best performing sources irrespective of whether the limitation is duplicable by the best performing sources or replicable by other sources; (3) EPA has not explained how the carbon monoxide and hydrocarbon floors reflect the average emission limitation achieved by the relevant best sources; and (4) EPA cannot establish work practice standards for dioxin/furan under section 112(h) because it has not

demonstrated that setting an emission standard is infeasible under section 112(h)(1).

Carbon Monoxide and Hydrocarbons Are Adequate Surrogates to Control Dioxin/Furan when Other Controls Are Not Effective or Achievable. Carbon monoxide and hydrocarbons (coupled with the DRE standard) are the best available surrogates to control dioxin/furan emissions when a numerical floor would not be achievable and when other indirect controls, such as control of the gas temperature at the inlet of a dry particulate matter control device to 400F, are not applicable or effective.¹³⁶

As we explained at proposal, operating under good combustion conditions to minimize emissions of organic compounds such as polychlorinated biphenyls, benzene, and phenol that can be precursors to dioxin/furan formation is an important requisite to control dioxin/furan emissions.¹³⁷ See 69 FR at 21274. Minimizing dioxin/furan precursors by operating under good combustion practices plays a part in controlling dioxin/furan emissions, and that role is substantially enhanced when there are no other dominant factors that relate to dioxin/furan formation and emission (e.g., operating a dry particulate matter control device at temperatures above 400F).

Carbon monoxide and hydrocarbons are widely accepted indicators of combustion conditions. The current RCRA regulations for boilers and hydrochloric acid production furnaces use emissions limits on carbon monoxide and hydrocarbons to control emissions of toxic organic compounds. See 56 FR 7150 (February 21, 1991) documenting the relationship between carbon monoxide, combustion efficiency, and emissions of organic compounds. In addition, carbon monoxide and hydrocarbons are used by many CAA standards for combustion sources to control emissions of organic HAP, including: MACT standards for hazardous waste burning incinerators, hazardous waste burning cement kilns, hazardous waste burning lightweight

aggregate kilns, Portland cement plants, and industrial boilers; and section 129 standards for commercial and industrial waste incinerators, municipal waste combustors, and medical waste incinerators. Finally, hydrocarbon emissions are an indicator of organic hazardous air pollutants because hydrocarbons are a direct measure of organic compounds.

Commenters on our proposed MACT standards for hazardous waste incinerators, cement kilns, and lightweight aggregate kilns stated that EPA's own surrogate evaluation¹³⁸ did not demonstrate a relationship between carbon monoxide or hydrocarbons and organic HAP at the carbon monoxide and hydrocarbon levels evaluated. See 64 FR at 52847 (September 30, 1999). Several commenters on that proposed rule noted that this should not have been a surprise given that the carbon monoxide and hydrocarbon emissions data evaluated were generally from hazardous waste combustors operating under good combustion conditions (and thus, relatively low carbon monoxide and hydrocarbon levels). Under these conditions, emissions of HAP were generally low, which made the demonstration of a relationship more difficult. These commenters noted that there may be a correlation between carbon monoxide and hydrocarbons and organic HAP, but it would be evident primarily when actual carbon monoxide and hydrocarbon levels are higher than the regulatory levels. We agreed with those commenters, and concluded that carbon monoxide and hydrocarbon levels higher than those we established as emission standards for hazardous waste burning incinerators, cement kilns, and lightweight aggregate kilns are indicative of poor combustion conditions and the potential for increased emissions organic HAP. We continue to believe that carbon monoxide and hydrocarbons are adequate surrogates for organic HAP which may be precursors for dioxin/furan formation and note that the commenter did not explain why our technical analysis is problematic.

Emissions that Are Not Replicable or Duplicable Are Not Being "Achieved". The commenter believes that floors must be established as the average emission limitation of the best performing sources irrespective of whether they are replicable by the best performing sources or duplicable by other sources. To the contrary, emission

¹³⁶ As discussed in Part Two, Section V, we view the carbon monoxide, hydrocarbon, and destruction removal efficiency standards as unaffected by the Court's vacature of the September 1999 challenged regulations for incinerators, cement kilns, and lightweight aggregate kilns. We are therefore not re-promulgating and reopening consideration of these standards in today's final rule for these source categories.

¹³⁷ Operating under good combustion conditions also helps minimize soot formation on boiler tubes. Research has shown that operating under conditions that can form soot followed by operating under good combustion conditions can lead to dioxin/furan formation. See Section 2.4 of Volume III of the Technical Support Document.

¹³⁸ See Energy and Environmental Research Corporation, "Surrogate Evaluation of Thermal Treatment Systems," Draft Report, October 17, 1994.

levels that are not replicable by the best performing sources are not being “achieved” by those sources and cannot be used to establish the floor.

For solid fuel boilers, we explained at proposal why dioxin/furan emissions are not replicable by the best performing sources (or duplicable by other sources): there is no dominant, controllable means that sources are using that can control dioxin/furan emissions to a particular level. See 69 FR at 21274–75. We explained that data and information lead us to conclude that rapid quench of post-combustion gas temperatures to below 400 °F—the control technique that is the basis for the MACT standards for dioxin/furan for hazardous waste burning incinerators, and cement and lightweight aggregate kilns—is not the dominant dioxin/furan control mechanism for coal-fired boilers. We believe that sulfur contributed by the coal fuel is a dominant control mechanism by inhibiting formation of dioxin/furan. Nonetheless, we do not know what minimum level of sulfur provides significant control. Moreover, sulfur in coal causes emissions of sulfur oxides, a criteria pollutant, and particulate sulfates. For this reason, as well as reasons stated at 69 FR 21275, we are not specifying a level of sulfur in coal for these sources as a means of dioxin/furan control.

The same rationale applies to liquid fuel boilers with no air pollution controls or wet air pollution control systems and to hydrochloric acid production furnaces—there is no dominant, controllable means that sources are using that can control dioxin/furan emissions to a particular emission level.¹³⁹ Thus, best performer dioxin/furan emissions are not replicable by the best performing sources (or duplicable by other sources). For these sources, the predominant dioxin/furan formation mechanism for other source categories—operating a fabric filter or electrostatic precipitator above 400F—is not a factor.

Given that these sources are not using controllable means to control dioxin/furan to a particular emission level, there is no assurance that the best performers can achieve in the future the emission level reported in the compliance test in our data base. Put another way, the test data do not reflect these sources’ variability, and the variability is largely unquantifiable given the uncertainties regarding control mechanisms plus the environmental

counter-productiveness of encouraging use of higher sulfur coal. Hence, that reported emission level is not being “achieved” for the purpose of establishing a floor.

Finally, we note that beyond-the-floor controls such as activated carbon can control dioxin/furan to a particular emission level. If a source were to install activated carbon, it could achieve the level demonstrated in a compliance test, after adjusting the level to account for emissions variability to ensure the measurement was replicable. The commenter argues that such a result is mandatory under the straight emissions approach (the only way the commenter believes best performers can be determined). Doing so, however, would amount to a surreptitious beyond-the-floor standard (forcing adoption of a control technology not used by any existing source), without considering the beyond-the-floor factors set out in section 112(d)(2). In fact, we considered beyond-the-floor standards based on use of activated carbon for these sources—solid fuel boilers, liquid fuel boilers with wet or no emission control device, and hydrochloric acid production furnaces—but rejected them for reasons of cost. The cost-effectiveness ranged from \$2.5 million to \$4.9 million per gram TEQ of dioxin/furan removed. In contrast, the cost-effectiveness of the beyond-the-floor standard we promulgate for liquid fuel boilers equipped with dry emission control devices is \$0.63 million per gram TEQ of dioxin/furan removed.¹⁴⁰

Consequently, we are not promulgating a beyond-the-floor standard for dioxin/furan for these sources, and do not believe we should adopt such a standard under the guise of determining floor levels.

The Carbon Monoxide and Hydrocarbon Floors Are Appropriate MACT Floors. We explained at proposal why the carbon monoxide standard of 100 ppmv and the hydrocarbon standard of 10 ppmv are appropriate floors. See 69 FR at 21282. The floor level for carbon monoxide of 100 ppmv is a currently enforceable Federal standard. Although some sources are achieving carbon monoxide levels below 100 ppmv, it is not appropriate to establish a lower floor level because carbon monoxide is a conservative surrogate for organic HAP. Organic HAP emissions may or may not be substantial at carbon monoxide levels greater than 100 ppmv, and are extremely low when

sources operate under the good combustion conditions required to achieve carbon monoxide levels in the range of zero to 100 ppmv.¹⁴¹ (See also the discussion below regarding the progression of hydrocarbon oxidation to carbon dioxide and water). As such, lowering the carbon monoxide floor below 100 ppmv may not provide significant reductions in organic HAP emissions. Moreover, it would be inappropriate to establish the floor blindly using a mathematical approach—the average emissions for the best performing sources—because the best performing sources may not be able to replicate their emission levels (and other sources may not be able to duplicate those emission levels) using the exact types of good combustion practices they used during the compliance test documented in our data base. This is because there are myriad factors that affect combustion efficiency and, subsequently, carbon monoxide emissions. Extremely low carbon monoxide emissions cannot be assured by controlling only one or two operating parameters.

We proposed a floor level for hydrocarbons of 10 ppmv even though the currently enforceable standard for boilers and hydrochloric acid production furnaces is 20 ppmv because: (1) Although very few sources elect to comply with the RCRA standard for hydrocarbons rather than the standard for carbon monoxide, those that comply with the hydrocarbon standard have hydrocarbon levels well below 10 ppmv; and (2) reducing hydrocarbon emissions within the range of 20 ppmv to 10 ppmv may reduce emissions of organic HAP.

Although all sources are likely to be achieving hydrocarbon levels below 10 ppmv, it is not appropriate to establish a lower floor level because hydrocarbons are a surrogate for organic HAP. Although total hydrocarbons would be reduced at a floor level below 10 ppmv, we do not know whether

¹⁴¹ We note, however, that this general principle may not always apply. There are data that indicate that even though carbon monoxide levels are below 100 ppmv, hydrocarbon levels may not always be below 10 ppmv. See 64 FR at 52851 and Part Four, Section IV B. and C. of this preamble. An example of how this might occur, although not a likely practical scenario, is if combustion is quenched before substantial carbon monoxide can be generated, leaving unburned hydrocarbons in the stack gas. Because of this potential (although unlikely) concern, the rule requires sources that elect to monitor carbon monoxide rather than hydrocarbons to conduct a one-time test to document that hydrocarbons are below 10 ppmv and to establish operating limits on parameters that affect combustion conditions (i.e., the same operating parameters that we use for compliance assurance with the DRE standard). See § 63.1206(b)(6).

¹³⁹ We note that the same rationale also applies to incinerators with wet or no air pollution control equipment and that are not equipped with a waste heat boiler.

¹⁴⁰ See USEPA, “Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards,” September 2005, Sections 12, 13, and 15.

organic HAP would be reduced substantially. As combustion conditions improve and hydrocarbon levels decrease, the larger and easier to combust compounds are oxidized to form smaller compounds that are, in turn, oxidized to form carbon monoxide and water. As combustion continues, carbon monoxide is then oxidized to form carbon dioxide and water. Because carbon monoxide is a difficult-to-destroy refractory compound (*i.e.*, oxidation of carbon monoxide to carbon dioxide is the slowest and last step in the oxidation of hydrocarbons), it is a conservative surrogate for destruction of hydrocarbons, including organic HAP, as discussed above. As oxidation progresses and hydrocarbon levels decrease, the larger, heavier compounds are destroyed to form smaller, lighter compounds until ideally all hydrocarbons are oxidized to carbon monoxide (and then carbon dioxide) and water. Consequently, the relationship between total hydrocarbons and organic HAP becomes weaker as total hydrocarbon levels decrease to form compounds that are not organic HAP, such as methane and acetylene.¹⁴²

Moreover, as discussed above for carbon monoxide, it would be inappropriate to establish the floor blindly using a mathematical approach—the average emissions for the best performing sources—because the best performing sources may not be able to replicate their emission levels (and other sources may not be able to duplicate those emission levels) using the exact types of good combustion practices they used during the compliance test documented in our data base. This is because there are myriad factors that affect combustion efficiency and, subsequently, hydrocarbon (and carbon monoxide) emissions. Extremely low hydrocarbon emissions cannot be assured by controlling only one or two operating parameters.

The Standards for CO and HC Are Not Work Practice Standards. The floor standards for CO or HC for boilers and hydrochloric acid production furnaces are quantified emission limits. The standards consequently are not work practice standards (even though they represent levels showing good combustion control). CAA section 302(k). EPA's reference to section 112(h)(1) at proposal (69 FR at 21275) was consequently erroneous.

¹⁴² USEPA, Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies, July 1999, Section 12.1.2.

*C. Use of Carbon Monoxide and Total Hydrocarbons as Surrogate for Non-Dioxin Organic HAP*¹⁴³

Comment: A commenter states that neither the total hydrocarbon nor carbon monoxide standard alone provides adequate surrogate control for organic HAP. Accordingly, EPA must include standards for both. Hazardous waste combustors could have total hydrocarbon levels below the standard during the carbon monoxide compliance tests, but higher total hydrocarbon levels at other times during normal operation because there are many variables that can affect total hydrocarbon emissions, and these will not all be represented during the carbon monoxide compliance test. The commenter states that EPA is on record stating that carbon monoxide limits alone may not by itself minimize organic emissions because products of incomplete combustion can result from small pockets within the combustion zone where adequate time, temperature, turbulence and oxygen have not been provided to completely oxidize these organics. The commenter also states that EPA is on record stating that total hydrocarbon levels can exceed good combustion condition levels when carbon monoxide levels are below 100 ppmv.

Response: The final rule requires compliance with destruction and removal efficiency and carbon monoxide or hydrocarbon standards as surrogates to control non-dioxin organic HAP emissions¹⁴⁴ from liquid fuel boilers, solid fuel boilers, and hydrochloric acid production furnaces. These are effective and reliable surrogates to control organic HAP. We conclude that simultaneous measurement of both total hydrocarbons and carbon monoxide with continuous emission monitors is not necessary because each serves as a reliable surrogate to control organic HAP emissions. The commenter has cited EPA preamble language that was included in the April 19, 1996 proposed rule for hazardous waste incinerators, cement kilns, and lightweight aggregate

¹⁴³ As discussed in part two, section V, we view carbon monoxide, hydrocarbon, and destruction removal efficiency standards as unaffected by the Court's vacature of the September 1999 challenged regulations for incinerators, cement kilns, and lightweight aggregate kilns. We are therefore not repromulgating and did not reconsider these standards in today's final rule for these source categories.

¹⁴⁴ As discussed in the previous section, these standards are also used as surrogates to control dioxin/furans for hydrochloric acid production furnaces, solid fuel-fired boilers, and liquid fuel-fired boilers that are not equipped with dry air pollution control devices.

kilns. In that rule we proposed to require compliance with both the total hydrocarbon standard and the carbon monoxide standard. We requested comment on whether these requirements were redundant, and we later requested comment on whether we should allow sources to comply with either the carbon monoxide standard or the total hydrocarbon standard. We clarified, however, that allowing sources to comply with the carbon monoxide standard would be contingent on the source demonstrating compliance with the hydrocarbon standard during the compliance test. We believed this was necessary because we had limited data that showed a source could have total hydrocarbon levels exceeding 10 ppmv even though their carbon monoxide emission levels were below 100 ppmv. EPA subsequently promulgated this approach in the September 1999 Final Rule. 62 FR 52829.

Today's rule adopts the same approach for liquid and solid fuel boilers and hydrochloric acid production furnaces. We again conclude that it is not necessary to require sources to verify compliance with both of these standards on a continuous basis with two separate continuous emission monitors, given the redundancy of these measurement techniques. Total hydrocarbon emission measurements are a more direct indicator of organic HAP emissions than carbon monoxide. Hence, continuous compliance with this standard always assures that organic HAP are well controlled. Carbon monoxide is a conservative indicator of combustion efficiency because it is a product of incomplete combustion and because it is a refractory compound that is more thermally stable than hydrocarbons. The hydrocarbon products of incomplete combustion that are simultaneously formed during incomplete, or inefficient, combustion conditions can be subsequently oxidized later in the combustion process. In such instances carbon monoxide will likely still be prevalent in the exhaust gas even though the products of incomplete combustion were later oxidized. The conservative nature of carbon monoxide as an indicator of good combustion practices is supported by our data. At carbon monoxide levels less than 100 ppmv, our data indicates that there is no apparent relationship between carbon monoxide and hydrocarbons (other than that hydrocarbon levels are generally below 10 ppm when carbon monoxide levels are below 100 ppm). For example, a source with a carbon monoxide level of 1 ppm is no more likely to have lower

measured hydrocarbons than a source achieving a carbon monoxide emission level of 100 ppm.¹⁴⁵

We consider the few instances where the data showed total hydrocarbon levels above 10 ppmv while carbon monoxide levels are below 100 ppmv to be anomalies. Even so, we have accounted for this by requiring compliance with the hydrocarbon standard during the compliance test if a source elects to comply with the carbon monoxide standard. See §§ 63.1216(a)(5)(i), 1217(a)(5)(i), and 1218(a)(5)(i).

We disagree with the commenter's assertion that the total hydrocarbon compliance demonstration during the compliance test is insufficient. Sources are required to establish numerous operating requirements based on operating levels that were demonstrated during the test, including minimum operating temperature, maximum feed rates, minimum combustion zone residence time, and operating requirements on the hazardous waste firing system that control liquid waste atomization efficiency. Sources must comply with these operating requirements on a continuous basis. Compliance with these requirements, in addition to the requirements to comply with the carbon monoxide and destruction and removal standards, adequately assure sources are controlling organic HAP emissions to MACT levels.

Comment: A commenter states that EPA's proposed use of surrogates for organic HAP do not ensure that each of the organic HAP (e.g., polychlorinated biphenyls and polyaromatic hydrocarbons) are reduced to the level of the HAP emitted by the relevant best performing sources. EPA has not shown the necessary correlation between either the total hydrocarbon or carbon monoxide standards and organic HAP, and neither is a reasonable surrogate according to the commenter.

Response: Carbon monoxide and total hydrocarbon monitoring are widely used and accepted indicators of combustion efficiency, and hence control organic HAP, which are destroyed by combustion.¹⁴⁶ Sources

that are achieving carbon monoxide of emission levels of 100 ppm or a hydrocarbon emission levels of 10 ppm are known to be operating pursuant to good combustion practices. This is supported by an extensive data analysis we used to support identical standards for incinerators, cement kilns, and lightweight kilns which were promulgated in the September 1999 Final Rule. We are applying the same rationale to support these standards for boilers and hydrochloric acid production furnaces.

Today's rule requires continuous compliance with either a carbon monoxide and hydrocarbon standard, in combination with a destruction and removal efficiency standard, as surrogates to control organic HAP. We conclude that sources which comply with these standards are operating under efficient combustion conditions, assuring non-dioxin organic HAP are being oxidized, thus limiting emissions to levels reflecting MACT. Efficient combustion of hazardous waste minimizes emissions of organic HAP that are fed to the combustion chamber as well as emissions attributable to products of incomplete combustion that may form within the combustion chamber or post combustion. We are not capable of issuing emission standards for each organic HAP because of data limitations and because such emission standards may not be replicable by individual sources or duplicable by the other best performing sources because of the complex nature of combustion and post combustion formation of products of incomplete combustion.

V. Additional Issues Relating to Variability and Statistics

Many commenters raised issues relating to emissions variability and statistics other than those discussed above in Section III.A: (1) Variability dampening for data sets containing nondetects; (2) imputation of variability to address variability dampening for data sets containing nondetects; and (3) our analysis of variance procedures to identify subcategories. We present comments and responses on the remaining topics below.

A. Data Sets Containing Nondetects

Comment: One commenter states that EPA's approach of assuming measurements that are below detection limits are present at the detection limit dampens the variability of the data set. Thus, the variability of ranking parameters is understated when ranking

sources to identify the best performers and emissions variability is understated when calculating the floor.

Response: We agree with the commenter. For the final rule, we use an approach to address nondetects whereby a value is assigned to each nondetect within its possible range such that the 99th percentile upper prediction limit for the data set (i.e., test condition runs for each source) is maximized. Although this approach maximizes the deviation among runs containing nondetect measurements, the test condition average is lower because we no longer assume the nondetect analyte is present at the level of detection. See response to comments discussion below for more information on this statistical approach to address variability of nondetects.

We use this measurement imputation approach to address variability of feedrate data sets containing nondetects for source ranking purposes and to address variability of emissions data sets containing nondetects when calculating floors. We do not apply the measurement implementation approach to system removal efficiency (SRE) data sets where feedrates or emissions contain nondetects, however. Statistical imputation of nondetect SREs is complicated given that SRE is derived from feedrate and emissions data, both of which could contain nondetect measurements.¹⁴⁷ Our inability to apply the imputation approach to SREs is not a major concern, however, because system removal efficiency is used as a source ranking criterion only (i.e., it is not used as the standard, except for hydrochloric acid production furnaces where there are no nondetect feedrate or emissions measurements), and there are few instances where system removal efficiencies are derived from nondetect feedrate or emissions data.

B. Using Statistical Imputation To Address Variability of Nondetect Values

On February 4, 2005, EPA distributed by email to major commenters on the proposed rule a direct request for comments on a limited number of issues that were raised by the public comments on the proposed rule. The nondetect measurement imputation approach discussed above was one of the issues for which we requested comment. We discuss below the major comments on the approach.

Comment: Most commenters state that they agree with either the concept or the approach in principle but cannot

¹⁴⁵ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 3.2 and USEPA, "Final Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies," July 1999, Section 5.1.

¹⁴⁶ This is why almost all of the RCRA Land Disposal Restriction treatment standards for organic waste, which standards are for the most part established at an analytic detection level for the organic HAP in question plus a variability factor,

are based on the performance of combustion technology. See 40 CFR Part 268.40-43.

¹⁴⁷ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005 Section 7.3.

provide substantive comments. These commenters indicate they cannot provide substantive comments because they cannot determine the implications of using the approach given that we did not provide the resulting floor calculations. One commenter suggests that, before blindly applying this arbitrary estimate of a nondetect value, a reality check should be done to validate that this is reasonable by consulting what is published on the method variability, as well as by checking variability factors derived for other data in the database that are above the detection limit.

Another commenter voiced significant concerns with the approach. The commenter states that EPA contradicts its assumption at proposal that all data that are reported as nondetect are present at the detection limits by now admitting that the true value is between zero and the level of detection. The commenter concludes that EPA now proposes to retreat from its assumption that undetected pollutants are always present at the detection limits not because that assumption is false but because it does not generate sufficiently lenient floors. The commenter believes that this underscores that EPA's statistical analysis approach cannot possibly give an accurate picture of any source's actual emission levels. Accordingly, it cannot possibly satisfy EPA's obligation to ensure that its floors reflect the average emission levels achieved by the relevant best performing sources.

The commenter also states that EPA's imputation approach is independently flawed because it assumes—again inaccurately—that the value for a nondetect is always either the highest value or lowest value in the allowable range. In reality the undetected values will necessarily fall in a range between the highest and lowest, and thus yield less variability than EPA would assume.

Response: We agree in theory with the commenter who suggests that the results of the imputation approach should be checked to see if it overstates variability for nondetect data by comparing the results of the imputation approach with the actual variability for detected measurements in the data set. We considered comparing the relative standard deviation derived from the imputation approach for data sets with nondetects, to the relative standard deviation for the data set using a regression analysis. Under the regression analysis approach, we considered relating the relative standard deviation of detected data sets to the average measurement. We would determine this relationship for each

standard for which we have nondetect data, and use the relationship to impute the standard deviation for a data set containing nondetects.¹⁴⁸

We could not perform this analysis, however, because: (1) We have very few detected measurements for the data sets for several standards and could not establish the relationship between relative standard deviation and emission concentration for those data sets; and (2) moreover, for many data sets where detected measurements would have been adequate to establish the relationship, it would have been problematic statistically to extrapolate the relationship to the very low values assigned to the nondetect measurements (e.g., 100% of the detection limit; the value assigned by our statistical imputation approach).¹⁴⁹

This commenter also suggests that we check the resultant standard deviation after imputation by consulting what is published on the method variability. The commenter did not explain, however, how method variability relates to the variability of nondetect data.

Moreover, we believe that the imputation approach is one approach we could have reasonably used to estimate variability of nondetect data. We first attempted to apply standard statistical techniques to address the nondetect issue. We investigated standard interval censoring techniques to calculate maximum likelihood estimates (MLE) of the average and standard deviation that provide the best fit for a normal distribution for the data containing nondetect values, taking into account that each nondetect data point can be anywhere within its allowable interval. These techniques are not applicable, however, to data sets where all data are nondetects, as is the case for many of our data sets. In that situation, we approximated the mean as the average of the midpoints of the nondetect intervals, and the standard deviation as one half of the possible range of the data.

After working with this MLE/Approximation approach for some time and iteratively developing complicated algorithms to address problems as they arose, we concluded that we needed a simpler approach that could be applied to all data sets. Accordingly, we

¹⁴⁸Note that, under this approach, we would continue to assume that the nondetect analyte is present at the detection limit.

¹⁴⁹Note that this was not the case where we use a regression analysis of relative standard deviation versus total chlorine measurements to impute a standard deviation for values below 20 ppmv that we corrected to 20 ppmv to address the low bias of Method 0050. In that situation, we have several total chlorine measurements very close to 20 ppmv.

developed the statistical imputation approach discussed in Section IV.A above.

For 22 separate floors, we compared the results of the approaches we considered for nondetects: (1) Nondetects present at the detection limit (i.e., full detection limit approach); (2) MLE; (3) MLE combined with an approximation approach (i.e., MLE/Approximation approach; and (4) statistical imputation.¹⁵⁰ The MLE approach was only applicable to 2 of the 22 floor data sets, and the numerical algorithm failed to converge on an answer for one of those. The MLE/Approximation approach sometimes results in floors that are unrealistically high (i.e., it calculated 5 of 22 floors that were higher than the statistical imputation approach, which always produces floors that are equal to or higher than assuming nondetects are present at the full detection limit), and sometimes fails to converge on an answer. Because of these limitations, we do not use either the MLE or MLE/Approximation approach.

We believe the statistical imputation approach is preferable to the full detection limit approach because it: (1) Accounts for variability of data sets containing nondetects; (2) can be applied to all data sets containing nondetects; and (3) results in reasonable floor levels. In most cases, floors calculated using statistical imputation are close to those calculated by the full detection limit approach. The statistical imputation approach can produce substantially higher floors than the full detection limit approach, however, when a relatively high nondetect is reported because of a high detection limit. Nonetheless, the statistical imputation approach calculated floors that were 30% higher than the full detection limit approach for only 2 of the 22 floors.

We reject the comment that our approach to handling nondetect data is a mere manipulation to raise the floor. The commenter observes that EPA appears to determine that its initial approach of assuming the worst-case for nondetect data—that the data are present at the detection limit—did not produce floors that were high enough, and consequently applies another manipulation—statistical imputation of nondetect measurements—that assumes the nondetect data are present at lower levels but nonetheless generates floors that are even higher than before. Although the commenter is correct

¹⁵⁰See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 5.4.

about the outcome of our handling of nondetect data—the floors are generally higher after statistically imputing nondetect measurements than if nondetects are simply assumed to be present at the detection limit—our rationale for handling nondetects is sound. At proposal, we assumed that nondetects are present at the detection limit. We do not know (nor does anyone else) whether a nondetect value is actually present at 1% or 99% of the detection limit. We thought that assuming that all values were at the limit of detection would reasonably estimate the range of performance a source could experience for these nondetect measurements. This approach inherently maximizes the average emissions but minimizes emissions variability.

Commenters on the proposed rule state that assuming nondetects are present at the detection limit dampens emissions variability—a consideration necessary to ensure that a source's performance over time is estimated reasonably. *Mossville*, 370 F. 3d at 1242 (daily maximum variability must be accounted for in MACT standards [including floors] which must be achieved continuously). See also *CMA*, 870 F. 2d at 232 (EPA not even obligated to use data from plants that consistently reported nondetected values in calculating variability factors for best performing plants). We agree with these commenters, and are using the statistical imputation approach to address the concern. Relative to our proposed approach of assuming nondetect measurements are present at the detection limit, the statistical imputation approach reduces the average of the data set for a source while maximizing the deviation of the data set. These are competing and somewhat offsetting factors when calculating the floor for existing sources given that we use a modified 99th percentile upper prediction limit to calculate the floor—the floor is the average of the test condition averages for the best performers plus the pooled variance of their runs. See *CMA*, 870 F. 2d at 232 (upholding approach to variability for datasets with nondetect values where various conservative assumptions in methodology offset less conservative assumptions).

We further disagree with this commenter's view that the statistical imputation approach is independently flawed because it assumes that the value for a nondetect is always either the highest value or lowest value in the allowable range. The commenter states that, in reality, the undetected values will necessarily fall in a range between

the highest and lowest, and thus yield less variability than EPA would assume. Although the commenter is correct that the true value of a nondetect measurement is likely to be in the range between the highest or lowest value possible rather than at either extreme, we do not know where the true value is within that range. To ensure that variability is adequately considered in establishing a floor, the statistical imputation approach, by design, maximizes the deviation by assuming the nondetect value is at one end of the range or the other, whichever results in a higher average for the data set.

C. Analysis of Variance Procedures To Assess Subcategorization

We use analysis of variance (ANOVA) to determine whether subcategories of sources have significantly different emissions. For two subsets of emissions, the variance of the data between the two subsets is compared to the variance within the subsets. The ratio of these two variances is called the F-statistic. The larger the F-statistic the more likely the underlying data distributions are different. To make a decision regarding the difference between the two subsets, we compare this calculated F-statistic to an F-value associated with a particular confidence level.

One commenter has raised several concerns with our use of the ANOVA procedure in the selection of incinerator subcategories.

Comment: The ANOVA procedure is based upon the assumption that the underlying distribution of both data sets has a normal shape. For incinerator emissions data this assumption is not valid. A log-probability plot shows that particulate emission data is better described by a lognormal distribution. Prior to conducting the ANOVA procedure, the data should be log-transformed.

Response: We use probability plots, Skewness Coefficients, and Correlation Coefficient/Shapiro-Wilks testing to evaluate whether it is more appropriate to analyze emissions data for ANOVA and floor calculations assuming the data represent a normal or lognormal distribution. We believe it is reasonable to assume the data represent a normal distribution for several reasons.

The purpose of the ANOVA subcategorization analysis is to determine if there is a significant difference in emission levels between potential subcategories to warrant establishing separate floors for the subcategories. Although in some cases it may appear that a data set in its entirety may be better represented by a lognormal distribution, the high

emissions data causing the right-hand skew will be truncated when we identify the best performing sources—those with the lowest emissions—to calculate floors. This moves the appearance of a skewed distribution toward one that is more symmetric and thus, more representative of a normal distribution.

In addition, our analyses showed: (1) The probability plots do not suggest that either assumed distribution is significantly or consistently better; (2) the data set arithmetic averages tend to be in the neighborhood of the medians, indicating the data sets are not significantly skewed and more closely normal than lognormal; and (3) in some cases, neither assumed distribution could be statistically rejected.¹⁵¹

Comment: Some of the data sets used for comparison have very few members. This means that the within-group variance for a small data set would have to be very low for the two groups to be judged as separate.

Response: We agree, but note that as the sample sizes change, the critical values are also changing depending on the degrees of freedom.

Comment: Only emissions data were considered in the ANOVA tests. Feed rate and removal efficiency should have been considered as well.

Response: Differences between subcategories in feedrates or system removal efficiency are irrelevant if there is no significant difference in emissions between the subcategories. The purpose of considering subcategorization is to determine if there are design, operation, or maintenance differences between subcategories that could affect the type or concentration of HAP emissions and thus sources' ability to achieve the floor absent subcategorization. Consequently, it is appropriate to consider emissions only when evaluating subcategorization.

Comment: The confidence level used by EPA for the F-statistic in all cases was 95 percent. If the calculated F-statistic were equal to this 95 percent confidence value, it would mean that there is only a 5 percent chance that data for the two subsets were drawn from the same parent distribution. A less stringent (lower) confidence level would be more appropriate for this analysis.

The commenter evaluated particulate emissions for specialty incinerators (i.e., munitions, chemical weapons and mixed waste incinerators) and non-specialty incinerators (all others). The commenter log-transformed the data and

¹⁵¹ USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 8.2.

determined that there was only a 30 percent chance that the two data sets could come from the same parent distribution. This result, together with the vastly different operating characteristics for the two types of incinerators, argues for their being treated as separate categories, according to the commenter.

Response: A confidence level of 95% assigns a probability of 0.95 of accepting the hypothesis when there is no difference between subcategories and hence a probability of 0.05 of rejecting a true hypothesis. This reduces the probability to 5% of rejecting a true hypothesis. A less stringent confidence level would increase the chances of rejecting a true hypothesis. The farther apart the averages of the two potential subcategories are, the more likely they are to be statistically different and the more likely you are to be wrong if you hypothesize that they are not different.

A 95% confidence level is most often used for ANOVA because it is generally believed that being wrong one time out of 20 is an acceptable risk for purposes of ANOVA. In addition, statisticians are comfortable with a 95% confidence level because, in a normal distribution, 95% of the data fall within 2 (actually 1.96) standard deviations of the mean.

Other confidence levels could be used for ANOVA—99% or 90%—if there is a good reason to deviate from the general default of 95%. A 99% confidence level is the second most commonly used confidence level and is generally used when it is very important that you be sure that you are right (i.e., where you can only accept the risk of being wrong 1 time out of 100) before you classify the populations (in this case subcategories) as different. Occasionally, but much less frequently, confidence levels of 90% or less are used. But, we note that these situations are so infrequent that some statistics books provide tables for the ANOVA F-statistic only at the 95% and 99% confidence levels.

For these reasons, we believe that the 95% confidence level is an appropriate level among those we could have reasonably selected.

VI. Emission Standards

A. Incinerators

Comment: A commenter states that EPA's subcategorization (and assignment of differing dioxin/furan standards as a result) between incinerators with wet or no air pollution control device and incinerators equipped with dry air pollution control devices or waste heat boilers is unlawful because incinerators equipped with a given type of pollution control

equipment are not different "classes," "types," or "sizes" of source. The commenter implies that EPA justifies this subcategorization by stating that these sources have different emission characteristics, which is no less unlawful and arbitrary than subcategorizing based on the pollution control devices they use.

Response: We agree that it would not be appropriate to subcategorize source categories based on a given air pollution control technique. See 69 FR at 403 (Jan. 4, 2004). As stated at proposal, we do not subcategorize incinerators with respect to dioxin/furans based on the type of air pollution control device used. 69 FR at 21214. For example, with respect to dioxin/furans, it would not be appropriate to subcategorize based on whether a source is using: (1) Good combustion practices; (2) a carbon bed; (3) an activated carbon injection system; or (4) temperature control at the inlet to its dry air pollution control device.

These devices and practices are what control dioxin/furan emissions. Today's final rule does not subcategorize based on these control devices and practices. Instead, our subcategorization approach recognizes the potential of some emission control equipment to create pollutant emissions that subsequently must be addressed.¹⁵²

Dioxin/furans are unique in that these pollutants are not typically present in the process inputs, but rather are formed in the combustor or in post combustion equipment. The primary cause of dioxin/furan emissions from incinerators not equipped with waste heat boilers is post combustion formation by surface-catalyzed reactions that occur within the dry air pollution system.¹⁵³ This is evidenced by the statistically significant higher dioxin furan emissions for incinerators with dry air pollution control systems compared to those without dry systems.

Incinerators with dry air pollution systems are designed to effectively control metal and particulate matter emissions through use of baghouses,

electrostatic precipitators, etc. Incinerators that are designed in this manner have the potential for elevated dioxin/furan emissions because dry air pollution control systems provide locations where surface-catalyzed reactions can occur (e.g., on particles on fabric filter bags or electrostatic precipitator plates). Thus, for purposes of dioxin/furan formation and control, incinerators equipped with dry air pollution systems are in fact different "types" of incinerators because of their unique pollutant generation characteristics.

On the other hand, incinerators with wet air pollution control systems are generally designed to effectively reduce total chlorine emissions (with the use of wet scrubbers) and metals and particulate matter emissions. There generally is a tradeoff, however, in that these types of incinerators may not be as efficient in reducing particulate matter and metal emissions compared to incinerators that are equipped with baghouses and dry electrostatic precipitators. These types of incinerators generally do not have the potential to have elevated dioxin/furan emissions because they do not provide locations where surface catalyzed reactions can occur. For purposes of dioxin/furan emission formation and control, sources with wet air pollution control systems are thus likewise different types of incinerators.¹⁵⁴

Subcategorizing dry air pollution systems and wet air pollution control systems for purposes of establishing a dioxin/furan standard is no different than subcategorizing incinerators equipped with waste heat boilers. The waste heat boiler is the origin of the dioxin/furan that is generated. These incinerators are designed to efficiently recover heat from the flue gas to produce useful energy. A result of this type of incinerator design, however, is that it also provides a location where surface catalyzed reactions can occur (i.e., the boiler tubes), potentially resulting in elevated dioxin/furan formation (and emissions if not properly controlled).

An alternative approach that does not subcategorize these sources, but rather identifies best performing sources as those sources with the lowest emissions irrespective of whether they have a wet

¹⁵² Although we subcategorize between incinerators with wet or no air pollution control device and incinerators equipped with dry air pollution control devices or waste heat boilers for the floor analysis, the calculated dioxin furan floors for both subcategories for existing sources were determined to be less stringent than the current interim standard. Subsequently, the final rule emission limitations for both subcategories are, for the most part, identical, and equivalent to the interim standard. See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 10.1, for further discussion.

¹⁵³ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume IV: Selection of MACT Standards," September 2005, Section 3, for further discussion.

¹⁵⁴ A similar analogy applies to incinerators that are not equipped with air pollution systems. These incinerators are not designed to control emissions of metals, chlorine, and particulate matter (perhaps because emission levels are low due to low HAP feed levels). Similar to incinerator types with wet systems, this design does not provide the locations for surface catalyzed reactions to occur, which leads us to conclude that these are different types of incinerator with respect to dioxin/furan control.

or dry air pollution control device, would yield floors that would not be achievable unless all the sources, including the best performers, adopted beyond-the-floor technology. The calculated dioxin/furan floor for existing incinerators and liquid fuel boilers using such an approach would be 0.008 and 0.009 ng TEQ/dscm, respectively.¹⁵⁵ All of the best performing sources for these calculated floors had either wet air pollution systems or no air pollution control systems. The floor technology used by these sources is good combustion practices. As a result, these floor levels would not be replicable by these best performing sources nor duplicable by other sources through use of the same good combustion practices because of the uncertainties associated with dioxin/furan generation mechanisms and rates that can vary both within sources and across sources, potentially leading to significant variability in emission levels.¹⁵⁶ Sources equipped with wet or no air pollution systems would thus likely be required to install carbon systems to comply with these standards, a technology used by only four incinerators (none of which were best performers in the above discussed floor analysis). Such an outcome should be viewed as a beyond-the-floor technology and therefore assessed pursuant to the factors enumerated in section 112(d)(2). Furthermore, it is unclear, and perhaps doubtful, that these floors would be achievable by these sources even if they were to install beyond-the-floor controls such as activated carbon systems because no sources using activated carbon are currently achieving those floor levels. We therefore conclude that it is appropriate, and necessary, to subcategorize these types of incinerators for purposes of calculating dioxin/furan floor standards.

B. Cement Kilns

1. Hg Standard

Comment: Several commenters recommend that EPA use a commenter-submitted dataset, which includes three years of data documenting day-to-day levels of mercury in hazardous waste

fuels fired to all hazardous waste burning cement kilns, to identify a MACT floor for existing and new cement kilns. Several commenters state that *existing* cement kilns should have the option to comply with either of the following mercury standards: (1) A hazardous waste feed concentration limit, expressed in ppmw, based on an evaluation of the five best performing sources within the commenter-submitted dataset (documenting day-to-day levels of mercury in the hazardous waste over a three year period); or (2) a hazardous waste maximum theoretical emissions concentration (MTEC), expressed in units of $\mu\text{g}/\text{dscm}$, developed by projecting emissions of the best performing sources assuming mercury concentrations in the hazardous waste were at the source's 99th percentile level in the commenter-submitted dataset. To identify the best performing sources, the commenter suggests selecting the five sources with the lowest median mercury concentrations in the dataset. For existing sources, the commenters' evaluation yields a hazardous waste feed concentration limit of 3.3 ppmw and a stack concentration emission limit of $150 \mu\text{g}/\text{dscm}$ (rounded to two significant figures and considering mercury contributions only from the hazardous waste). For *new* cement kilns, the commenters recommend a mercury standard in the format of a hazardous waste feed concentration limit only, expressed in ppmw, based on the single source with the lowest 99th percentile level of mercury in hazardous waste. The commenters recommend a mercury standard of 1.9 ppmw for new sources.

Response: We agree with commenters that the commenter-submitted dataset documenting the day-to-day levels of mercury in hazardous waste fuels fired to all hazardous waste burning cement kilns is the best available data to identify floor levels for existing and new cement kilns. See discussion in Part Four, Section I.D. However, we disagree with the commenters' suggested format of the mercury standard for existing sources. Establishing the mercury standard as the commenters' suggest (i.e., 3.3 ppmw in the hazardous waste feed or $150 \mu\text{g}/\text{dscm}$ as a hazardous waste MTEC) fails to consider the interim mercury standards. As discussed in Part Four, Section III.E, there can be no backsliding from the levels of performance established in the interim standards. While not every source feeding hazardous waste with a maximum mercury concentration of 3.3 ppmw would exceed the interim standard, most sources using more than

50 percent hazardous waste as fuel (i.e., replacing at least half its fossil fuel with hazardous waste) would exceed the interim standard, emitting mercury higher than the levels allowed under §§ 63.1204(a)(2) and 63.1206(b)(15) of the interim standards.¹⁵⁷ The hazardous waste MTEC of $150 \mu\text{g}/\text{dscm}$ calculated by the commenters is also higher than the level currently allowed under § 63.1206(b)(15) of the interim standards. Since sources cannot backslide from the levels of the interim standards, if we were to accept the commenters' floor analysis results as presented (which we are not), then we would "cap" each calculated standard (i.e., 3.3 ppmw hazardous waste feed concentration and $150 \mu\text{g}/\text{dscm}$ in stack emissions) at the interim standard level. This would result in a mercury standard for existing sources of 3.3 ppmw hazardous waste feed *and* a hazardous waste feed MTEC of $120 \mu\text{g}/\text{dscm}$ or $120 \mu\text{g}/\text{dscm}$ as a stack gas concentration limit. We note this is similar to the mercury standard adopted today: a hazardous waste feed concentration limit of 3.0 ppmw *and* a hazardous waste feed MTEC of $120 \mu\text{g}/\text{dscm}$ or $120 \mu\text{g}/\text{dscm}$ as a stack gas concentration limit. For an explanation of why we derived a level of 3.0 ppmw from the data, see Section 7.5.3 of Volume III of the Technical Support Document.

The commenters' suggested new source mercury standard of 1.9 ppmw in the hazardous waste has the same deficiency. New sources with a hazardous waste fuel replacement rate of approximately 75% could emit mercury at levels higher than currently allowed under the interim standards. After capping the calculated standard at the interim standard level, we would identify the mercury standard for new sources as a hazardous waste concentration limit of 1.9 ppmw in the hazardous waste and a hazardous waste feed MTEC of $120 \mu\text{g}/\text{dscm}$ or $120 \mu\text{g}/\text{dscm}$ as a stack gas concentration limit. For reasons discussed in Section 7.5.3 of Volume III of the Technical Support Document, this is indeed the mercury standard we are promulgating for new cement kilns.

The commenters also suggest that the best performing sources should be identified as those with the lowest three-year median concentration of mercury in hazardous waste. Although this approach would be permissible, we conclude that it is more appropriate to identify the best performers (or single best performer for new sources) by

¹⁵⁵ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 20 and Appendix C, tables labeled "E-INC-all-DF" and "E-LFB-all-DF".

¹⁵⁶ Dioxin/furan formation mechanisms are complex. Sources equipped with wet or no air pollution control systems cannot rely on good combustion practices alone to achieve these floor levels because they cannot "dial in" to a specific emission level, as is the case with typical back-end control systems that control particulate matter and metals, for example. See Part Four, Section IV.B.

¹⁵⁷ USEPA, "Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards," Section 23.4, September 2005.

selecting those with the lowest 99th percentile upper level mercury concentrations. (This is not a statistically determined upper prediction limit; there is sufficient data for an arithmetically calculated 99th percentile to reliably reflect sources' performance.) We believe that this approach best accounts for the variability experienced by best performing sources over time.

A detailed discussion of the MACT floor analysis for existing and new cement kilns is presented in Section 7.5.3 of Volume III of the Technical Support Document. In summary, the mercury standard for existing cement kilns is 3.0 ppmw in the hazardous waste feed and 120 µg/dscm as a hazardous waste maximum theoretical emission concentration feed limit or 120 µg/dscm as a stack gas concentration limit. For new sources the mercury standard is 1.9 ppmw in the hazardous waste feed and 120 µg/dscm as a hazardous waste maximum theoretical emission concentration feed limit or 120 µg/dscm as a stack gas concentration limit.¹⁵⁸

Comment: Two commenters oppose EPA's proposed approach to base compliance with the mercury standard on averaged annual emissions. The commenters state an annual average would allow mercury emissions to exceed the interim standard because a source could burn high concentrations of mercury waste over a short period and still comply with an annual limit by burning low concentration wastes at other times. These commenters support the concept of a 12-hour rolling average feedrate limit (i.e., the current requirement under the interim standards) in conjunction with an emission standard no less stringent than the interim standard.

Response: We agree with these comments. Cement kilns must establish a 12-hour rolling average feedrate limit of mercury to comply with these standards. The mercury standards for cement kilns are "capped" at the interim standard level to prevent backsliding from the current level of performance. This is accomplished by expressing the standard as a limit on the mercury concentration in the hazardous waste (with the rolling average) and either an emission concentration limit or hazardous waste maximum theoretical emission concentration feed limit. See § 63.1209(l)(1)(iii).

2. Total Chlorine

Comment: One commenter states that the proposed MACT floor approach is inconsistent with the statutory definition of MACT because EPA's selection of a routinely achievable system removal efficiency (SRE) was arbitrary and not representative of the best performing sources. Instead, the commenter suggests EPA identify a MACT SRE based on the five sources with the best SREs and apply that SRE to the MACT chlorine feed level. Later, in supplemental comments, the same commenter suggests two alternative approaches to identify a floor level. One approach applies a ranking methodology based on emissions and chlorine feed, and the second suggested approach applies a triple ranking method based on emissions, feed, and chlorine SRE. Other commenters, however, supported EPA's proposed approach.

Response: We are adopting the same approach we proposed at 69 FR at 21259. As we explained, this is a variant of the SRE/Feed approach, the variant involving the degree of system removal efficiency achieved by the best performing sources. In summary, to determine the floor level we first identify the best performing sources according to their hazardous waste chlorine feedrate. The best performing sources are those that have the lowest maximum theoretical emissions concentration (MTEC), considering variability. We then apply an SRE of 90 percent (the specific point in contention) to the best performing sources' total MTEC (i.e., thus evaluating removal of total chlorine across the entire system, including chlorine contributions to emissions from all feedstreams such as raw materials and fossil fuels) to identify the MACT floor, which is expressed as a stack gas emissions concentration in parts per million by volume. This approach defines the MACT floor as an emission level that the best performing sources could achieve if the source limits the feedrate of chlorine in the hazardous waste to the MACT level (i.e., the level achieved by the average of the best performing five sources) while also achieving an SRE that accounts for the inherent variability in raw material alkalinity and (to a lesser degree) cement kiln dust recycle rates, and production requirements. 69 FR at 21259.

Under this approach, we are evaluating hazardous waste feed control

as we do for other sources. One commenter objects to our determination that an SRE of 90 percent is representative of the best performing sources because we have not established a MACT SRE—the average SRE achieved by the best performing sources.

There is no doubt that the cement manufacturing process is capable of capturing significant quantities of chlorine when favorable conditions exist within the kiln system. Our usual approach of establishing an SRE by ranking the most efficient SREs taken from individual compliance tests, however, would result in a standard that would not be achievable because it may not be duplicable by the best performers or certainly would not be replicable by others, given that it is a function of various highly variable parameters, especially levels of alkali metals (e.g., sodium and potassium) and volatile compounds (e.g., chlorine and sulfur) in the raw materials. Alkalis and volatiles vary at a given best performer facility (in fact, at all facilities) as different strata are mined in the quarry, and across facilities due to different sources of raw materials. Raw material substitution is infeasible and counter to the objective of producing quality product (i.e., a product with low alkali content).

Cement kilns thus are not able to design or operate to achieve a specific SRE at the high (most efficient) end of the range of test conditions. This is demonstrated by our calculations of system removal efficiency data, which is essentially a collection of performance "snapshots." See SRE data summarized in Table 1 at the end of this response; see also *Mossville*, 370 F. 3d at 1242 (maximum emission variability associated with raw material variability needs to be accounted for in MACT floor determination since the standard must be met at all times under all operating conditions). The performance data of the "apparent" best performers—upwards of 99 percent—identified by the commenter are simply a snapshot in the possible range of performance and are not replicable in the future due to factors which are uncontrollable by the source, as just explained. In confirmation, cement kilns achieving this level of removal in one test proved incapable of replicating their own result in other tests even though individual sources each have their own proprietary source of raw materials. See results in table for Giant (SC), Essroc (IN), Holcim (MO), Giant (PA), and LaFarge (KS) all

¹⁵⁸Please note that we do not regard this standard as a work practice standard under section 112(h)(1) of the Act, because part of the standard includes an

emission limit which is measured at the stack. EPA believes the special requirements of section

112(h)(1) apply when a work practice is the exclusive standard.

of whom would violate a 99 + percent standard based on their own operating results.

TABLE 1.—SUMMARY OF SYSTEM REMOVAL EFFICIENCY DATA FOR WET PROCESS CEMENT KILNS ¹⁵⁹

Facility	Number Runs in Data Base	Low SRE Run (%)	High SRE Run (%)	Average SRE of All Runs (%)
LaFarge (OH)	3	99.1	99.4	99.3
Giant (SC)	24	95.5	99.8	99.0
Essroc (IN)	13	97.3	99.9	98.7
Holcim (MO)	6	96.4	99.9	98.4
LaFarge (KS)	12	95.7	99.3	98.1
Giant (PA)	17	87.7	99.4	97.1
Continental (MO)	3	95.7	97.0	96.5
Ash Grove (AR)	37	85.1	98.8	95.1
Texas Industries (TX)	6	88.8	97.0	93.6
Holcim (MS)	9	76.5	99.2	90.0

¹⁵⁹ See Section 3.6 of Volume II (Specific MACT Standards) of Comment Response Document, September 2005.

However, the data indicate that SRE is reasonably quantifiable to a point. Based on our data base of system removal efficiency information from 130 test conditions where total chlorine was evaluated, we conclude that a system removal efficiency of 90 percent is a reasonable estimate of MACT SRE.¹⁶⁰

We also reject the commenter's three suggested alternative approaches to identify a MACT SRE to apply to the MACT feed level. The commenter's methods all suffer a common flaw: They fail to recognize and take into account the limitations of the total chlorine SRE data. For example, as just demonstrated, available data show that considering the SRE data associated with the most recent compliance test as a ranking factor will result in unachievable standards due to the varying effectiveness of chlorine capture (which impacts emissions) depending on the raw material mix characteristics. Considering only the most recent compliance test data as suggested yields results that are unachievable because the best performer's SRE data are likely biased high (e.g., sources that happen to test under favorable conditions are likely to be identified as best performers), which would not be replicable by even that source on a day-to-day basis.

3. Semivolatile and Low Volatile Metals

Comment: Commenters oppose EPA's proposed approach to treat each kiln as

¹⁶⁰ As discussed a number of times earlier, we are not basing any standards on feed control of HAP in raw material and fossil fuel input. We instead are controlling HAP attributable to those inputs by means of end-of-stack emission standards which reflect removal of HAP by some type of control device. This approach is consistent with the discussion above, since we are not basing the cement kiln chlorine standard on control of any raw material input, but rather on some type of back-end removal efficiency.

a separate and unique source in the SRE/Feed MACT floor analysis for cement kilns.¹⁶¹ Commenters state that the approach is an improper way to perform a statistical analysis and reduces the variability in emissions that otherwise would be observed in a MACT pool of five unique sources. Variability is reduced because co-located kilns at the same plant share many of the factors that comprise front-end and back-end controls. As a result, the calculated MACT floors for SVMs and LVMs for cement kilns are too stringent. The commenters' recommended solution (in instances where co-located kilns are among the top five performers) is to use only the data from the best performing co-located kiln, exclude any lesser performing kilns at the plant site, and then include the next-best performing non-co-located kiln in the MACT pool. Implementing their recommendation, the commenters state that the MACT floor for SVMs increases from 4.0×10^{-4} to 7.4×10^{-4} lbs/MMBtu and the floor for LVMs increases from 1.4×10^{-5} to 1.8×10^{-5} lbs/MMBtu. Another commenter generally supports EPA's approach noting that the variability factor applied to the emissions data already accounts for variability.

Response: We consider sources that are not identical as unique sources and emissions data and information from unique sources are considered separate sources in the floor analyses. An example of an "identical" source in our data base is compliance test data from a similar on-site combustion unit used in place of a compliance test for another unit (*i.e.*, emissions testing of an identical unit was not conducted). These sources and their associated data

¹⁶¹ It is common for cement manufacturing plants to operate multiple cement kilns at the same plant.

are called "data in lieu of" sources in our data based on the RCRA provisions under § 266.103(c)(3)(i). We acknowledge that co-located sources may in fact share certain similar operation features (e.g., use of raw material from the same quarry, use of the same coal and hazardous waste burn tank to fire the kilns); however, given that the co-located sources (except those designated as data in lieu of) are not designed identically, and given their hazardous waste feed control levels were not identical during testing, we conclude we must consider each source as a unique source in the floor analyses.¹⁶²

Comment: Commenter states that EPA's proposed standards for new cement kilns are unachievable due to problems with its accounting for variability, in part because EPA did not consider geographic differences when assessing feed control levels. The concentrations of hazardous constituents in the waste in a particular region are likely to be different than in the waste from another geographical region due to types of industrial sectors located within each region. Sources cannot reasonably arrange for transportation of lower HAP wastes generated across the country and cannot treat the hazardous waste to remove or reduce HAP concentrations. The commenter cites several court decisions that support their assertions. Commenter believes that while this represents a problem for developing both the new and existing source floors, it is a greater predicament for the new

¹⁶² Nonetheless, we analyzed the SVM and LVM floors for cement kilns as suggested by the commenter. Results of the analysis are presented in "Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards," Section 8.8, September 2005.

source floor because this floor level is based on test data for only one source.

Response: We are not obligated to account for varying hazardous waste feed control levels occurring because of differing HAP generation rates in different locations (for commercial sources), or because different production process types generate higher or lower levels HAP concentration wastes. Hazardous waste feed control is a legitimate control technology. The commenter seems to suggest that we should subcategorize low feeding sources and high feeding sources based on their hazardous waste feed control level. This would inappropriately subcategorize sources based on differing levels of controls, which we do not do. See 69 FR at 403 (January 5, 2004). Nonetheless, as previously discussed, the SRE/Feed methodology lessens the impact of feed control variations across commercial units because it results in fewer situations where best performing back-end controlled sources (from a particulate matter emissions perspective) cannot achieve the semivolatile and low volatile metal design levels and floors.

For new source standards, the single best performing cement kiln sources for semivolatile metals and low volatile metals were not the lowest hazardous waste feed controlled source (both floors were based on sources with the fourth best, (i.e., lowest, hazardous waste feed control level). We therefore do not believe these sources are atypically low hazardous waste feeders relative to the other best performing sources in the existing source MACT pools.

C. Lightweight Aggregate Kilns

1. Mercury Standard

Comment: One commenter, an operator of lightweight aggregate kilns subject to this rule, recommends that EPA establish the mercury standard for lightweight aggregate kilns at a hazardous waste feed concentration limit of 3.3 ppmw for existing sources and 1.9 ppmw for new sources, which is the same standard suggested in public comments by a trade organization representing hazardous waste burning cement kilns. The commenter notes that these mercury limits are appropriate for lightweight aggregate kilns because the commenter's two lightweight aggregate manufacturing facilities participate in the same hazardous waste fuel market as the majority of cement kilns. Moreover, the commenter maintains that its parent company also owns and operates two cement kilns and that its lightweight aggregate kilns receive hazardous waste

from many of the same generators that provide hazardous waste fuel to the cement kilns. Consequently, the commenter states that the cement industry's data set of actual mercury feed concentrations in the hazardous waste best represents the full range of hazardous waste fuel concentrations that exist in the waste fuel market (see also Part Four, Sections I.D and E).

Response: We disagree with the commenter. Although the cement industry's set of mercury feed concentration data in the hazardous waste may represent the full range of concentrations for the cement kiln source category, we cannot conclude the same for lightweight aggregate kilns because the commenter states that the mercury dataset are only applicable to its kilns.¹⁶³ Further, the commenter provides no specific information or data to support the conclusion that its suggested approach is justified for the other lightweight aggregate kiln facility.

We also disagree with the commenter as to the appropriateness of establishing the mercury standard in the format of a hazardous waste feed concentration (i.e., 3.3 ppmw for existing sources and 1.9 ppmw for new sources) for lightweight aggregate kilns. A hazardous waste feed concentration standard is improper for this source category because one lightweight aggregate kiln facility's sources (although not the commenter's) controls mercury emissions using wet scrubbing. Thus, a hazardous waste feed concentration standard would inappropriately limit the mercury concentration in hazardous waste for sources that use control equipment capable of capturing mercury. A source with control equipment should not be restricted to a hazardous waste feed concentration standard that is based on sources that can only control mercury emissions through limiting the amount of mercury in the hazardous waste.

In any case, as explained earlier in our discussion of cement kiln mercury standard, we believe that it is preferable to establish an emission standard to assure that the actual amount of mercury emitted by these sources is controlled by means of a numerical standard for stack emissions.

Comment: One commenter agrees that a source may not be able to achieve the mercury standard due to raw material contributions that might cause an exceedance of the emission standard in

¹⁶³ We note that the commenter-submitted dataset is not amenable for use in establishing standards expressed in a thermal emission format because sufficient information on the characteristics of the hazardous waste (e.g., heating value of hazardous waste) were not provided.

spite of a source using properly designed and operated MACT floor control technologies, including controlling the levels of metals in the hazardous waste. The commenter opposes the proposed alternative standard of 42 µg/dscm, which is expressed as a hazardous waste maximum theoretical emissions concentration. Instead, the commenter suggests that EPA maintain the alternative standard options of §§ 63.1206(b)(15) or 63.1206(b)(9).

Response: We agree with the commenter that the mercury standard should address the concern of raw material contributions causing an exceedance of the emission standard. We also agree that the proposed alternative standard of a hazardous waste maximum theoretical emissions concentration of 42 µg/dscm is an improper standard because the underlying data are unrepresentative. See discussion in Part Four, Section I.E. We note that the mercury standard promulgated today is 120 µg/dscm as a stack gas concentration limit or 120 µg/dscm as a hazardous waste maximum theoretical emission concentration feed limit. The alternative mercury standard sought by the commenter under § 63.1206(b)(15) is a limit of 120 µg/dscm as a hazardous waste maximum theoretical emission concentration, which is included in the mercury standard promulgated today. This should address the commenter's concern.

Comment: One commenter supports a mercury standard with short-term compliance limits (e.g., 12-hour rolling average feedrate limits) as opposed to the annual limit proposed.

Response: For reasons discussed in Part Four, Section I.E, we are using a different mercury dataset than at proposal. We solicited comment on a floor approach using these data in a notice¹⁶⁴ sent directly to certain commenters. We are adopting that approach today. The monitoring requirements of the mercury standard for lightweight aggregate kilns includes short-term averaging periods (i.e., not to exceed a 12-hour rolling average), as recommended by the commenter.

2. Total Chlorine Standard

Comment: One commenter supports excluding from the floor analysis all lightweight aggregate kiln sources that lack air pollution control devices for chlorine, such as scrubbing technology. The floor analysis should simply exclude sources without back-end controls according to the commenter.

¹⁶⁴ See docket item OAR-2004-0022-0370.

Response: We disagree. For the final rule, we are using the SRE/Feed MACT floor approach which defines best performers as those sources with the best combined front-end hazardous waste feed control and back-end air pollution control efficiency. The commenter's suggestion would exclude emissions data from two of the three facilities in this source category even though valid emissions data from these sources are available (and therefore ordinarily to be used, see *CKRC*, 255 F. 3d at 867), and these sources achieved the best front-end hazardous waste feed control in the category. We note that the best feedrate controlled sources have hazardous waste thermal feed levels that are approximately one-fifth the level of the source's with back-end controls. These data describe the level of performance of sources in the category and must be evaluated in the MACT floor analysis. We also note that even if we were to implement the commenter's suggestion, the MACT floor results would not change for existing and new lightweight aggregate kilns because the total chlorine emissions data of the source with back-end air pollution controls (after considering variability) are higher than the standards promulgated today. Thus, the commenter's suggestion also would result in a standard that would be capped by the interim standard.

3. Beyond-the-Floor Standards

Comment: One commenter opposes EPA's proposed decision to promulgate a beyond-the-floor standard for dioxin/furans for existing and new lightweight aggregate kilns based on performance of activated carbon injection.

Response: For the final rule, we conclude that a beyond-the-floor standard for lightweight aggregate kilns is not warranted. The Clean Air Act requires us to consider costs and non-air quality impacts and energy requirements when considering more stringent requirements than the MACT floor. In the proposed rule, we estimated that the incremental annualized compliance costs for lightweight aggregate kilns to achieve the beyond-the-floor standard would be approximately \$1.8 million and would provide an incremental reduction in dioxin/furan emissions of 1.9 grams TEQ per year (see 69 FR at 21262). At proposal we judged costs of approximately \$950,000 per additional gram of dioxin/furan TEQ removed as justified, and, therefore, we proposed a beyond-the-floor standard. Since proposal, we made several changes to the dioxin/furan data base as the result of public comments. One implication of

these changes is a lower national emissions estimate for dioxin/furans for lightweight aggregate kilns. We now estimate an incremental reduction in dioxin/furan emissions of 1.06 grams TEQ per year with costs ranging between \$1.6 and \$2.2 million per additional gram of dioxin/furan TEQ removed. Based on these costs and consideration of the non-air quality impacts and energy requirements (including more waste generated in the form of spent activated carbon, and more energy consumed), we conclude that a beyond-the-floor standard for existing and new lightweight aggregate kilns is no longer justified. For an explanation of the beyond-the-floor analysis, see Section 12.1.2 of Volume III of the Technical Support Document. We note that EPA also retains its authority under RCRA section 3005(c) (the so-called omnibus permitting authority) by which permit writers can adopt more stringent emission standards in RCRA permits if they determine that today's standards are not protective of human health and the environment.

D. Liquid Fuel Boilers

1. Mercury Standard Not Achievable When Burning Legacy Mixed Waste

Comment: One commenter states that the proposed liquid fuel boiler mercury standard is not achievable by a commercial boiler, DSSI (Diversified Scientific Services, Inc.) that burns mercury-bearing low level radioactive waste that is also a hazardous waste (so-called 'mixed waste') that was generated years ago (so-called, legacy waste). The waste is an organic liquid containing high concentrations of mercury. The boiler is equipped with a wet scrubber which provides good mercury control—93%, system removal efficiency according to the commenter.

The commenter states that the proposed liquid fuel boiler mercury standard is not achievable using feedrate control and/or additional back-end control. Waste minimization is not an option because the waste has already been generated. Further, available national treatment capacity for mercury-bearing, low-level radioactive organic hazardous waste is very limited. The only other hazardous waste combustion facility authorized to treat such waste is the Department of Energy incinerator at Oak Ridge, Tennessee. Waste treatment volumes at that facility are restricted by the mercury feed rate limitation for the incinerator. In addition, the feedrate of the waste cannot be practicably reduced because of the large back-log of waste that must be treated.

The commenter suggests that their boiler be subject to the incinerator mercury standard because the mixed waste has far higher concentrations of mercury than wastes burned by other boilers and, as a consequence, the boiler is more incinerator-like with respect to the feedrate of mercury.

Response: We agree with the commenter's suggestion. The final rule subjects this commercial liquid fuel boiler to the mercury standard for incinerators. We are classifying this source as a separate type of source for purposes of the mercury standard, because the type of mercury-containing waste it processes is dramatically different from that processed by other liquid fuel boilers, effectively making this a different type of source for purposes of a mercury standard¹⁶⁵. The source thus feeds mercury at concentrations exceeding that of any boiler but at concentrations within the range processed by hazardous waste incinerators. The maximum test condition average MTEC¹⁶⁶ for mercury for the remaining liquid fuel boilers is 20 µg/dscm. All the liquid fuel boiler mercury data represent "normal" data, i.e., data that were not spiked. (The lack of spiked data in the liquid fuel boiler data base, in and of itself, indicates that these sources do not process mercury-bearing waste and do not need the operational flexibility gained by spiking to account for occasional higher concentration mercury wastes.) DSSI's 2002 mercury test condition average MTEC was spiked to 3500 µg/dscm. In other words, DSSI needs the operational flexibility to feed 175 times more mercury than any other liquid fuel boiler. Incinerators, on the other hand, had mercury MTECs that ranged to 110,000 µg/dscm in 2002. In fact, DSSI's mercury feed rate is the eighth highest of the 40 incinerators, including DSSI, for which we have 2002 mercury feed rate data. DSSI's process feed is thus within the upper range of mercury feed found at incinerators.

We believe it is well within the broad discretion accorded us in section 112(d)(1) to subcategorize among "types" and "classes" of sources within a category. See also *Weyerhaeuser v. Costle*, 590 F. 2d at 254, n. 70 (D.C. Cir. 1978) (similar raw waste characteristics justify common classification) and *Chemical Manufacturers Ass'n v. EPA*, 870 F. 2d 177, 253–54 and n. 340 (5th

¹⁶⁵ See CAA section 112 (d) (1)), authorizing EPA to distinguish among different "types * * * of sources within a category or subcategory" in developing MACT standards.

¹⁶⁶ Maximum theoretical emission concentration is the feedrate normalized by gas flowrate assuming zero system removal efficiency.

Cir. 1989) (same). We note that this boiler will be subject to the liquid fuel boiler standards for all HAP other than mercury (the only HAP where the issue of appropriate classification arises).

Not surprisingly, given the disparity in waste concentration levels, the DSSI boiler, even though equipped with back end control comparable to best performing commercial incinerators, achieves mercury emission levels less than an order of magnitude higher than the other hazardous waste-burning liquid fuel boilers, few of which use back end control that is effective for mercury.¹⁶⁷ This emission disparity likewise indicates that DSSI is treating a different type of waste than other liquid fuel boilers.

The nature of the mercury-bearing waste further confirms that it is of a different type than that processed by other hazardous waste burning liquid fuel boilers. The waste is a remediation waste, a type of waste burned routinely by commercial hazardous waste incinerators but almost never by a liquid fuel boiler.

Moreover, the waste is a legacy, mixed waste generated decades ago in support of the United States' strategic nuclear arsenal. It is not amenable to the types of control all other liquid fuel boilers use to reduce mercury emissions—some type of feed control or other minimization technique. We investigated whether any waste minimization options are feasible for this waste, and find that they are not. Normally, waste minimization is accomplished by one of three means: eliminating the use of mercury in the process to prevent it from being in the waste; pretreating the waste before burning to remove the mercury; or sending it to another facility better suited to handle the waste. Changing the production process to eliminate or reduce the mercury content of the waste is not an option because this waste has already been generated. Pretreatment is already practiced to the maximum extent feasible by settling out and separating the heavier mercury from the liquid components after thermal desorption. The remaining organic liquid that is burned by the mixed waste boiler contains concentrations of mercury (in organo-mercury and other organic soluble forms) that are orders of magnitude higher than burned by other liquid fuel boilers. Much of the waste cannot be feasibly pretreated to remove mercury because this legacy, mixed waste comes from many highly diverse

sources. It is not practical or feasible to investigate how to remove the mercury from wastes of such varied and unique origins.

Only one other facility could potentially treat this mixed waste, DOE's incinerator at Oak Ridge, Tennessee, whose permit allows the incinerator to manage mixed waste. However, waste treatment volumes for mercury-bearing wastes at that facility are restricted by the mercury feed rate limitation in the incinerator's permit. The DOE incinerator alone cannot assure national capacity for mercury-bearing, low-level radioactive organic hazardous waste. In addition, the back-end emission controls of the mixed waste boiler are superior to those used by most incinerators, including the Oak Ridge incinerator. This boiler uses a highly effective wet scrubbing system—the principal MACT floor back-end control for mercury used by incinerators—that achieves over 93% system removal efficiency. This is superior control compared to most incinerators, including the one at Oak Ridge which achieves 75 to 85% removal.¹⁶⁸

Thus, this mixed waste boiler is reasonably classified a different type of source with respect to mercury waste than other hazardous waste-burning liquid fuel boilers, based on the nature of the waste burned and confirmed by the source's mercury emissions. We note that, although the final rule subjects only the DSSI mixed waste boiler to the incinerator mercury standard, we would conclude that any other liquid fuel boiler with the same fact pattern (i.e., that met the same criteria as the DSSI boiler as discussed above) should also be subject to the incinerator mercury standard rather than the liquid fuel boiler mercury standard.

Comment. One commenter states that EPA's standards for all sources must reflect the actual emission levels achieved by the relevant best sources. If EPA wishes to subject the boiler source and incinerators to the same emission standards, however, it is entirely within the Agency's power to do so.

Response. We agree. There is no functional difference between this boiler and incinerators with respect to mercury feed rate and the type of waste processed (incinerators often treat remediation wastes). Therefore, the

most relevant sources for the purposes of clarification in this case are incinerators, not liquid fuel boilers.

Accordingly, we have classified DSSI as an incinerator for purposes of a mercury standard (i.e., made it subject to the mercury standard for incinerators), and have included the DSSI mercury data with the incinerator data when assessing mercury standards for incinerators.

Comment. In something of a contradiction, the same commenter argues that the mixed waste boiler source (DSSI) does not claim that it cannot meet the relevant mercury standard for liquid fuel boilers, but only that it cannot do so "using either feedrate control or MACT floor back end emission control." Floors must reflect the emission levels that the relevant best sources actually achieve, not what is achievable through the use of a chosen emission control technology. It is flatly unlawful—and essentially contemptuous of court—for EPA even to entertain the source's argument that the source should be subject to a less stringent emission standard based on the levels they believe would be achievable through the use of one chosen control technology.

The commenter also states that the source acknowledges that it could achieve a better emission level, and apparently meet the relevant standards, by using activated carbon. Their argument that doing so would generate large quantities of spent radioactive carbon does not support its attempt to avoid Clean Air Act requirements; the alternative to the source accumulating large quantities of radioactive carbon is releasing large quantities of radioactive and toxic pollution into the environment.

Response. DSSI cannot meet the liquid boiler mercury standard because it burns a unique waste that resembles wastes processed by hazardous waste incinerators (in terms of mercury concentration and provenance) and is unlike any mercury-containing waste burned by the remaining liquid fuel boilers. See the earlier discussion showing that DSSI needs the operational flexibility to feed 175 times more mercury than any other liquid fuel boiler, but that DSSI's process feed is within the upper range of mercury feed found at incinerators.

We agree that DSSI is processing different types of mercury-bearing wastes than those combusted by all other liquid fuel boilers. We believe that establishing a different mercury standard for DSSI is warranted, as it would for any source with demonstrably unique, unalterable feedstock which is

¹⁶⁷ USEPA, "Technical Support Document for HWC MACT Standards, Volume I: Description of Source Categories," September 2004, Section 2.4.4.

¹⁶⁸ For more explanation concerning mixed waste sources, limitations on the concentrations of mercury fed to these sources, and the system removal efficiency achieved, see USEPA,

"Technical Support Document for HWC MACT Standards, Volume III: Selection of Standards," September 2005, Section 8.7.

more difficult to treat than that processed by other sources otherwise in the same category.

How DSSI chooses to comply with the incinerator mercury standard (for example, whether it must use some other type of emissions control technology) is not germane to this decision. We note that today's mercury standard for incinerators will force this source to lower its mercury emissions, since it is unlikely that it can meet today's 120 µg/dscm standard at all times without some changes in operations.

Comment. The source argues that waste minimization is not feasible for legacy mixed waste that has already been generated. It is not possible to travel back in time and unmake mixed legacy waste that already has been created. That obvious fact, however, lends no support to their argument that it should be allowed to burn mixed legacy waste with less stringent emission standards, according to one commenter.

Response. As discussed above, the mercury standard for liquid fuel boilers is not achievable for this source because it is a different type and class of boiler, based on the type of mercury-containing hazardous waste it processes. Because this boiler has mercury feed rates that resemble those of incinerators—not liquid fuel boilers—and waste minimization is not possible, subjecting the boiler to the mercury incinerator standard is a reasonable means of sub-categorization pursuant to the discretionary authority provided us by section 112(d)(1) of the Clean Air Act.

Comment. The commenter states that it is entirely possible to dispose of mixed legacy waste without burning it. Specifically, currently available technologies such as chemical oxidation and precipitation can be used to treat mixed legacy waste without burning it—and without releasing mercury into the air. Therefore, mixed legacy waste should not be burned at all; it should be disposed of safely through the application of one of these more advanced technologies.

Response. First, these wastes must be treated before they can be land disposed. RCRA sections 3004(d), (g)(5), and (m). They also must meet a standard of 0.025 mg/l measured by the Toxicity Characteristic Leaching Procedure before land disposal is permissible. 40 CFR 268.40 (standard for “all other nonwastewaters that exhibit the characteristic of toxicity for mercury”).¹⁶⁹ EPA's technical judgment

is that it would be very difficult to meet this standard by any means other than combustion. Moreover, as an organic liquid, the waste is readily amenable to treatment by combustion. In addition, combustion is a legal form of treatment for the waste. EPA did not propose to change or otherwise reconsider these treatment standards in this rulemaking, and is not doing so here. We note, however, that 40 CFR 268.42 and 268.44 provide means by which generators and treatment facilities can petition the Agency to seek different treatment standards from those specified by rule, and set out requirements for evaluating such petitions.

We note further that, because this waste is radioactive, exceptional precautions need to be taken in its handling. The nonthermal treatment alternatives mentioned by the commenter ignore the potential for radiation exposure if nonthermal treatment is used. Concerns (some of which are mentioned in DSSI's comment) include: Nonthermal treatment would (or could) increase worker exposure; desire to reduce handling of radioactive materials in general; need to avoid contaminating equipment that subsequently requires decontamination or handling as radioactive material; minimizing the generation of additional radioactive waste residues; reducing the amount of analysis of radioactive materials, which causes potential exposure, generation of radioactive wastes and equipment; wastes are varied and often of small volumes, which makes it difficult to develop routine procedures.

Nonthermal treatment alternatives are also not currently available to DOE to manage the diversity and volume of DOE mixed waste. It is thus our belief that the commenter has not fully explored the implications of its position, especially with regard to radiation exposure.

If the commenter wishes to pursue this issue, EPA believes the appropriate context is through the Land Disposal Restriction mechanisms described above.

Comment. The commenter states that the source argues that feedrate control is not “practical.” There appears to be no record evidence indicating what would make feedrate control impractical and why any such obstacle could not be overcome.

Response. Feedrate control to the extent necessary to achieve the liquid fuel boiler standards is not practical for

reasons just discussed. This source is one of two available sources that is authorized to treat mixed waste, and the other source is not likely to have the ability to burn mercury-bearing organic waste in the future due to permit limitations and size constraints.

Comment. The commenter states that mixed legacy waste should not be burned at all. If there are truly no other facilities that are currently permitted to dispose of mixed legacy waste, such waste should be stored until a facility that can treat such waste safely—e.g., through chemical oxidation—can be permitted.

Response. The commenter's suggestion is beyond the scope of today's rulemaking. The suggestion is also illegal, since RCRA prohibits the storage of hazardous waste for extended periods. See RCRA section 3004(j); and *Edison Electric Inst. v. EPA*, 996 F. 2d 326, 335–37 (DC Cir. 1993) (illegal under RCRA section 3004(j) to store hazardous waste pending development of a treatment technology). EPA also notes that it retains authority under RCRA section 3005(c) (the so-called omnibus permitting authority) by which permit writers can adopt more stringent emission standards in RCRA permits if they determine that today's standards are not protective of human health and the environment.

2. Different Mercury, Semivolatile Metals, Chromium, and Total Chlorine Standards for Liquid Fuel Boilers Depending on the Heating Value of the Hazardous Waste Burned

Comment. Several commenters state that liquid fuel boilers should have an alternative concentration-based standard in addition to the thermal emission-based standard. Liquid fuel boilers are typically “captive” units that burn waste fuels generated from on-site or nearby manufacturing operations, rather than accepting wastes from a wide variety of other sources. Because they have captive fuel sources, operators generally do not have fuel blending capabilities. Liquid fuel boilers “burn what they have,” and as such have very limited operational flexibility. EPA should not penalize boilers that have the same mass concentrations of metals or chlorine in their waste compared to other boilers, but which wastes have a lower heating value than wastes burned by other boilers. (The “penalty” is that emissions limits that are normalized by the heating value of the hazardous waste require that less volume of lower heating value waste can be burned compared to higher heating value fuel.) This problem is made worse by the limited data base for liquid fuel boilers,

¹⁶⁹ Although the legacy waste that DSSI is burning is nominally classified as a nonwastewater

due to its high organic content, it is in fact a liquid matrix, meaning that the treatment standard of 0.025 µg/l is effectively a total standard.

the lack of historical data to verify that these standards are achievable over time, and having most or all of the measured emissions below detection limits. In addition, most of the mercury and semivolatile metal data EPA has in the data base were obtained during normal operations and while the source demonstrated compliance with RCRA's chromium standard—the other metals data were available only because stack method Method 29 reports data for all RCRA metals, even ones that are not at issue for the compliance test. (Sources generally elected to comply with the BIF Tier I metals emissions levels, but Tier III for chromium. Thus, the Method 29 test for chromium will give emissions results for all the metals—even those not subjected to stack testing—not just chromium.)

Response. As explained earlier in Part Four, Section V.A., EPA has selected normalizing parameters that best fit the input to the combustion device. A thermal normalizing parameter (i.e., expressing the standards in terms of amount of HAP contributed by hazardous waste per thermal content of hazardous waste) is appropriate where hazardous waste is being used in energy-recovery devices as a fuel, since the waste serves as a type of fuel. Using a thermal normalizing parameter in such instances avoids the necessity of subcategorizing based on unit size.

The commenters raise the other side of the same issue. As the commenters point out, some liquid fuel boilers burn lower Btu hazardous waste because that is the waste available to them, and those with waste that has a low heating value are, in their words, “penalized,” compared to those with a high(-er) heating value. Also, since these are not commercial combustion units, they normally lack the opportunity to blend wastes of different heating values to result in as-fired high heating value fuels. If boiler standards are normalized by hazardous waste heating value, sources with lower heating value waste must either reduce the mass concentration of HAP or increase the waste fuel heating value (or increase the system removal efficiency) compared to sources with wastes having the same mass concentration of HAP but higher heating value.

Moreover, the thermal normalizing parameter is not well suited for a hazardous waste that is not burned entirely for its fuel value. In cases where the lower heating value waste is burned, the boiler is serving—at least in part—as a treatment device for the lower heating value hazardous waste. When this occurs, the better normalizing parameter is the unit's gas flow (a

different means of accounting for sources of different size), where the standard is expressed as amount of HAP per volume of gas flow (the same normalizing parameter used for most of the other standards promulgated in today's final rule.)

The commenters requested that liquid fuel boilers be able to select the applicable standard (i.e., to choose between normalizing parameters) and further requested that we assess the performance of these units (for the purpose of establishing concentration-based MACT floor levels) by using the same MACT pool of best performing sources expressed on a thermal emissions basis.

Neither of these suggestions is appropriate. Choice of normalizing parameter is not a matter of election, but rather reflects an objective determination of what parameter is reasonably related to the activity conducted by the source. Moreover, the commenter's suggestion to use thermal emissions to measure best performance for a concentration-based standard does not make sense. It arbitrarily assumes that the best performers with respect to low and high heating value wastes are identical.

Instead, we have established two subcategories among the liquid fuel boilers: those burning high and those burning low heating value hazardous waste. The normalizing parameter for sources burning lower energy hazardous waste is that used for the other hazardous waste treatment devices, gas flow rate, so that the standard is expressed as concentration of HAP per volume of gas flow (a concentration-based form of the standard.) The normalizing parameter for sources burning higher energy content hazardous waste is the thermal parameter used for energy recovery devices, such as cement kilns and lightweight aggregate kilns. For the purposes of calculating MACT floors, the best performers are then drawn from those liquid fuel boilers burning lower energy hazardous waste for the lower heating value subcategory, and from those liquid fuel boilers burning higher energy hazardous waste for the higher heating value subcategory.¹⁷⁰ (See

¹⁷⁰ We also agree that liquid fuel boilers present several unique circumstances, namely: they are often unable to blend fuel and have limited operational flexibility as a result; our data base on these sources' performance is relatively small; much of our mercury and semivolatile metals data is at or near detection limits; and much of the mercury and semivolatile metals data was obtained for other purposes, namely from risk burns or as a result of Method 29 testing to demonstrate compliance with a RCRA chromium standard. While not immediately important to the topic at

Section 23.2 of Volume III of the Technical Support Document for more information.)

Moreover, liquid fuel boilers are not irrevocably placed in one or the other of these subcategories. Rather, the source is subject to the standard for one or the other of these subcategories based on the as-fired heating value of the hazardous waste it burns at a given time. Thus, when the source is burning for energy recovery, then the thermal emissions-based standard would apply. When the source is burning at least in part for thermal destruction, then the concentration based standard would apply. This approach is similar to how we have addressed the issue of normalization in other rules where single sources switch back and forth among inputs which are sufficiently different to warrant separate classification.¹⁷¹

We next considered what an appropriate as-fired heating value would be for each liquid fuel boiler subcategory. Although we have used 5000 Btu/lb (the heating value of lowest grade fuels such as scrap wood) in past RCRA actions as a presumptive measure of when hazardous waste is burned for destruction (see, e.g. 48 FR 11159 (March 16, 1983)), we do not think that measure is appropriate here. We used the 5,000 Btu/lb level to delineate burning for destruction from burning for energy recovery at a time when that determination meant the difference between regulation and nonregulation. See 50 FR 49166–167 (Nov. 29, 1985). This is a different issue from choosing the most reasonable normalizing parameter for regulated units (i.e., units which will be subject to a standard in either case).

Instead, we are adopting a value of 10,000 Btu/lb as the threshold for subcategorization. This is approximately the heating value of commercial liquid fossil fuels. 63 FR 33782, 33788 (June 19, 1998) It is also typical of current hazardous waste burned for energy recovery. *Id.* Moreover, EPA has used this value in its comparable fuel specification as a means of differentiating fuels from waste. See *id.* and Table 1 to 40 CFR section 261.38, showing that EPA normalizes all

hand—namely that not all liquid fuel boilers burn for energy recovery—they are secondary issues that we need to closely consider to make sure we do not estimate what the best performing 12% of sources are achieving in an unreasonable manner.

¹⁷¹ See NESHAP for Stationary Combustion Turbines, 40 CFR section 63.6175 (definitions of “diffusion flame gas-fired stationary combustion turbine”, “diffusion flame oil-fired stationary combustion turbine”, “lean pre-mix gas-fired stationary combustion turbine” and “lean premix oil-fired stationary combustion turbine”).

constituent concentrations to a 10,000 Btu/lb level in its specification for differentiating fuels from wastes.

We next examined the waste fuel being burned at cement kilns and lightweight aggregate kilns, which burn hazardous waste fuels to drive the process chemistry to produce products¹⁷², to cross-check whether 10,000 Btu/lb is a reasonable demarcation value for subcategorizing. 10,000 Btu/lb is the minimum heating value found in burn tank and test report data we have for cement kilns and lightweight aggregate kilns¹⁷³. We believe the cement kiln and light weight aggregate kiln data confirm that this is an appropriate cutpoint, since these sources are energy recovery devices that blend hazardous wastes into a consistent, high heating value fuel for energy recovery in their manufacturing process.

We then separated the liquid fuel boiler emissions data we had into two groups, sources burning hazardous waste fuel with less than 10,000 Btu/lb and all other liquid fuel boilers, and performed separate MACT floor analyses. (See Sections 13.4, 13.6, 13.7, 13.8, and 22 of Volume III of the Technical Support Document.) We calculated concentration-based MACT standards for these sources from their respective mercury, semivolatile metals, chromium, and total chlorine data.

Liquid fuel boilers will need to determine which of the two subcategories the source belongs in at any point in time. Thus, you must determine the as-fired heating value of each batch of hazardous waste fired so that you know the heating value of the hazardous waste fired at all times.¹⁷⁴ If the as-fired heating value of hazardous wastes varies above and below the cutpoint (i.e., 10,000 Btu/lb) at times, you are subject to the thermal emissions standards when the heating value is not less than 10,000 Btu/lb and the mass concentration standards when the heating value is less than 10,000 Btu/lb. To avoid the administrative burden of frequently switching applicable

operating requirements between the subcategories, you may elect to comply with the more stringent operating requirements that ensure compliance with the standards for both subcategories.

Comment: EPA's attempt to give actual performance two different meanings within a single floor approach is unlawful, unexplained, internally inconsistent, and arbitrary. If EPA believes that mass-based emissions constitute sources' actual performance, the best performing sources must be those with the best mass based emissions—not thermal emissions.

Response: As just explained, we agree with this comment, and have developed MACT floors independently for the two subcategories of liquid fuel boilers. Thus, we have defined two separate MACT pools based on the thermal input of the waste fuel and derived two separate and consistent MACT standards for sources when they burn solely for energy recovery, and when they do not.

We also note that a source cannot “pick and choose” the less stringent of the two standards and comply with those. The source must be in compliance with the set of standards that apply.

3. Alternative Particulate Matter Standard for Liquid Fuel Boilers

Comment: A commenter requested that EPA establish standards that allow boilers the option to comply with either a concentration-based particulate matter standard or thermal emissions-based particulate matter standard.

Response: We determined that it is appropriate to express the particulate matter emission standard as a concentration-based standard consistently across source categories and not to give boilers the option to comply with a thermal emissions-based particulate matter standard. As discussed in Part Four, Section III.D as well as the preceding section, metal and chlorine concentration-based emission standards can be biased against sources that process more hazardous waste (from an energy demand perspective), in part because the SRE/Feed methodology assesses feed control of each source when identifying the best performing sources; the ranking procedure thus favors sources with lower percentage hazardous waste firing rates (keeping all other assessment factors equal). The thermal emission standard format eliminates this firing rate bias, which amounts to a limitation on the amount of raw material (hazardous waste fuel to an energy recovery device) that may be

processed, when identifying best performing sources.

The methodology we use to identify best performing sources for particulate matter emissions is not affected by the firing rate bias in the manner that metal and chlorine emissions are. This is primarily because we define best performing sources as those with the best back-end air pollution control technology; feed control is not assessed (specifically ash feed control) for raw materials, fossil fuel, or unenumerated HAP metal in the hazardous waste. The hazardous waste firing rate bias is therefore not present when we identify the best performing particulate matter sources because a source's hazardous waste firing rate is not a direct factor in the ranking procedure.

We also note that four of the nine best performing liquid fuel boilers for particulate matter are equipped with fabric filters. Particulate matter emissions from sources equipped with fabric filters are not significantly affected by ash inlet loading. This is not true for metals and chlorine, given metal and chlorine emissions from fabric filters tend to increase at increased feed rates. See Volume III of the Technical Support Document, Sections 5.3 and 7.4. We conclude that the hazardous waste firing rate issue is not a concern for these sources given their particulate matter emissions would not be significantly affected by increased hazardous waste firing rates.

4. Long-term, Annual Averaging Is Impermissible

Comment: Standards expressed as long-term limits are legally impermissible because those levels, by definition, would sometimes be greater than the average emission levels achieved by the best performing sources. Compliance also must be measured on a continuous basis, under section 302(k) of the Act. Thus, floor levels (and standards) for mercury expressed as long-term limits are illegal.

Response: The commenter maintains that the statutory command in section 112(d)(3)(A) to base floor standards for existing sources on “the average emission limitation achieved by the best performing 12 percent of * * * existing sources” precludes establishing standards expressed as long term averages because certain daily values could be higher. We do not accept this position. The statute does not state what type of “average” performance EPA must assess. Long term, i.e., annual, averaging of performance is quite evidently a type of average, and so is permissible under the statutory text. Moreover, it is reasonable to establish

¹⁷² The Norlite light-weight aggregate kiln was not included in this analysis because they claim they are not burning for energy recovery. The waste Norlite burns is 4,860 Btu/lb or lower. This is indicative of a source burning solely for thermal treatment of the waste and not, at least in part, for energy recovery. See 40 CFR 266.100(d)(2)(ii).

¹⁷³ The cement kiln burn tank data and test report data shows the minimum heating values of 9,900 and 10,000 Btu/lb, respectively, for the hazardous waste. The minimum lightweight aggregate kiln heating values for hazardous waste was 10,000 Btu/lb, excluding the Norlite source.

¹⁷⁴ If you burn hazardous waste in more than one firing nozzle, you must determine the mass-weighted average heating value of the as-fired hazardous waste across all firing nozzles.

standards on this basis (the standards being the average of the best performing sources, expressed as a long-term average), where sufficient data exist. Indeed, since the principal health concern posed by the emitted HAP is from chronic exposure (i.e. cumulative exposure over time), long-term standards (which reduce the long-term distribution of emitted HAP) arguably would be preferable in addressing the chief risks posed by these sources' emissions.

We establish standards with long-term averaging limits whenever we use normal data to estimate long-term performance. We do this in the few instances where there are insufficient data (whether normal data or compliance test data) to estimate each source's short term emission levels (e.g., mercury and semivolatile metal standards for liquid fuel boilers).¹⁷⁵ One or two snapshot data based on normal operations are not likely to reflect a source's short-term operating levels in part because feed control levels can vary over time.¹⁷⁶ See *Mossville*, 370 F. 3d at 1242 (varying feed rates lead to different emission levels, and this variability must be encompassed within the floor standard because the standard must be met at all times). As a result, snapshot normal emissions, when averaged together, better reflect a source's long term average emissions. An emission standard based on normal data that is averaged together, but expressed as a short-term limit, would not be achievable by the best performing sources because it would not adequately account for their emissions variability. See *National Wildlife Federation v. EPA*, 286 F. 3d at 572–73 (“[c]ontinuous operation at or near the daily maximum would in fact result in discharges that exceed the long-term average. Likewise, setting monthly limitations at the 99th percentile would not insure that the long-term average is met”). Long-term limits better account for this variability

¹⁷⁵ Two emission standards in this rulemaking are based on normal data but are expressed as short term limits (the mercury standards for lightweight aggregate and cement kilns). However, in these instances we had enough normal data to reasonably estimate each source's maximum emissions, thus allowing us to express the standard as a short term limit. See USEPA, “Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards,” September 2005, Sections 11.2 and 12.2.

¹⁷⁶ This is not the case for floors that are based on compliance tests because sources spiked their hazardous wastes to account for variability in hazardous waste feedrate. See Part Four, Section III.C above. Normal data, however, are a snapshot of what occurred on that day and are not likely to be representative over the long term, especially for mercury and semivolatile metals for liquid fuel boilers, where these limited data were almost entirely below the analytic detection limit.

because such limits allow sources to average their varying feed control levels over time while still assuring average emissions over this period are below the levels demonstrated by the best performing sources.

Indeed, under the commenter's approach where no averaging of intra-source data would be allowed, sources would not be in compliance with the standards during the performance tests themselves. The tests consist of the average of three data runs, so half of the emissions-weighted data points would be impermissibly higher than the average during the test used to derive today's emission standards.

EPA also does not see that section 302(f) of the Act, cited by the commenter, supports its position. That provision indicates that the emission standards EPA establishes must limit the quantity, rate, or concentration of air pollutants on a continuous basis. A standard expressed as a long-term average does so by constraining the overall distribution of emissions to meet a long-term average. Also, long term limits result in emission standards that are lower than those that otherwise would be implemented on a short-term basis. The short-term limit would have to reflect the best performing sources' short term emissions variability (i.e., the maximum amount of variability a source could experience during a single test period). *National Wildlife Federation*, 286 F. 3d at 571–73.

Comment: Other commenters argued the opposite point, that ERA has no data to show that an annual average is achievable, and EPA should establish a longer averaging period.

Response: We believe that all sources can achieve the mercury and semivolatile metals standards for liquid fuel boilers on an annual basis using some combination of MACT controls, i.e., feed control, back end control, or some combination of both. We agree that we have a small data set for these standards, but also believe that it is intuitive that a liquid fuel boiler can meet these standards on an annual basis, because one year is sufficiently more than any seasonal (i.e., several month long) production of certain items that may not be represented by the tests we have.

This informs us that an average of less than a year may not be achievable. It does not inform us that averaging of more than a year is required, since variations that occur with a year are averaged together. An annual average is sufficient for a source to determine whether an individual waste stream impacts negatively on the compliance of

the liquid fuel boiler and take measures to address the issue.

5. Gas Fuel Boilers

Comment: How can a boiler burning only gaseous waste also be burning hazardous waste? Uncontained gases are not considered hazardous waste under RCRA. Why are boilers that burn only gasses part of the liquid fuel boiler subcategory?

Response: We agree with the commenter that boilers that burn gasses are unlikely to burn hazardous wastes. However, gas fuel hazardous waste boilers have existed in the past,¹⁷⁷ and we believe we need to define a MACT standard for them. Therefore, we included gas fuel boilers in the liquid fuel boiler subcategory for reasons cited in the proposed rule. See 69 FR at 21216.

E. General

1. Alternative to the Particulate Matter Standards

Comment: Commenters state that some incinerators are currently complying with the alternative to the particulate matter standard provision pursuant to the interim standards. See § 63.1206(b)(14). The eligibility and operating requirements for the alternative to the particulate matter standard in the Interim Standards are different than the proposed alternative to the particulate matter standard in the replacement rule. Specifically, the proposed alternative to the particulate matter standard would no longer require sources to demonstrate a 90% system removal efficiency or a minimum hazardous waste metal feed control level to be eligible for the alternative. Commenters request that EPA clarify in the final rule that the proposed alternative to the particulate matter standard supersedes the requirements in the Interim Standards.

Response: We are finalizing the alternative to the particulate matter standard for incinerators as proposed, with the exception that the alternative metal emission limitations have been revised as a result of database changes since proposal. See § 1219(e) and part three, section II.A. We considered superseding the interim standard alternative to the particulate matter standard requirements (63.1206(b)(14)) immediately (upon promulgation) by replacing it with the revised alternative

¹⁷⁷ For example, sources 2014 and 2015 owned by Environmental Purification Industries in Toledo, Ohio, were considered hazardous waste boilers at the time the Phase II data base was noticed in the June 27, 2000, despite the fact that these boilers burned only gasses. These boilers have since stopped burning hazardous waste.

standard provisions finalized in today's rule. Although the eligibility requirements for the alternative to the particulate matter standard finalized today are less stringent than the interim standard requirements, the metal emission limitations that are also required by the alternative finalized today are by definition equivalent to or more stringent than the metal limitations in the interim standard alternative. We therefore cannot completely supersede the interim standard provisions immediately (upon promulgation) because sources have three years to comply with more stringent standards. We are instead revising the interim standard provisions of § 63.1206(b)(14) to only reflect the revised alternative standard eligibility criteria (specifically, we have removed the requirements to achieve a given system removal efficiency and hazardous waste metal HAP feed control level).¹⁷⁸ These eligibility criteria revisions become effective immediately with respect to the interim standards because they are less stringent than the current requirements. Sources should modify existing Notifications of Compliance and permit requirements as necessary prior to implementing these revised procedures.

Comment: One commenter is opposed to the alternative to the particulate matter standard because it ignores the health effects/benefits that are attributable to particulate matter.

Response: Particulate matter is not defined as a hazardous air pollutant pursuant to the NESHAP program. See CAA 112(b)(1). We control particulate matter as a surrogate for metal HAP. See part four, section IV.A. As a result, a particulate matter standard is not necessary in instances where metal HAP emission standards can alternatively and effectively control the nonmercury metal HAP that is intended to be controlled with the surrogate particulate matter standard. The alternative to the particulate matter standard in the final rule accomplishes this. We acknowledge that particulate matter emission reductions result in health benefits. That in itself does not give EPA the authority under § 112(d)(2) to directly regulate particulate matter, however.

¹⁷⁸ Sources can only use § 63.1206(b)(14) for purposes of complying with the interim standards. After the compliance date for today's rule, incinerators electing to comply with the alternative to the particulate matter standard must comply with the provisions found in § 63.1219(e).

2. Assessing Risk as Part of Consideration of Nonair Environmental Impacts

Comment: Commenter states that EPA has inappropriately failed to consider emissions of persistent bioaccumulative pollutants in its beyond-the-floor analysis despite EPA's acknowledgment that these HAPs have non-air quality health and environmental impacts.

Response: EPA has taken the consistent position that considerations of risk from air emissions have no place when setting MACT standards, but rather are to be considered as part of the residual risk determination and standard-setting process made under section 112 (f) of the statute. EPA thus interprets the requirement in section 112 (d) (2) that we consider "non-air quality health and environmental impacts" as applying to the by-product outputs from utilization of the pollution control technology, such as additional amount of waste generated, and water discharged.¹⁷⁹ EPA's interpretation was upheld as reasonable in *Sierra Club v. EPA*, 353 F. 3d 976, 990 (D.C. Cir. 2004) (Roberts, J.).

VII. Health-Based Compliance Alternative for Total Chlorine

A. Authority for Health-Based Compliance Alternatives

Comment: One commenter states there is no established health threshold for either HCl or chlorine.

Response: Although EPA has not developed a formal evaluation of the potential for HCl or chlorine carcinogenicity (e.g., for IRIS), the evaluation by the International Agency for Research on Cancer stated that there was inadequate evidence for carcinogenicity in humans or experimental animals and thus concluded that HCl and chlorine are not classifiable as to their carcinogenicity to humans (Group 3 in their categorization method). Therefore, for the purposes of this rule, we have evaluated HCl and chlorine only with regard to non-cancer effects. In the absence of specific scientific evidence to the contrary, it has been our policy to classify non-carcinogenic effects as threshold effects. RfC development is the default approach for threshold (or nonlinear) effects.

Comment: One commenter states that the proposal is an inappropriate forum for bringing forward such a significant change in the way that MACT standards

¹⁷⁹ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume V: Emission Estimates and Engineering Costs," September 2005, Section 6, for a discussion of the non-air impact that were assessed for this final rule.

are established under Section 112(d) of the Clean Air Act. A precedent-setting change of the magnitude that EPA has raised should be discussed openly and carefully with all affected parties, rather than being buried in several individual proposed standards.

Response: Including health-based compliance alternatives for hazardous waste combustors does not mean that EPA will automatically provide such alternatives for other source categories. Rather, as has been the case throughout the MACT rule development process, EPA will undertake in each individual rule to determine whether it is appropriate to exercise its discretion to use its authority under CAA section 112(d)(4) in developing applicable emission standards. Stakeholders for those affected rules will have ample opportunity to comment on the Agency's proposals.

Comment: One commenter states that the proposed approach is contrary to the intent of the CAA which explicitly calls for a general reduction in HAP emissions from all major sources nationwide through the establishment of MACT standards based on technology, rather than risk, as a first step.

Response: For pollutants for which a health threshold has been established, CAA section 112(d)(4) allows the Administrator to consider such threshold level, with an ample margin of safety, to establish emission standards.

Comment: One commenter states that the proposed approach would take the national air toxics program back to the time-consuming NESHAP process that existed prior to the Clean Air Act Amendments of 1990.

Response: We disagree that allowing a health-based compliance alternative in the final rule will alter the MACT program or affect the schedule for promulgation of the remaining MACT standards. Today's rule is the last MACT rule to be promulgated, and the health-based compliance alternative did not delay promulgation of the rule.

Comment: A commenter is concerned that the proposal would remove the benefit of the "level-playing field" that would result from the proper implementation of technology-based MACT standards.

Response: Providing health-based compliance alternatives in the final rule for sources that can meet them will assure the application of a uniform set of requirements across the nation. The final rule and its criteria for demonstrating eligibility for the health-based compliance alternatives apply uniformly to all hazardous waste combustors except hydrochloric acid

production furnaces. The final rule establishes two baseline levels of emission reduction for total chlorine, one based on a traditional MACT analysis and the other based on EPA's evaluation of the health threat posed by emissions of HCl and chlorine. All hazardous waste combustor facilities must meet one of these baseline levels, and all facilities have the same opportunity to demonstrate that they can meet the alternative health-based emission standards. We also note that additional uniformity is provided by limiting the health-based compliance alternatives for incinerators, cement kilns, and lightweight aggregate kilns to the emission levels allowed by the Interim Standards.

Comment: Several commenters state that site-specific emission limits are inappropriate under section 112(d)(4) because they are not emission standards. One commenter asserts that the Agency's position that the limits are based on uniform procedures is flawed because the process allows "any scientifically-accepted, peer-reviewed risk assessment methodology for your site-specific compliance demonstration." This is not a "uniform" procedure, according to the commenter. There are a host of variables that influence the results of an accepted methodology. The commenter reasons that, without some standardization of those variables, there is no uniform or standard analysis. Each permitting authority could establish its view of appropriate variables; there would be no national consistency.

Several other commenters assert that EPA has the authority to establish an exposure-based emission limit for total chlorine. One commenter notes that one issue that often arises when considering risk-based standards is whether EPA has authority under section 112 to establish an exposure-based emission limit. The commenter states that the concern seems to be that some stakeholders construe the Act's statutory provisions as requiring uniform emission limitations at all facilities, rather than emissions that are measured at places away from the source and that vary from facility to facility. The commenter does not see any legal impediment to establishing exposure-based limits.

The commenter notes that, first, under section 112, EPA has authority to establish "emission standards." Emission standards are defined to be a requirement established by the State or the Administrator which limits the quantity, rate or concentration of emissions of air pollutants on a continuous basis * * * to assure continuous emission reduction, and any

design, equipment, work practice or operational standard promulgated under this chapter. EPA's alternate risk-based emission standard will limit the quantity, rate or concentration of the emissions. The commenter states that there is no requirement in the definition that specifies where the emission standard is to be measured, nor is there such a requirement anywhere in the statute.

Second, the commenter notes that EPA's proposed exposure-based limit will result in facilities establishing operating parameter limitations, or OPLs. These OPLs qualify as emission limitations because they are "operational standards" being promulgated under section 112, according to the commenter. They will be measured at the facility, not at the point of exposure. Finally, the commenter reasons that the limitations EPA is establishing are uniform. They uniformly protect the individual most exposed to emission levels no higher than a hazard index of 1.0. Consequently, the commenter believes that there is nothing in the statute that prevents the Agency from promulgating exposure-based emission standards.

Response: We agree with the commenters who believe the Agency has the authority to establish health-based compliance alternatives under a national exposure standard. In particular, we agree with the commenter that the health-based compliance alternatives are national standards since they provide a uniform and national measure of risk control, and also that the health-based compliance alternatives are "emission standards" because they limit the quantity, rate or concentration of total chlorine emissions.

Section 112(d)(4) authorizes EPA to bypass the mandate in section 112(d)(3) in appropriate circumstances. Those circumstances are present for hazardous waste combustors other than hydrochloric acid production furnaces. Section 112(d)(4) provides EPA with authority, at its discretion, to develop health-based compliance alternatives for HAP "for which a health threshold has been established," provided that the standard reflects the health threshold "with an ample margin of safety."

Both the plain language of section 112(d)(4) and the legislative history indicate that EPA has the discretion under section 112(d)(4) to develop health-based compliance alternatives for some source categories emitting threshold pollutants, and that those standards may be less stringent than the corresponding MACT standard

(including floor standards) would be.¹⁸⁰ EPA's use of such standards is not limited to situations where every source in the category or subcategory can comply with them. As with technology-based standards, a particular source's ability to comply with a health-based standard will depend on its individual circumstances, as will what it must do to achieve compliance.

In developing health-based compliance alternatives under section 112(d)(4), EPA seeks to ensure that the concentration of the particular HAP to which an individual exposed at the upper end of the exposure distribution is exposed does not exceed the health threshold. The upper end of the exposure distribution is calculated using the "high end exposure estimate," defined as "a plausible estimate of individual exposure for those persons at the upper end of the exposure distribution, conceptually above the 90th percentile, but not higher than the individual in the population who has the highest exposure" (EPA Exposure Assessment Guidelines, 57 FR 22888, May 29, 1992). Assuring protection to persons at the upper end of the exposure distribution is consistent with the "ample margin of safety" requirement in section 112(d)(4).

We agree with the view of several commenters that section 112(d)(4) is appropriate for establishing health-based compliance alternatives for total chlorine for hazardous waste combustors other than hydrochloric acid production furnaces. Therefore, we have established such compliance alternatives for affected sources in those categories. Affected sources which believe that they can demonstrate compliance with the health-based compliance alternatives may choose to comply with those compliance alternatives in lieu of the otherwise applicable MACT-based standard.

Comment: One commenter states that the risk assessments would not provide an ample margin of safety because background exposures are not taken into account. There is no accounting for other chlorine compounds from other sources at the facility, or from other neighboring facilities. The commenter believes that there is no evidence in the section 112(f) residual risk assessments produced thus far that emissions from collocated sources will actually be pursued by EPA. The commenter also notes that the Urban Air Toxics program cannot be relied upon to address ambient background. This program,

¹⁸⁰ See also Legislative History at 876 (section 112(d)(4) standard may be less stringent than MACT).

required under section 112(k), was to be completed by 1999. However, the strategy has not been finalized and the small amount of activity in this area is focused on *voluntary* emission reductions rather than federal requirements. Finally, the commenter notes that control of criteria pollutants via State Implementation Plans to achieve compliance with the NAAQS is problematic. For particulate matter (PM) and ozone, new NAAQS were set in 1997 and seven years later the nonattainment designations are still being determined. The designation process will be followed by a 3 year period to prepare State Implementation Plans and several more years to carry out those plans. In the meantime, there will be high levels of PM and ozone in the air near many hazardous waste combustors in New Jersey which will exacerbate exposures to chlorine and hydrogen chloride.

Response: Total chlorine missions from collocated hazardous waste combustors must be considered in establishing health-based compliance alternatives under § 63.1215. Ambient levels of HCl or chlorine attributable to other on-site sources, as well as off-site sources, are not considered, however. As we indicated in the Residual Risk Report to Congress and in the recent residual risk rule for Coke Ovens, the Agency intends to consider facility-wide HAP emissions as part of the ample margin of safety determination for CAA section 112(f) residual risk actions. 70 FR at 19996–998 (April 15, 2005); see also, 54 FR at 38059 (Sept. 14, 1989) (benzene NESHA).

Comment: Several commenters state that acute exposure guideline levels (AEGLs) are *once-in-a-lifetime* exposure levels. They assert that, because short term exposures at a Hazard Index greater than 1.0 may occur more than once in a lifetime, using AEGLs for the purpose of setting risk-based short-term limits for HCl and chlorine does not provide an “ample margin of safety.”

Response: To assess acute exposure, we proposed to use acute exposure guideline levels for 1-hour exposures (AEGL–1) as health thresholds. We have investigated commenters’ concerns, however, and conclude that AEGLs are not likely to be protective of human health because individuals may be subject to multiple acute exposures at a Hazard Index greater than 1.0 from hazardous waste combustors. Consequently, we use acute Reference Exposure Levels (aRELs) rather than acute exposure guideline levels (AEGLs) as acute exposure thresholds for the final rule. See also Part Two, Section IX.D above. Acute RELs are health

thresholds below which there would be no adverse health effects while AEGL–1 values are health thresholds below which there may be mild adverse effects.

Acute exposures are relevant (in addition to chronic exposures) and the acute exposure hazard index of 1.0 could be exceeded multiple times over an individual’s lifetime. Although we concluded at proposal that the chronic exposure Hazard Index would always be higher than the acute exposure Hazard Index, and thus would be the basis for the total chlorine emission rate limit, this conclusion relates to acute versus chronic exposure to a constant, maximum average emission rate of total chlorine from a hazardous waste combustor. See 69 FR at 21300. We explained that acute exposure must nonetheless be considered when establishing operating requirements to ensure that short-term emissions do not result in an acute exposure Hazard Index of greater than 1.0. This is because total chlorine and chloride feedrates to a hazardous waste combustor (e.g., commercial incinerator) can vary substantially over time. Although a source may remain in compliance with a feedrate limit with a long-term averaging period (e.g., 12-hour, monthly, or annual) based on the chronic Hazard Index, the source could feed chlorine during short periods of time that substantially exceed the long-term feedrate limit. This could result potentially in emissions that exceed the one-hour (i.e., acute exposure) Hazard Index. Consequently, we discussed at proposal the need to establish both short-term and long-term total chlorine and chloride feedrate limits to ensure that neither the chronic exposure nor the acute exposure Hazard Index exceeds 1.0.¹⁸¹

We conclude that 1-hour Reference Exposure Levels (aRELs) are a more appropriate health threshold metric than AEGL–1 values for hazardous waste combustors given that the acute Hazard Index limit of 1.0 may be exceeded multiple times over an individual’s lifetime, albeit resulting from uncontrollable factors. The California Office of Health Hazard Assessment has developed acute health threshold levels that are intended to be

¹⁸¹ Note that we conclude for the final rule that most sources are not likely to exceed the acute Hazard Index because they will establish a 12-hour rolling average chlorine feedrate limit and their chlorine feedrates are not likely to vary substantially over that averaging period. Thus, we believe that most sources will not be required to establish an hourly rolling average chlorine feedrate limit. The owner/operator must determine whether the hourly rolling average chlorine feedrate limit can be waived under § 63.1215(d).

protective for greater than once in a lifetime exposures. The acute exposure levels are called acute Reference Exposure Levels and are available at http://www.oehha.ca.gov/air/acute_rels/acutereel.html.

The 1-hour REL values for hydrogen chloride and chlorine are 2.1 mg/m³ and 0.21 mg/m³, respectively. The AEGL–1 values for hydrogen chloride and chlorine are 2.7 mg/m³ and 1.4 mg/m³, respectively. Although there is little difference between the 1-hour REL and AEGL–1 values for hydrogen chloride, the 1-hour REL for chlorine is substantially lower than the AEGL–1 value.

In summary, we believe that aRELs are a more appropriate health threshold metric than AEGL–1 values for establishing health-based compliance alternatives for hazardous waste combustors because aRELs are “no adverse effect” threshold levels that are intended to be protective for multiple exposures.

Comment: One commenter states that the health-based compliance alternative is unlawful because the proposal does not address ecological risks that may result from uncontrolled HAP emissions, including risks posed to those areas where few people currently live, but sensitive habitats exist.

Response: An ecological assessment is normally required under CAA section 112(d)(4) to assess the presence or absence of “adverse environmental effects” as that term is defined in CAA section 112(a)(7). To identify potential multimedia and/or environmental concerns, EPA has identified HAP with significant potential to persist in the environment and to bioaccumulate. This list does not include hydrogen chloride or chlorine.

We also note that health-based total chlorine emission limits for incinerators, cement kilns, and lightweight aggregate kilns cannot be higher than the current Interim Standards. See § 63.1215(b)(7). Thus, the ecological risk from total chlorine emissions from these sources will not be increased under the health-based limits.

In addition, we note that only 2 of 12 solid fuel boilers have total chlorine emissions higher than 180 ppmv, and only 1 liquid fuel boiler has emissions higher than 170 ppmv. Thus, boilers generally have low total chlorine emissions which would minimize ecological risk.

Consequently, we do not believe that emissions of hydrogen chloride or chlorine from hazardous waste boilers will pose a significant risk to the environment, and facilities attempting to comply with the health-based

alternatives for these HAP are not required to perform an ecological assessment.

B. Implementation of the Health-Based Standards

Comment: Several commenters are concerned that the health-based compliance alternative will place an intensive resource demand on state and local agencies to review and approve facilities' eligibility demonstrations, and State and local agencies may not have adequate expertise to review and approve the demonstrations. One commenter states that permitting authorities do not have the expertise to review eligibility demonstrations that are based on procedures other than those included in EPA's Reference Library, as would be allowed. The commenter also states that, if the health-based compliance alternative is promulgated, EPA should establish one standard method for the analyses so there is consistency nationwide. If EPA offers more than one method, EPA should do all of the risk assessment reviews, instead of passing the responsibility, without clear direction, to the permitting authorities, according to the commenter.

Response: The health-based compliance alternatives for total chlorine that EPA has adopted in the final rule should not impose significant resource burdens on states. The required compliance demonstration methodology is structured in such a way as to avoid the need for states to have significant expertise in risk assessment methodology. We have considered the commenters' concerns in developing the criteria defining eligibility for these compliance alternatives, and the approach that is included in the final rule provides clear, flexible requirements and enforceable compliance parameters. The final rule provides two ways that a facility may demonstrate eligibility for complying with the health-based compliance alternatives. First, look-up tables allow facilities to determine, using a limited number of site-specific input parameters, whether emissions from their sources might cause the Hazard Index limit to be exceeded. Second, if a facility cannot demonstrate eligibility using a look-up table, a modeling approach can be followed. The final rule presents the criteria for performing this modeling.

Only a portion of hazardous waste combustors will submit eligibility demonstrations for the health-based compliance alternatives. Of these sources, several should be able to demonstrate eligibility based on simple

analyses—using the look-up tables. However, some facilities will require more detailed modeling. The criteria for demonstrating eligibility for the compliance alternatives are clearly defined in the final rule. Moreover, under authority of RCRA section 3005(c)(3), multi-pathway risk assessments will typically have already been completed for many hazardous waste combustors to document that emissions of toxic compounds, including total chlorine, do not pose a hazard to human health and the environment. Thus, state permitting officials have already reviewed and approved detailed modeling studies for many hazardous waste combustors. The results of these studies could be applied to the eligibility demonstration required by this final rule.

Because these requirements are clearly defined, and because any standards or requirements created under CAA section 112 are considered applicable requirements under 40 CFR part 70, the compliance alternatives would be incorporated into title V programs, and states would not have to overhaul existing permitting programs.

Finally, with respect to the burden associated with ongoing assurance that facilities that opt to do so continue to comply with the health-based compliance alternatives, the burden to states will be minimal. In accordance with the provisions of title V of the CAA and part 70 of 40 CFR (collectively "title V"), the owner or operator of any affected source opting to comply with the health-based compliance alternatives is required to certify compliance with those standards every five years on the anniversary of the comprehensive performance test. In addition, if the facility has reason to know of changes over which the facility does not have control, and these changes could decrease the allowable HCl-equivalent emission rate limit, the facility must submit a revised eligibility demonstration. Further, before changing key parameters that may impact an affected source's ability to continue to meet the health-based emission standards, the source is required to evaluate its ability to continue to comply with the health-based compliance alternatives and submit documentation to the permitting authority supporting continued eligibility for the compliance alternative. Thus, compliance requirements are largely self-implementing and the burden on states will be minimal.

Comment: One commenter suggests that the look-up tables would have more utility if EPA developed tables for each

source category to ensure the HCl-equivalent emission rate limits reflected stack parameters representative of each source category. Similarly, another commenter notes that a look-up table designed to be applicable to all hazardous waste combustors is very conservative and will have limited utility. This commenter does not suggest that EPA develop look-up tables for each class of hazardous waste combustors, however. Rather, the commenter suggests that since look-up tables have already been developed for industrial boilers that do not burn hazardous waste¹⁸² hazardous waste combustors should be allowed to use those look-up tables instead of the look-up tables proposed for hazardous waste combustors.

Response: We noted at proposal that the emission rates provided in the look-up table for hazardous waste combustors are more stringent than those promulgated for solid fuel industrial boilers that do not burn hazardous waste. This is because the key parameters used by the SCREEN3 atmospheric dispersion model (i.e., stack diameter, stack exit gas velocity, and stack exit gas temperature) to predict the normalized air concentrations that EPA used to establish HCl-equivalent emission rates for solid fuel industrial boilers that do not burn hazardous waste are substantially different for hazardous waste combustors. Thus, the maximum HCl-equivalent emission rates for hazardous waste combustors would generally be lower than those EPA established for solid fuel industrial boilers that do not burn hazardous waste.

Nonetheless, we agree with the commenter's concerns that the look-up tables would have more utility if they better reflected the range of stack properties representative of hazardous waste combustors. Accordingly, we examined the stack parameters for all hazardous waste-burning sources in our data base (except for hydrochloric acid production furnaces that are not eligible for the health-based emission standards). After analyzing the relationships among the various stack parameters (i.e., stack height, stack diameter, stack gas exhaust volume, and exit temperature), we concluded that the look-up table should be modified to treat both stack diameter and stack height as independent variables rather than relying on stack height alone.

We developed separate tables for short-term (i.e., 1-hour) HCl-equivalent

¹⁸² See Table 2 of Appendix A to Subpart DDDDD, Part 63.

emissions limits to protect against acute health effects and long-term (i.e., annual) emission limits to protect against chronic effects from exposures to chlorine and hydrogen chloride. As discussed above, we used the acute Reference Exposure Level (aREL) developed by Cal-EPA as the benchmark for acute health effects. We used EPA's Reference Concentrations (RfC) as the benchmark for chronic health effects from exposures occurring over a lifetime.

Emission limits in the look-up table are expressed in terms of HCl-toxicity equivalent emission rates (lbs/hr). To convert your total chlorine emission rate (lb/hr) to an HCl-equivalent emission rate, you must adjust your chlorine emission rate by a multiplicative factor representing the ratio of the HCl health risk benchmark to the chlorine health risk benchmark. For 1-hour average HCl-equivalent emission rates, the ratio is the ratio of the aREL for HCl (2100 micrograms per cubic meter) to the aREL for chlorine (210 micrograms per cubic meter), or a factor of 10.¹⁸³ For annual average emissions, the ratio is the ratio of the RfC for HCl (20 micrograms per cubic meter) to the RfC for chlorine (0.2 micrograms per cubic meter), or a factor of 100. See § 63.1215(b).

We used the SCREEN3 air dispersion model to develop the emission limits in the look-up tables. SCREEN3 is a screening model that estimates air concentrations under a wide variety of meteorological conditions in order to identify the meteorological conditions under which the highest ambient air concentrations are likely to occur and what the magnitude of the ambient air concentrations are likely to be. The SCREEN3 model implements the procedures in EPA's "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised" (EPA-454/R-92-019, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, October 1992). Included are options for estimating ambient air concentrations in simple elevated terrain and complex terrain. Simple elevated terrain refers to terrain elevations below stack top. We did not use the complex terrain option in the development of the look-up tables because of the site-specific nature of plume impacts in areas of complex terrain. Therefore, the look-up tables

¹⁸³ We note that this factor of 10 ratio of the aRELs of HCl to chlorine is based on current aREL values and is subject to change. You must use current aREL (and RfC) values when you conduct your eligibility demonstration. See § 63.1215(b)(4 and 5).

cannot be used in areas of complex terrain (which we define generally as terrain that rises above stack top). Sources located in complex terrain (i.e., as a practical matter, sources other than those that are located in flat or simple elevated terrain as discussed below and thus cannot use the look-up tables) must use site-specific modeling procedures to establish HCl-equivalent emission rates.

We looked at two generic terrain scenarios for purposes of the look-up table. In one we assumed the terrain rises at a rate of 5 meters for every 100 meter run (i.e., a slope of 5 percent) and that terrain is "chopped off" above stack top (following the convention for such analyses in simple elevated terrain). In the other we assumed flat terrain. As can be seen from the tables in § 63.1215, the emission limits with flat terrain are significantly higher than those with simple elevated terrain. To reasonably ensure that the emission limits are not substantially over-stated (e.g., by a factor of 2), the simple elevated terrain table must be used whenever terrain rises to an elevation of one half (1/2) the stack height within a distance of 50 stack heights.

For both the simple elevated terrain and flat terrain scenarios, we performed model runs for urban and rural dispersion conditions, with and without building downwash. We selected the highest (ambient air concentration) values at each distance from among the four runs for each of the terrain scenarios.

As can be seen from the tables in § 63.1215, the HCl-equivalent emission rate limits range from 0.13 pounds per hour on an annual average (for a 0.3 meter diameter stack that is 5 meters tall that lies within 30 meters of the property boundary) to 340 pounds per hour (for a 4.0 meter diameter stack that is 100 meters tall that lies 5000 meters from the property boundary) when located in simple elevated terrain. In flat terrain, the range is from 0.37 to 1100 pounds per hour on an annual average. This contrasts with the look-up table at proposal, where the comparable range was from 0.0612 pounds per hour (for a 5 meter stack height at a distance of 30 meters) to a maximum of 18 pounds per hour (for stack heights of 50 meters or greater, at distances of 500 meters or greater).

If you have more than one hazardous waste combustor on site, the sum of the ratios for all combustors of the HCl-equivalent emission rate to the HCl-equivalent emission rate limit cannot exceed 1.0. See § 63.1215 (c)(3)(v). This will ensure that the Hazard Index of 1.0 is not exceeded considering emissions from all on-site combustors.

Comment: Several commenters state that facilities should be allowed to establish an averaging period for the total chlorine and chloride feedrate limit that is shorter than an annual rolling average. Commenters are referring to the feedrate limit to ensure compliance with the annual average HCl-equivalent emission rate limit. Commenters are concerned with the data handling issues that could arise from calculating, recording, and reporting an annual rolling average feedrate level that is updated hourly, and note that a shorter averaging period would make the limit more stringent.

Response: We agree with commenters, and conclude, moreover, that a 12-hour averaging period rather than an annual averaging period will be imposed on the vast majority of sources as a practical matter. This is because sources must establish a limit on the feedrate of total chlorine and chloride to ensure compliance with the semivolatile metals emission standards. See § 63.1209(n). The feedrate limit for total chlorine and chloride is established under § 63.1209(n) as the average of the hourly rolling averages for each test run, and the averaging period is 12 hours. Thus, the averaging period for the feedrate limit for semivolatile metals—12-hour rolling average updated hourly—trumps the annual rolling average averaging period that would otherwise apply here.¹⁸⁴

Sources may also demonstrate compliance with the semivolatile metals standard by assuming all semivolatile metals in feedstreams are emitted. See § 63.1207(m)(2). Sources that do not have emission control equipment, such as most liquid fuel boilers, are particularly likely to use this approach. Under this approach, there is no concern regarding increased volatility of metals as chlorine feedrates increase, and such sources are not subject to a feedrate limit for chlorine for compliance assurance with the semivolatile metal standard. These sources may establish an averaging period for the feedrate of total chlorine and chloride for compliance with the health-based compliance alternative for total chlorine of not to exceed one year.¹⁸⁵

¹⁸⁴ To also ensure compliance with the annual average HCl-equivalent emission rate limit, however, the numerical value of the feedrate limit established during the semivolatile metals performance test cannot exceed the value calculated as the annual average HCl-equivalent emission rate limit divided by [1 - system removal efficiency], where you demonstrate the total chlorine system removal efficiency during the comprehensive performance test.

¹⁸⁵ We note that we have also applied this "not-to-exceed" approach to establishing the duration of

Comment: Several commenters offered suggestions on whether a short-term feedrate limit was needed for total chlorine and chloride (*i.e.*, chlorine) as EPA suggested, and if EPA continues to consider it necessary, how the limit should be established.

One commenter states that it is not necessary to set short-term limits for chlorine feedrates. If EPA concludes that short-term limits are necessary, however, the commenter recommended these options: (1) Cap the feedrate at a level that is extrapolated up to the feedrate associated with Interim Standard for incinerators; (2) if the facility uses the site-specific option to set emission limits, the dispersion models can easily be used to set a 1-hour (or longer) limit; and (3) if the facility uses the look up table (which at proposal provided only annual average HCl-equivalent emission rate limits), a short-term limit can be set based on a multiplier of the annual limit¹⁸⁶ times the annual limit as recommended by documents in EPA's Air Toxics Risk Assessment Reference Library.

Another commenter states that, if EPA were to promulgate a short-term feedrate limit, the EPA-endorsed factor of 0.08 employed to translate maximum hourly concentrations to annual concentrations could be used to identify the maximum hourly feedrate limit.

Finally, another commenter states that extrapolation of the chlorine feedrate (from the level during the comprehensive performance test when the source documents compliance with the annual average HCl-equivalent emission rate limit) should be allowed to 100% of the 1-hour average HCl-equivalent emission rate limit because numerous safety factors have already been included in the health risk threshold values, look-up tables, and modeling demonstration.

Response: At proposal, we explained that sources would establish an annual average feedrate limit on chlorine as the feedrate level during the comprehensive performance test demonstrating compliance with the annual average HCl-equivalent emission rate limit.¹⁸⁶

averaging periods for the limits on all operating parameters established under § 63.1209. See new § 63.1209(r) and USEPA, "Final Technical Support Document for HWC MACT Standards, Volume IV: Compliance with HWC MACT Standards, September 2005, Section 2.4.6.

¹⁸⁶ We discussed at proposal that the feedrate limit to ensure compliance with the long-term Hazard Index limit of not to exceed 1.0 would be the average of the hourly rolling averages for each test run, with compliance based on an annual average. Note that, under the final rule however, the long-term chlorine feedrate limit is established as the annual average HCl-equivalent emission rate limit divided by [1 - system removal efficiency]. See § 63.1215(g)(2).

Only long-term exposures—maximum annual average exposures—need be considered when confirming that the chlorine feedrate during the comprehensive performance test (*i.e.*, average of the hourly rolling averages for each run) is acceptable because the annual exposure Hazard Index limit (*i.e.*, not to exceed 1.0) would always be exceeded before the 1-hour Hazard Index limit (*i.e.*, not to exceed 1.0). Thus, the feedrate limit associated with annual exposures would always be more stringent than the feedrate limit associated with 1-hour exposures. See 69 FR at 21299.

We further explained at proposal, however, the need to establish a short-term feedrate limit for chlorine to ensure that the 1-hour HCl-equivalent emission rate did not exceed the 1-hour average HCl-equivalent emission rate limit due to variability in the chlorine feedrate during the annual averaging period for the feedrate limit. We requested comment on approaches to establish this 1-hour chlorine feedrate limit, including extrapolating feedrates to 100% of the 1-hour average HCl-equivalent emission rate limit. See 69 FR at 21304.

In the final rule we have corrected and refined these procedures. The final rule requires you to establish a long-term chlorine feedrate limit to maintain compliance with the annual average HCl-equivalent emission rate limit as either: (1) The chlorine feedrate during the comprehensive performance test if you demonstrate compliance with the semivolatile metals emission standard during the test (see § 63.1209(o)); or (2) if you comply with the semivolatile metals emission standard under § 63.1207(m)(2) by assuming all metals in the feed to the combustor are emitted, the annual average HCl-equivalent emission rate limit divided by [1 - system removal efficiency] where you demonstrate the system removal efficiency during the comprehensive performance test. See discussion in Part Two, Section IX.H, of this preamble. If you establish the chlorine feedrate limit based on the feedrate during the performance test to demonstrate compliance with the semivolatile metals emission standard, the averaging period for the feedrate limit is a 12-hour rolling average. If you establish the chlorine feedrate limit based on the system removal efficiency during the performance test, the averaging period is up to an annual rolling average.

The final rule also requires you to establish an hourly rolling average chlorine feedrate limit if you determine under § 63.1215(d)(3) that the 1-hour average HCl-equivalent emission rate

limit may be exceeded. That feedrate limit is established as the 1-hour HCl-equivalent emission rate limit divided by [1 - system removal efficiency].

Under § 63.1215(d)(3), you must establish an hourly rolling average chlorine feedrate limit unless you determine considering specified criteria that your chlorine feedrates will not increase over the averaging period for the long-term chlorine feedrate limit (*i.e.*, 12-hour rolling average or (up to) annual rolling average) to a level that may result in an exceedance of the 1-hour average HCl-equivalent emission rate limit. The criteria that you must consider are: (1) The ratio of the 1-hour average HCl-equivalent emission rate based on the total chlorine emission rate you select for each combustor to the 1-hour average HCl-equivalent emission rate limit for the combustor; and (2) the potential for the source to vary chlorine feedrates substantially over the averaging period for the long-term chlorine feedrate limit.

For example, if a source's primary chlorine-bearing feedstreams have a relatively constant chlorine concentration over the averaging period for the chlorine feedrate limit to ensure compliance with the annual average HCl-equivalent emission rate limit (*e.g.*, generally 12-hours), as may be the case for commercial sources feeding from large burn tanks or on-site sources where chlorine levels in wastes are fairly constant, you may conclude that there is little probability that 1-hour feedrates would vary substantially over the averaging period. Thus, a 1-hour rolling average chlorine feedrate limit may not be warranted. Even if chlorine feedrates could vary substantially over the long-term feedrate averaging period, however, an hourly rolling average feedrate limit still may not be warranted if the source's 1-hour average HCl-equivalent emission rate is well below the 1-hour HCl-equivalent emission rate limit. See Part Two, Section IX.H, of this preamble for a discussion of the relationship between emission rates, emission rate limits, and feedrate limits.

We disagree with the commenter who states that short-term chlorine feedrate limits are not necessary. The 1-hour average HCl-equivalent emission rate limit could potentially be exceeded for sources with highly variable chlorine feedrates and where the 1-hour HCl-equivalent emission rate is relatively high compared to the 1-hour HCl-equivalent emission rate limit. The 1-hour average HCl-equivalent emission rate limit could be exceeded even though the source remains in compliance with the annual average HCl-equivalent emission rate limit (and,

moreover, the 12-hour rolling average or (up to) annual rolling average chlorine feedrate limit).

We agree with commenters that suggest that the hourly rolling average chlorine feedrate limit should be extrapolated from performance test feedrates up to 100% of the 1-hour average HCl-equivalent emission rate limit. The final rule requires you to establish the hourly rolling average feedrate limit (if a limit is required under § 63.1215(d)(3)) as the 1-hour HCl-equivalent emission rate limit divided by [1 - system removal efficiency]. Establishing the hourly rolling average feedrate in this manner ensures that the 1-hour HCl-equivalent emission rate limit is not exceeded, and thus that the aREL-based Hazard Index of 1.0 is not exceeded.

We also agree in principle with commenters that suggest that the hourly rolling average feedrate limit be based on the 1-hour average HCl-equivalent emission rate limit which is based on emissions modeling. These commenters suggested that we use a multiplier of 10 or 12.5 (*i.e.*, 1/0.08) to project 1-hour average HCl-equivalent emission rate limits from the annual average HCl-equivalent emission rate limits. Rather than use these approaches to project 1-hour average emissions from annual average emissions, however, we use emissions modeling to develop look-up tables for both 1-hour average HCl-equivalent emission rate limits and annual average HCl-equivalent emission rate limits. For sources that use site-specific risk assessment to demonstrate eligibility, they will use the same models to estimate 1-hour average maximum ambient concentrations. Thus, the final rule uses modeling to establish directly 1-hour average HCl-equivalent emission rate limits rather than approximating those limits from annual average HCl-equivalent emission rate limits as commenters suggest. In summary, the final rule requires you to establish the 1-hour average HCl-equivalent emission rate limit by either using Tables 3 or 4 in § 63.1215 to look-up the limit, or conducting a site-specific risk analysis. Under the site-specific risk analysis option, the 1-hour average HCl-equivalent emission rate limit would be the highest emission rate that the risk assessment estimates would result in an aREL-based Hazard Index not exceeding 1.0 at any off-site receptor location.

We do not agree that the short-term feedrate limit should be capped at the level corresponding to the Interim Standards for incinerators, cement kilns, and lightweight aggregate kilns. The final rule caps the total chlorine

emission rate and the annual average HCl-equivalent emission rate limit at the level equivalent to the Interim Standard for total chlorine. Thus, the long-term chlorine feedrate limit (12-hour rolling average or (up to) an annual rolling average) is capped at the level corresponding to the Interim Standards for incinerators, cement kilns, and lightweight aggregate kilns. The hourly rolling average feedrate limit to maintain compliance with the 1-hour average HCl-equivalent emission rate limit, however, can exceed the numerical value of the long-term chlorine feedrate limit because the 1-hour average HCl-equivalent emission rate limit is substantially higher than the annual average HCl-equivalent emission rate limit. Thus, capping at the interim standard level is inappropriate unless the interim standard were somehow re-expressed as a 1-hour limit.

Comment: Many commenters state that requiring prior approval of the eligibility demonstration would be unworkable. Commenters are concerned that the permitting authority may not approve the demonstration prior to the compliance date even though the source has submitted complete and accurate information and has responded to any requests for additional information in good faith. Commenters are also concerned that the permitting authority may disapprove the demonstration too late for the source to take other measures to comply with the total chlorine MACT standard. One commenter recommends the following alternative approach: (1) If the regulatory agency does not act on a risk demonstration within the 6-month period, it is conditionally deemed approved; and (2) if a risk demonstration is disapproved, the source would have to comply with the MACT emission standards no later than three years after notice of disapproval and, in the interim, sources would comply with current emission limits for total chlorine.

Another commenter suggests that, if the permitting authority has neither approved nor disapproved the eligibility demonstration by the compliance date, the source may begin complying on the compliance date with the alternative health-based limits specified in the eligibility demonstration.

Finally, another commenter states that facilities should be granted a three-year extension of the compliance date if the Agency denies a good-faith eligibility demonstration. The commenter is concerned that sources will not have time to install additional controls or take other measures after a denial is issued but prior to the compliance date.

Response: We agree with commenters that requiring prior approval of the eligibility demonstration may be unworkable for the reasons commenters suggest. We also agree with commenters that sources who make a good-faith eligibility demonstration but whose demonstration is denied by the permitting authority may need additional time to install controls or take other measures to comply with the MACT emission standards.

Accordingly, the final rule does not require prior approval of the eligibility demonstration for existing sources. If your permitting authority has not approved your eligibility demonstration by the compliance date, and has not issued a notice of intent to disapprove your demonstration, you may nonetheless begin complying, on the compliance date, with the HCl-equivalent emission rate limits and associated chlorine feedrate limits you present in your eligibility demonstration.

In addition, the final rule states that the permitting authority should notify you of approval or intent to disapprove your eligibility demonstration within 6 months after receipt of the original demonstration, and within 3 months after receipt of any supplemental information that you submit. A notice of intent to disapprove your eligibility demonstration, whether before or after the compliance date, will identify incomplete or inaccurate information or noncompliance with prescribed procedures and specify how much time you will have to submit additional information or comply with the total chlorine MACT standards. The permitting authority may extend the compliance date of the total chlorine MACT standards to allow you to make changes to the design or operation of the combustor or related systems as quickly as practicable to enable you to achieve compliance with the total chlorine MACT standards.

Comment: One commenter states that proposed § 63.1215(f)(1)(A) should have required sources to conduct a new comprehensive performance test only if there are changes that would decrease the HCl-equivalent emission rate limit below the HCl-equivalent emission rate demonstrated during the comprehensive performance test. Similarly, the commenter suggests that a retest should not be required if a change increases the HCl-equivalent emission rate limit but the source elects to maintain the current feedrate limit.

Another commenter states that the Agency should clarify that if there are any changes that are not controlled by the facility owner/operator, and the

facility is required to change its design or operation to lower chlorine emissions to address the changes, the facility may request up to three years to make such changes.

Response: We generally agree with the commenters and have revised the rule as follows: (1) A new comprehensive performance test is required to reestablish the system removal efficiency for total chlorine only if you change the design, operation, or maintenance of the source in a manner that may decrease the system removal efficiency (e.g., the emission control system is modified in a manner that may decrease total chlorine removal efficiency); and (2) if you use the site-specific risk analysis option for your eligibility demonstration and changes beyond your control (e.g., off-site receptors newly residing or congregating at locations exposed to higher ambient levels than originally estimated) dictate a lower HCl-equivalent emission rate limit and you must make changes to the design, operation, or maintenance of the combustor or related systems to comply with the lower limit, you may request that the permitting authority grant you additional time to make those changes as quickly as practicable.

Comment: Several commenters state that the proposed approach for calculating chlorine emissions to address the potential bias using Method 26/26A attributable to high bromine or sulfur levels in feedstreams is not statistically valid. They indicate that the approach could lead to collection of total chlorine, hydrogen chloride and chlorine data that are contradictory and difficult to apply in a compliance situation. One commenter suggests that using Method 26/26A results for sources with bromine and sulfur dioxide, while recognizing that there is bias in the sampling method, will result in a valid compliance approach.

Response: We agree with commenters that the proposed approach to avoid the bias when feedstreams contain high levels of bromine or sulfur (bromine/chlorine ratio in feedstreams of greater than 5 percent, or sulfur/chlorine ratio in feedstreams of greater than 50 percent) during the comprehensive performance test may be problematic. The proposed approach would have required you to use Method 320/321 or ASTM D 6735-01 for hydrogen chloride measurements, to use Method 26/26A for total chlorine (i.e., hydrogen chloride and chlorine combined) measurements, and to calculate chlorine levels by difference. The potential problem is that chlorine emission levels are generally a very small portion of total chlorine measurements, and

variability in the hydrogen chloride or total chlorine measurements due to method imprecision or other factors could result in inaccurate estimations of chlorine emission levels.

We do not agree, however, that using Method 26/26A for chlorine measurements for combustors feeding high levels of bromine or sulfur is acceptable—the chlorine measurement may be biased low. Chlorine emission levels must be determined as accurately as possible given that the long-term health threshold for chlorine is 100 times the threshold for HCl, and the short-term health threshold for chlorine is 10 times the threshold for HCl (i.e., using current RfCs and aRELs). To ensure that a conservative estimate of the chlorine emission rate is used to establish the alternative health-based emission limits and to address commenters' concerns, the final rule requires that you determine chlorine emissions to be the higher of: (1) The chlorine value measured by Method 26/26A, or an equivalent method; or (2) the chlorine value calculated by difference between the combined hydrogen chloride and chlorine levels measured by Method 26/26A, or an equivalent method, and the hydrogen chloride measurement from EPA Method 320/321 or ASTM D 6735-01, or an equivalent method.

Comment: Several commenters state the procedures for calculating HCl-equivalent emission rates cannot merely reference an outside source, such as a Web site, unless that reference specifies that the contents of the source are as of a date certain. To specify use of health threshold values that can change over time provides inadequate opportunity for notice and comment on the regulation.

Response: We believe that the best available sources of health effects information should be used for risk or hazard determinations. To assist us in identifying the most scientifically appropriate toxicity values for our analyses and decisions, the Web site to be used for RfCs identifies pertinent toxicity values using a default hierarchy of sources, with EPA's Integrated Risk Information System (IRIS) being the preferred source. The IRIS process contains internal and external peer review steps and IRIS toxicity values represent EPA consensus values. When adequate toxicity information is not available in IRIS, however, we consult other sources in a default hierarchy that recognizes the desirability of these qualities in ensuring that we have consistent and scientifically sound assessments. Furthermore, where the IRIS assessment substantially lags the

current scientific knowledge, we have committed to consider alternative credible and readily available assessments (e.g., the acute Relative Exposure Levels established by the California Office of Health Hazard Assessment). For our use, these alternatives need to be grounded in publicly available, peer-reviewed information. We agree with the commenter that the issue of changing toxicity values is a general challenge in setting health-based regulations. However, we are committed to establishing such regulations that reflect current scientific understanding, to the extent feasible.

C. National Health-Based Standards for Cement Kilns

Comment: One commenter states that our suggestion at proposal that it would be appropriate to establish a single national emission rate type standard applicable to all cement kilns based on the worst-case scenario cement kiln is unduly burdensome as it discounts the benefits of improved dispersion realized by facilities that have invested in taller stacks that minimize downwash effects. The commenter recommends a dual limit for cement kilns such that the HCl equivalent emission rate is limited to both: (1) A 130 ppmv total chlorine emission standard (the Interim Standard) coupled with a chlorine feedrate limit based on a 12-hour rolling average; and (2) a Hazard Index of 1.0.

Response: We have decided not to include a separate national standard for cement kilns in the final rule for several reasons: (1) We have no assurance that the Cl₂/HCl volumetric ratio exhibited during the most recent compliance test, and that was the basis for the commenter documenting in a study¹⁸⁷ that the Hazard Index of 1.0¹⁸⁸ was not exceeded, is representative of ratios in the past or future; (2) the commenter's recommended emission standard for cement kilns—130 ppmv total chlorine emission limit and a Hazard Index of 1.0—is equivalent to the requirements under § 63.1215 applicable to other hazardous waste combustors to establish site-specific emission limits; (3) the MACT standard for total chlorine for cement kilns is 120 ppmv such that the health-based standard that the commenter recommends—130 ppmv,

¹⁸⁷ See Trinity Consultants, "Analysis of HCl/Cl₂ Emissions from Cement Kilns for 112(d)(4) Consideration in the HWC MACT Replacement Standards," September 17, 2003.

¹⁸⁸ The HCl/Cl₂ ratio for the total chlorine measurement is important because the current RfC for chlorine is 0.2 µg/m³ while the current RfC for HCl is 20 µg/m³. Thus, when calculating HCl-equivalent emission rate limits, chlorine emissions are currently multiplied by a factor of 100.

the Interim Standard—would provide little compliance relief; and (4) even though the final rule does not provide a separate national health-based standard for cement kilns, cement kilns may apply for the health-based compliance alternatives applicable to other hazardous waste combustors.

Prior to publication of the proposed rule, the commenter submitted results of site-specific risk assessments for all cement kiln facilities showing that both the long-term and short term Hazard Index of 1.0 would not be exceeded at any facility assuming: (1) Sources emit total chlorine at the Interim Standard level of 130 ppmv; and (2) total chlorine emissions are apportioned between HCl and chlorine according to the apportionment exhibited during the most recent compliance test.

At proposal, we requested comment on how to ensure that the 130 ppmv concentration-based standard would ensure that total chlorine emission rates (lb/hr) would not increase to levels that may exceed the Hazard Index limit of 1.0 given that: (1) The partitioning ratio between HCl and chlorine could change over time such that a larger fraction of total chlorine could be emitted as chlorine, which has a much lower health risk threshold; and (2) the mass emission rate of total chlorine could increase. See 69 FR at 21306.

The commenter has addressed the concern about the mass emission rate of total chlorine potentially increasing by suggesting that the health-based standard include a limit on the feedrate of total chlorine and chloride at the level used in their risk assessment supporting a separate national standard for cement kilns. The commenter has also addressed the concern about the HCl and chlorine apportionment ratio changing over time by suggesting that the standard also include a requirement that the Hazard Index of 1.0 not be exceeded. We agree that sources need to account for variability in the chlorine to HCl ratio (see § 63.1215(b)(6)) and that periodic checks to ensure that the Hazard Index of 1.0 is not exceeded are needed. We believe the best way to ensure that the health-based compliance alternatives for total chlorine for cement kilns are protective with an ample margin of safety is through the procedures of § 63.1215 where site-specific emission rate limits are established rather than under a separate national standard for cement kilns.

VIII. Implementation and Compliance

A. Compliance Assurance Issues for both Fabric Filters and Electrostatic Precipitators (and Ionizing Wet Scrubbers)

1. Implementation Issues

Comment: Several commenters state that design and performance specifications and explicit detailed test procedures to determine conformance with the specifications are needed so that manufacturers can certify that their bag leak detection systems and particulate matter detection systems meet applicable criteria. Absent design and performance specifications and test procedures, commenters assert that the “manufacturer’s certification” cannot ensure the performance capabilities of the devices.

Response: In general, we believe adherence to manufacturer’s written specifications and recommendations is an appropriate approach to reasonably ensure performance of a bag leak detection system or particulate matter detection system, and we have retained that provision in the final rule. We agree, however, that there may be cases where other procedures are more appropriate than the manufacturer’s recommendations to ensure performance of a bag leak detection system or particulate matter detection system. Consequently, the rule allows you to request approval for alternative monitoring procedures under § 63.1209(g)(1).¹⁸⁹ We note that you may use references other than EPA’s Guidance Document, “Fabric Filter Bag Leak Detection Guidance,” September 1997 to identify appropriate performance specifications for the bag leak detection system or particulate matter detection system, including: PS-11 for PM CEMS; PS-1 for opacity monitors; and CPS-001 for opacity monitoring below 10% opacity. You may use these references to support your request for additions to, or deviations from, manufacturer’s specifications.

Comment: One commenter states that bag leak detection systems and particulate matter detection systems should have a detection limit of 1.0 mg/acm to ensure peak performance is maintained rather than explicitly allowing sources to request approval for a detection limit on a site-specific basis as the rule currently allows. Several other commenters state that the bag leak detection system or particulate matter

detection system need not have a detection limit as low as 1.0 mg/acm to detect increases in normal emissions. One commenter believes that bag leak detection systems installed on cement kilns should be allowed to have a detection limit of 10 mg/acm because: (1) A detection limit requirement of 10 mg/acm is more than sufficient to protect the particulate matter emission limit and to detect increases in particulate matter concentration given that the current particulate matter emission limit for existing kilns is 63 mg/dscm; (2) a detection limit requirement of 10 mg/acm is consistent with the requirement for bag leak detection systems in Subpart LLL, Part 63, for cement plants that choose to install bag leak detection systems on finish mills and raw mills, for bag leak detection systems and particulate matter detection systems installed on lime kilns under Subpart AAAAAA, and for industrial boilers under Subpart DDDDD; (3) a 10 mg/acm detection limit is achievable using state-of-the-art transmissometers (the actual instrument used in a continuous opacity monitoring system (COMS) at cement plants having kiln stack diameters of 2–3 meters, or greater; and (4) it is unclear if any bag leak detection system device can actually be demonstrated to achieve a 1.0 mg/acm detection limit except by extrapolation from tests conducted at higher dust loadings and theoretical arguments based on signal-to-noise ratios or other parameters. This commenter also recommends that EPA establish a 10 mg/am³ detection limit for all cement kilns rather than provide for site-specific determinations because allowing site-specific determinations is likely to create confusion in the selection of monitoring devices and further complicate the manufacturer’s certification of performance requirements.

Response: The current requirement for the bag leak detection system sensitivity/detection limit applicable to incinerators and lightweight aggregate kilns is 1.0 mg/acm unless you demonstrate under § 63.1209(g)(1) that a lower sensitivity (i.e., higher detection limit) would detect bag leaks. We proposed to apply the bag leak detection system requirements to all hazardous waste combustors equipped with fabric filters and promulgate that requirement today. Although we also requested comment whether detection limits higher than 1.0 mg/acm should be allowed, none of the comments has convinced us to alter our view that the rule should allow higher detection limits on a site-specific basis. Similarly,

¹⁸⁹ See discussion in Part Five, Section III.C, for an explanation of how the alternative monitoring provisions of § 63.1209(g)(1) relate to those of § 63.8(f).

we believe that the same detection limit requirement should apply to particulate matter detection systems that you may elect to use for compliance monitoring for your electrostatic precipitator or ionizing wet scrubber in lieu of site-specific operating parameter limits.

Both bag leak detection systems and particulate matter detection systems must be able to detect particulate emission in the range of normal concentrations. For example, to establish the alarm level for the bag leak detection system, you must first adjust detector gain/sensitivity and response time based on normal operations. Although the alarm level for particulate matter detection systems will be established based on operations during the comprehensive performance test or higher (see discussion below), the detector must be responsive within the range of normal operations for you to effectively minimize exceedances of the alarm level.

The range of normal emission concentrations will generally be well below both the particulate matter standard and emissions during the comprehensive performance test. Consequently, we disagree with commenters that believe the detection limit need only be within the range of emissions at the particulate matter emission standard. On the other hand, normal emissions may be well above 1.0 mg/acm such that a higher detection limit (e.g., 10 mg/acm) may be appropriate on a site-specific basis.

We also disagree with the comment that bag leak detection systems (or particulate matter detection systems) may not be able actually to achieve a 1.0 mg/acm detection limit. EPA is aware of bag leak detection system instruments certified to meet levels of 0.2 mg/m³ and particulate matter detection systems can readily achieve detection limits well below 1.0 mg/acm.¹⁹⁰

Comment: One commenter states that a continuous opacity monitoring system (COMS) that can achieve a detection level of 10 mg/acm or less can be used to monitor electrostatic precipitator performance. The commenter believes that allowing a COMS for compliance under Subpart EEE is also appropriate because cement kilns will be operating under the requirements of Subpart LLL (for cement kilns that do not burn hazardous waste) at times, which requires compliance with an opacity standard using a COMS.

Response: You may use a COMS (i.e., transmissometer) that meets the

detection limit requirement as discussed above (i.e., 1.0 mg/acm or a higher detection limit that you document under an alternative monitoring petition under § 63.1209(g)(1) would routinely detect particulate matter loadings during normal operations) as the detector for your bag leak detection system or particulate matter detection system.

2. Compliance Issues

Comment: One commenter states that, if the bag leak detection system or particulate matter detection system exceeds the alarm level or an operating parameter limit (OPL) is exceeded, the automatic waste feed cutoff (AWFCO) system must be initiated. Allowing a source to exceed the alarm level for 5% of the time in a 6-month period does not ensure continuous compliance.

Response: Although the AWFCO system must be initiated if an OPL is exceeded, we believe that allowing exceedances of the bag leak detection system or particulate matter detection system alarm level up to 5% of the time in a 6-month period is reasonable. Requiring initiation of the AWFCO for an exceedance of an OPL is reasonable because sources generally can control directly the parameter that is limited. Examples are the feedrate of metals or chlorine, or pressure drop across a wet scrubber. Bag leak detection systems and particulate matter detection systems, however, measure mass emissions of particulate matter, a parameter that is affected by many interrelated factors and that is not directly controllable. We believe that the 5 percent alarm rate is a reasonable allowance for sources due to difficult-to-control variations in particulate matter emissions. More important, although the bag leak detection system and particulate matter detection system measure mass emissions of particulate matter, the detector response is not correlated to particulate matter emission concentrations to the extent necessary for compliance monitoring.¹⁹¹ Thus, triggering the alarm level is not evidence that the particulate matter emission standard has been exceeded.

The purpose of a BLDS or PMDS is to alert the operator that the PM control device is not functioning properly and that corrective measures must be undertaken. We believe that using a BLDS or PMDS for compliance assurance better minimizes emissions of PM (and metal HAP) than use of

operating parameter limits (which are linked to the automatic waste feed cutoff system). APCD operating parameters often have an uncertain relationship to PM emissions while the BLDS and PMDS provide real-time information on actual PM mass emission levels.¹⁹²

Comment: One commenter states that requiring a notification if the bag leak detection system or particulate matter detection system set point is exceeded more than 5% of the time in a 6-month period is not cost-effective. Sources using bag leak detection systems have not linked exceedances to the data logging system and would incur an expense to do so.

Response: We continue to believe that limiting the aggregate duration of exceedances in a 6-month period is a reasonable approach to gage the effectiveness of the operation and maintenance procedures for the combustor. We note that recent MACT standards for several other source categories use this approach, including standards for industrial boilers and process heaters and standards for lime kilns.

Comment: One commenter states that EPA did not present a rationale for requiring a notification within 5 working days if the bag leak detection system or particulate matter detection system set point is exceeded more than 5% of the time during a 6-month period. The commenter notes that this notice is not required under the Subpart DDDDD boiler and process heater MACT. The commenter also notes that the source is required to take corrective measures under both the operation and maintenance plan and bag leak detection systems and particulate matter detection systems requirements. The commenter believes that requiring a report to the permitting authority is duplicative, unnecessary, and increases the burden on regulated facilities without providing additional protection to human health or the environment.

Response: If a source exceeds the alarm set point more than 5% of the time in a 6-month period, it is an indication that the operation and maintenance plan may need to be revised. Requiring the source to report the excess exceedances to the permitting

¹⁹⁰ USEPA, "Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the HWC MACT Standards," September 2005, Appendix C, Section 4.0.

¹⁹¹ Actually, the BLDS is not correlated at all to PM concentrations, and the alarm level for a PMDS may or may not be approximately correlated to PM concentrations. See § 63.1206(c)(9).

¹⁹² Moreover, for FFs, we are not aware of any APCD operating parameters that correlate well with PM emissions. Thus, sources must use a BLDS or PMDS for compliance assurance. For ESPs and IWSs, we are not aware of generic APCD parameters that correlate well with PM emissions. See discussion below in Section VIII.C of the text. Consequently, although the rule allows sources with ESPs and IWSs to establish site-specific operating parameter limits, sources are encouraged to use a PMDS.

authority serves as a notification that the authority may need to review the operation and maintenance plan with the source to determine if changes are warranted.

We agree with the commenter, however, that it is not necessary to require that the report be submitted within five working days of the end of the 6-month block period. Consequently, the final rule requires you to submit the report within 30 days of the end of the 6-month block period. Allowing 30 days to submit the report rather than 5 days as proposed is reasonable. We are concerned that 5 days may not be enough time to complete the report given that several exceedances toward the end of the 6-month block period may cause you to exceed the 5% time limit and that there may be many individual exceedances that need to be included in the report. We acknowledge that it may take some time to prepare the report given that you must describe the causes of each exceedance and the revisions to the operation and maintenance plan you have made to mitigate the exceedances.

Comment: One commenter notes that there is no guidance on how to calculate when the set-point has been exceeded more than 5 percent of the operating time within a 6 month period. The commenter notes that the MACT for industrial boilers and process heaters provides minimal instruction on how this is to be done, but it is not specific enough to enable facilities to ensure that they are in compliance with this requirement.

Response: For the final rule, we have adopted the procedures specified in the industrial boiler and process heater MACT for calculating the duration of exceedances of the set point. Those procedures are as follows:

1. You must keep records of the date, time, and duration of each alarm, the time corrective action was initiated and completed, and a brief description of the cause of the alarm and the corrective action taken.
2. You must record the percent of the operating time during each 6-month period that the alarm sounds.
3. In calculating the operating time percentage, if inspection of the fabric filter, electrostatic precipitator, or ionizing wet scrubber demonstrates that no corrective action is required, no alarm time is counted.
4. If corrective action is required, each alarm shall be counted as a minimum of 1 hour.

Although the commenter indicates that these procedures are not specific enough to ensure that sources are in compliance with the requirements, the

commenter did not indicate the deficiencies or suggest additional requirements. If you need additional guidance on compliance with this provision, you should contact the permitting authority.

Comment: One commenter supports the approach of listing the shutting down of the combustor as a potential—but not mandatory—corrective measure in response to exceeding an alarm set point. Several commenters suggest, however, that EPA should specify that corrective measures could include shutting off the hazardous waste feed rather than shutting down the combustor. Other commenters state that it is inappropriate to imply that shutting down the combustor must be part of a corrective measures program for responding to exceedance of a set point. These commenters believe that the requirement to take corrective action upon the alarm is sufficiently protective. The facility should determine if shutting down the combustor is a necessary response to avoid noncompliance with a standard.

Response: You must operate and maintain the fabric filter, electrostatic precipitator, or ionizing wet scrubber to ensure continuous compliance with the particulate matter, semivolatile metals, and low volatile metals emission standards. Your response to exceeding the alarm set point should depend on whether you may be close to exceeding an operating parameter limit (e.g., ash feedrate limit for an incinerator or liquid fuel boiler equipped with an electrostatic precipitator) or an emission standard. If so, corrective measures should include, as commenters suggest, cutting off the hazardous waste feed. Corrective measures could also include, however, shutting down the combustor as the ultimate immediate corrective measure if an emission standard may otherwise be exceeded. Consequently, the final rule continues to require you to alleviate the cause of the alarm by taking the necessary corrective measure(s) which may include shutting down the combustor. This provision does not imply that shutting down the combustor is the default corrective measure. Rather, it implies that the ultimate immediate response, absent other effective corrective measures, would be to shut down the combustor.

Comment: One commenter states that periods of time when the combustor is operating but the bag leak detection system or particulate matter detection system is malfunctioning should not be considered exceedances of the set-point.

Response: If the bag leak detection system or particulate matter detection system is malfunctioning, the source

cannot determine whether it is operating within the alarm set point. Accordingly, it is reasonable to consider periods when the bag leak detection system or particulate matter detection system is malfunctioning as exceedances of the set point.

B. Compliance Assurance Issues for Fabric Filters

Comment: One commenter states that establishing the set point for the bag leak detection system at twice the detector response achieved during bag cleaning as recommended by EPA guidance would not be sensitive enough to detect gradual degradation of the fabric filter, nor would it be low enough to require the operator of the source to take corrective measures that would ensure effective operation of the baghouse over time.

Response: The commenter expresses the same concern that EPA raised at proposal. See 69 FR at 21347. We have concluded, however, that it may be problematic to establish an alarm set point for fabric filters based on operations during the comprehensive performance test. This is because, as noted in earlier responses and at 69 FR at 21233, it is much more difficult to “detune” a fabric filter than an electrostatic precipitator to maximize emissions during the performance test.¹⁹³ Consequently, emissions from fabric filters that have not been detuned during the performance test may not be representative of the range of normal emissions caused by factors such as bag aging. Baghouse performance degrades over time as bags age. In addition, establishing the alarm set point based on operations during the performance test for baghouses that have not been detuned would establish more stringent compliance requirements on sources that perform the best—the lower the emissions, the lower the alarm set point. This would unfairly penalize the best performing sources.

For these reasons, the final rule requires you to establish the alarm set-point for bag house detection systems using principles provided in USEPA, “Fabric Filter Bag Leak Detection Guidance,” (EPA-454/R-98-015, September 1997).

Comment: One commenter states that the bag leak detection system requirement should not apply to the coal mill baghouse for cement kilns with indirect-fired coal mill systems where a fraction of kiln gas is taken

¹⁹³ One approach to detune a fabric filter to simulate the extreme high range of normal operations would be to install a butterfly valve that allows a portion of the combustion gas to by-pass a section of the baghouse.

from the preheater and routed to the coal mill and subsequently to a baghouse before entering the stack. The commenter notes that the PM in this gas is nearly exclusively coal dust, and the baghouse is substantially smaller than the baghouse for the kiln.

Response: We believe that a bag leak detection system is a reasonable approach to monitor emissions for the coal mill baghouse to ensure compliance with the particulate matter (and semivolatile and low volatile metals) emission standards. These systems are inexpensive to install and operate. Annualized costs are approximately \$24,000.¹⁹⁴ Although the commenter did not suggest an alternative monitoring approach, and we are not aware of a less expensive and effective approach, we note that sources may petition the permitting authority under § 63.1209(g)(1) to request an alternative monitoring approach.

C. Compliance Issues for Electrostatic Precipitators and Ionizing Wet Scrubbers

Comment: Several commenters believe that a particulate matter detection system may not be necessary for monitoring of electrostatic precipitators and ionizing wet scrubbers. Commenters state that site-specific operating parameter limits linked to the automatic waste feed cutoff system can effectively monitor and ensure the performance of electrostatic precipitators and ionizing wet scrubbers. Particulate matter detection systems on cement kilns would have to operate in a high moisture stack environment (all kilns burning hazardous waste that are equipped with electrostatic precipitators are wet process kilns), with the potential for condensation and/or water droplet interference. Commenters state that when water droplets are present, many of these devices are not applicable.

Response: The final rule provides sources equipped with electrostatic precipitators or ionizing wet scrubbers the alternative of using a particulate matter detection system or establishing site-specific operating parameter limits for compliance assurance. If a particulate matter detection system is used, corrective measures must be taken if the alarm set point is exceeded. If the source elects to establish site-specific operating parameter limits, the limits

must be linked to the automatic waste feed cutoff system.

In response to commenters' concern that high moisture stack gas may be problematic for particulate matter detection systems, we note that extractive light-scattering detectors and beta gauge detectors can effectively operate in high moisture environments. We acknowledge, however, that the cost of these extractive detector systems is substantially higher than transmissometers or in situ light-scattering detectors.

Comment: One commenter states that EPA must set minimum total power requirements for both ionizing wet scrubbers and electrostatic precipitators because allowing permit officials to establish compliance operating parameters on a site-specific basis frustrates the intention of the CAA by obviating the requirements for federal standards. The commenter asserts that a minimum total power requirement is monitorable, recordable, and reportable, three requirements that are necessary for these facilities to come into, and remain in compliance with, their Title V operating permits.

Other commenters state that electrostatic devices are not easily characterized by operating parameters in a "one-size-fits-all" fashion. The significant operating parameters for electrostatic devices are secondary voltage, secondary current, and secondary power (the product of the first two items). The relationship between these parameters and performance of the unit differ between applications and unit types. For example, inlet field power can increase as unit performance appears to decrease. In this case, an operating parameter other than secondary power by field would be more appropriate. The commenter notes that, in its various proposals over the years, EPA has discussed a number of approaches to establish operating parameter limits for electrostatic devices, including: Minimum total secondary power; minimum secondary power by field; pattern of increasing power from inlet to outlet field; and minimum secondary power of the last 1/3 of fields (or the last field). Commenters have also proposed: minimum specific power (secondary power divided by flue gas flow rate); minimum secondary voltage and/or secondary current; and total secondary voltage and/or secondary current. The commenter concludes that it is not surprising that there is so little agreement on the right approach, because different units and applications respond differently. EPA's proposal to let facilities and local regulators

determine the best approach is far wiser than regulating from a distance.

Response: We agree with the commenters that state that it is not practicable to establish operating parameter limits that would effectively ensure performance of all electrostatic devices. Accordingly, the final rule continues to allow sources to establish site-specific operating parameter limits for these devices.

We disagree with the commenter's assertion that site-specific operating parameter limits obviate the requirements for federal standards. The site-specific operating parameter limits merely reflect the truism that no two sources are identical and so what each needs to do to comply with the uniform standards may differ. The final rule provides consistent, federally-enforceable emission standards. Necessary flexibility in compliance assurance for those emission standards does not undermine the uniformity of those standards. In addition, we disagree with the commenter's concern that without a minimum power limit, there will be no monitorable, recordable, and reportable Title V permit limits for electrostatic devices. To the contrary, site-specific operating parameter limits can and will be monitored, recorded, reported, and linked to the automatic waste feed cutoff system. And, if a source elects to use a particulate matter detection system in lieu of establishing site-specific operating parameter limits, the detector response will be monitored, recorded, reported, and linked to requirements to take corrective measures if the alarm set point is exceeded.

Comment: One commenter asserts that the use of electrostatic precipitator total power input data (sum of the product of kilovolts times milliamps for each electrostatic precipitator field) is one acceptable approach as a site-specific parameter to monitor electrostatic precipitator performance. Limits on power input for each field (or particular fields) are not warranted.

Response: A limit on total power input to a multifield electrostatic device is generally not an acceptable operating parameter for compliance assurance. We have documented that when total power input was held constant for a four-field electrostatic precipitator while the power input to the fourth field was decreased, emissions of particulate matter doubled from 0.06 gr/dscf to 0.12 gr/dscf. See 66 FR at 35143 (July 3, 2001). Thus, if the total power input during the comprehensive performance test were used as the operating parameter limit, particulate matter emissions could exceed the emission

¹⁹⁴ USEPA, "Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the HWC MACT Standards," September 2005, Appendix C.

standard because of changes in other parameters that were not limited even though total power input did not exceed the parametric limit.

Notwithstanding our concern that a limit on total power input to a multifeild electrostatic device is generally not an effective operating parameter for compliance assurance, this does not preclude you from documenting to the permitting authority that total power input is an effective compliance assurance parameter for your source. See § 63.1209(m)(1)(iv).

Comment: Several commenters suggest that the rule should offer various approaches to establish an achievable particulate matter detection system alarm level on a site-specific basis in lieu of the approach we proposed (i.e., average detector response during the comprehensive performance test): (1) Use the 2 times the maximum peak height or 3 times the baseline concepts developed in EPA's bag leak detection guidance documents; (2) allow spiking to set the alarm set point given that PS 11 allows for spiking as a way to calibrate PM CEMs; (3) establish the limit as the 99th percentile upper prediction limit of the average response during each performance test run instead of the average of the test run averages; (4) allow upward extrapolation from the average of the test run averages to some percentage of the particulate matter emissions standard (fraction could be variable depending upon how close to the standard the facility is during the compliance test); or (5) set the alarm point at the maximum test run.

Response: We agree with several of the commenters' suggestions: explicitly allowing spiking (and emission control device detuning) during the comprehensive performance test to maximize controllable operating parameters to simulate the full range of normal operations; and upward extrapolation of the detector response. See discussion below.

The final rule is consistent with commenters' suggestion to establish the alarm level for particulate matter detection systems on fabric filters based on the concepts in the Agency's guidance document on bag leak detection systems. Commenters made this suggestion in response to our request for comments on requiring particulate matter detection systems on fabric filters and establishing the alarm level based on the detector response during the comprehensive performance test. See 69 FR at 21347. The final rule requires bag leak detection systems on all fabric filters and suggests that you establish the alarm level using concepts

in the bag leak detection system guidance.¹⁹⁵

Neither the suggestion to establish the alarm level at the 99th percentile upper prediction limit (UPL99) based on the average response during the comprehensive performance test runs nor the suggestion to establish the alarm level at the maximum test run response would control PM emissions at the level achieved during the performance test or provide some assurance that the PM standard was not being exceeded, unless the detector response is correlated to PM concentrations. For example, if the detector response does not relate linearly to PM concentration (or if the response changes w/changes in particulate characteristics), the UPL99 detector response could relate to a much higher (e.g., 99.9th percentile) PM concentration. In addition, even if the detector response were correlated to PM concentration, there is no assurance that the correlation would be consistent over the range of the average detector response during the performance test to the UPL99 detector response. Note that under PS-11 for PM CEMS, even after complying with rigorous procedures to correlate the detector response to PM concentrations, the detector response may be extrapolated only to 125% of the highest PM concentration used for the correlation. Thus, the final rule does not use these approaches to establish the alarm level.

If you elect to use a particulate matter detection system in lieu of site-specific operating parameters for your electrostatic precipitator or ionizing wet scrubber, you must establish the alarm level using either of two approaches. See Appendix C of USEPA, "Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the HWV MACT Standards," September 2005. Under either approach, you may

¹⁹⁵ Note that a bag leak detection system is a type of particulate matter detection system for purposes of this discussion. A triboelectric detector is normally used for a bag leak detector system because it is very inexpensive and has a low detection limit. A triboelectric detector meets the criterion for a particulate matter detector in a particulate matter detection system in that it detects relative mass emissions of particulate matter within the range of normal emission concentrations. (Note further, however, that a triboelectric detector cannot be correlated to particulate matter concentrations and thus cannot be used as a particulate matter CEMS. Note also that a triboelectric detector cannot be used on sources equipped with electronic control devices.) The alarm level for a bag leak detection system would be established using the concepts discussed in the Agency's guidance document on bag leak detection systems. The alarm level for a particulate matter detection system used on a fabric filter, however, (preferable with a detector other than a triboelectric device that could be correlated to PM concentrations) would be established based on the detector response during the comprehensive performance test.

maximize controllable operating parameters during the comprehensive performance test to simulate the full range of normal operations (e.g., by spiking the ash feedrate and/or detuning the electrostatic device).¹⁹⁶

You may establish the alarm set-point as the average detector response of the test condition averages during the comprehensive performance test.

Alternatively, you may establish the alarm set point by extrapolating the detector response. Under the extrapolation approach, you must approximate the correlation between the detector response and particulate matter emission concentrations during an initial correlation test. You may extrapolate the detector response achieved during the comprehensive performance test (i.e., average of the test condition averages) to the higher of: (1) A response that corresponds to 50% of the particulate matter emission standard; or (2) a response that correlates to 125% of the highest particulate matter concentration used to develop the correlation.

To establish an approximate correlation of the detector response to particulate matter emission concentrations, you should use as guidance Performance Specification-11 for PM CEMS (40 CFR Part 60, Appendix B), except that you need only conduct only 5 runs to establish the initial correlation rather than a minimum of 15 runs required by PS-11. In addition, the final rule requires you to conduct an annual Relative Response Audit (RRA) for quality assurance as required by Procedure 2—Quality Assurance Requirements for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources, Appendix F, Part 60.¹⁹⁷ The RRA is required on only a 3-year interval, however, after you pass two sequential annual RRAs.

The rule requires only minimal correlation testing because the particulate matter detection system is used for compliance assurance only—as an indicator for reasonable assurance that an emission standard is not exceeded. The particulate matter detection system is not used for compliance monitoring—as an indicator of continuous compliance with an

¹⁹⁶ Note, however, that bypassing or detuning an emission control system could cause PM stratification and could make it difficult to pass the PS-11 performance criteria you use as guidelines for a PMDS.)

¹⁹⁷ You perform an RRA by collecting three simultaneous reference method PM concentration measurements and PM CEMS measurements at the as-found source operating conditions and PM concentration.

emission standard. Because particulate matter detection system correlation testing and quality assurance is much less rigorous than the requirements of PS-11 for a PM CEMS, the particulate matter detection system response cannot be used as credible evidence of exceedance of the emission standard.

D. Fugitive Emissions

Comment: A commenter does not support EPA's proposed approach to allow alternative techniques that can be demonstrated to prevent fugitive emissions without the use of instantaneous pressure limits given that the CAA requires continuous compliance with the standards and given positive pressure events can result in fugitive emissions, irrespective of facility design.

Response: Rotary kilns can be designed to prevent fugitive emissions during positive pressure events. As stated in the February 14, 2002 final rule, and subsequently in the April 20, 2004 proposed rule, there are state-of-the-art rotary kiln seal designs (such as those with shrouded and pressurized seals) which are capable of handling positive pressures without fugitive releases. See 67 FR at 6973 and 69 FR at 21340. We have included documentation of such kiln designs in the docket.¹⁹⁸ Instantaneous combustion zone pressure limits thus may not be necessary to assure continuous compliance with these fugitive emission control requirements. Our approach to allow alternative techniques that have been demonstrated to prevent fugitive emissions is therefore reasonable and appropriate. We note that these alternative techniques must be reviewed and approved by the appropriate delegated regulatory official.¹⁹⁹

Comment: A commenter disagrees with EPA's clarification that fugitive emission control requirements apply only to fugitives attributable to the hazardous waste, given that the CAA does not distinguish between HAP emissions that come from hazardous waste streams and other HAP emissions.

Response: The fugitive emission control requirements in today's final rule originated from the RCRA hazardous waste combustion fugitive emission control requirements for incinerators and boilers and industrial furnaces.²⁰⁰ The primary focus of these RCRA requirements is to ensure hazardous waste treatment operations

are conducted in a manner protective of human health and the environment.²⁰¹ It is therefore appropriate to clarify that the intent of this requirement is to control fugitive emission releases from the combustion of hazardous waste.

Furthermore, MACT requirements for source categories that do not combust hazardous waste (e.g., industrial boilers, Portland cement kilns, and commercial and industrial solid waste incinerators) do not have combustion chamber fugitive emission control requirements for the non-hazardous waste inputs or outputs (e.g., clinker product for cement kilns or coal and natural gas fuels for industrial boilers). We have previously taken the position that emissions not affected by the combustion of hazardous waste (e.g., clinker coolers, raw material handling operations, etc.) are regulated pursuant to the applicable nonhazardous waste MACT rules.^{202, 203} We conclude the clarification that the fugitive emission control requirements applies only to fugitive emissions that result from the combustion of hazardous waste is appropriate because it regulates emissions attributable to nonhazardous waste streams to the same level of stringency that otherwise would apply if the source did not combust hazardous waste.²⁰⁴

Comment: A commenter states that the instantaneous monitoring requirements are inappropriate because (1) EPA has not demonstrated that the average of the top 12% of boilers are capable of operating with no

instantaneous deviations from the negative pressure requirements; and (2) these requirements, though not standards themselves, effectively increase the stringency of the standard itself beyond what even the best available technology can achieve.

Response: As previously discussed, the fugitive emission control requirements included in today's rule originated from the RCRA hazardous waste combustion chamber fugitive emission control requirements. These provisions allow sources to control fugitive emissions by "maintaining the combustion zone pressure lower than atmospheric pressure, or an alternative means of control equivalent to maintenance of combustion zone pressure lower than atmospheric pressure." All sources that must comply with the provisions of this rule are, or were, required to control fugitive emissions from the combustion unit pursuant to RCRA.

The monitoring requirements in today's rule do not increase the stringency of the standard beyond what the best available technology can achieve. Although we do not have data that confirm negative pressure is being maintained on an instantaneous basis (as we define it)²⁰⁵ for at least 12 percent of the boilers, we believe this is current practice and readily achievable by most sources.²⁰⁶ These requirements have been in force for many years, and there is no basis for stating that they are unachievable (EPA is not aware of industrywide noncompliance with these provisions, the necessary premise of the comment). First, maintaining negative pressure is the option that most boilers elect to implement to demonstrate compliance with the RCRA fugitive emission control requirements. Second, negative pressure is readily achieved on an instantaneous basis in boilers through use of induced draft fans. Third, the requirements we are finalizing today for boilers are identical to the fugitive emission control requirements that hazardous waste incinerators, cement kilns, and lightweight aggregate kilns are currently complying with pursuant to the EEE interim standard regulations. See § 63.1206(c)(5). Most of these sources maintain negative combustion chamber pressure through use of induced draft fans, providing further evidence that continuously maintaining combustion

²⁰¹ Section 3004(a) of RCRA requires the Agency to promulgate standards for hazardous waste treatment, storage, and disposal facilities as necessary to protect human health and the environment. The standards for hazardous waste incinerators generally rest on this authority. § 3004(q) of RCRA requires the Agency to promulgate standards for emissions from facilities that burn hazardous waste fuels (e.g., cement and lightweight aggregate kilns, boilers, and hydrochloric acid production furnaces) as necessary to protect human health and the environment.

²⁰² See 69 FR at 21203 and 64 FR at 52871, and § 63.1206(b)(1)(ii).

²⁰³ Portland cement manufacturing facilities that combust hazardous waste are subject to both Subpart EEE and Subpart LLL, and hydrochloric acid production facilities that combust hazardous waste may be subject to both Subpart EEE and Subpart NNNNN. In these instances Subpart EEE controls HAP emissions from the cement kiln and hydrochloric acid production furnace stack (and also fugitive emissions from the combustion chamber), while Subparts LLL and NNNNN would control HAP emissions from other operations that are not directly related to the combustion of hazardous waste (e.g., clinker cooler emissions for cement production facilities, and hydrochloric acid product transportation and storage for hydrochloric acid production facilities).

²⁰⁴ This issue has little relevance given that the measures taken to control the fugitive emissions from the combustion of hazardous waste will also control the fugitive emission associated with other feedstreams.

²⁰⁵ The February 14, 2002 Final Amendments Rule clarifies that a reasonable pressure monitoring frequency that could meet the intent of "instantaneous" would be once every second. See 67 FR at 6974.

²⁰⁶ Commenters did not provide data to the contrary.

¹⁹⁸ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume IV: Compliance With the HWC MACT Standards," September 2005, Section 10.

¹⁹⁹ See § 63.1206(c)(5)(i)(C) and (D).

²⁰⁰ See § 266.102(e)(7) and § 264.345(d).

zone pressure lower than ambient pressure is readily achievable by well designed and operated boilers.²⁰⁷

We note that use of instantaneous pressure monitoring is not a requirement. A source can elect to implement any of the four compliance options to control combustion system leaks as well as request to use alternative monitoring approaches. See §§ 63.1206(c)(5) and 63.1209(g). The instantaneous pressure monitoring option offers sources a method that satisfies the intent of the rule that can be applied at numerous sources. The inclusion of this requirement in today's rule is thus an attempt to simplify the review process for both regulators and affected sources; the absence of prescriptive compliance options in this case may likely result in time-consuming site-specific negotiations that would prolong the review and approval of comprehensive performance test workplans.

Comment: A commenter believes that requiring an instantaneous waste-feed cutoff when these pressure excursions occur is short-sighted and will result in greater HAP emissions. The commenter recommends EPA instead allow the use of reasonable pressure averaging periods in lieu of instantaneous pressure requirements.

Response: As discussed in the February 14, 2002 Final Amendments Rule, automatic waste feed cutoffs are appropriate non-compliance deterrents, and are necessary whenever an operating limit is exceeded. See 67 FR at 6973. Pressure excursions that result in combustion system leaks (and subsequently lead to automatic waste feed cutoffs) should be prevented by maintaining negative pressure in the combustion zone. We agree that needless triggering of automatic waste feed cutoffs due to short term pressure fluctuations that do not result in combustion system leaks would provide less environmental protection, not more. Today's rule offers three alternative options that do not require the use of instantaneous pressure monitoring to control combustion system leaks. See § 63.1206(c)(5). The use of averaging periods in these alternatives is not prohibited. Sources that elect to use an alternative compliance option must demonstrate that the alternative method is equivalent to maintaining combustion zone pressure lower than ambient pressure or, that the alternative approach prevents fugitive emissions.

²⁰⁷ The commenter did not provide information that would lead us to conclude that these requirements are harder to implement for boilers than for incinerators, cement kilns, and lightweight aggregate kilns.

E. Notification of Intent To Comply and Compliance Progress Report

1. Notice of Intent To Comply

In the NPRM, we proposed to re-institute the Notification of Intent to Comply (NIC) because we felt that it offered many benefits in the early stages of MACT compliance. As discussed in the 1998 "fast track" rule (63 FR 33782) and in the proposal, the NIC serves several purposes: as a planning and communication tool in the early implementation stages, to compensate for lost public participation opportunities when using the RCRA streamlined permit modification procedure to make upgrades for MACT compliance, and as a means to share information and provide public participation opportunities that would be lost when new units are not required to comply with certain RCRA permit requirements and performance standards. Please refer to the proposal at 69 FR 21313–21316 for additional discussion of the regulatory history, purpose, and implementation of the NIC provisions.

Overall, most commenters supported our decision to finalize NIC provisions. However, they also feel that the NIC should only be required for sources that have not completed a NIC previously (i.e., Phase 2 sources or Phase 1 sources that did not meet the previous NIC deadline) and for sources that need to make upgrades to comply with the final standards (i.e., either Phase 1 or Phase 2). They suggest that if sources do not need to make upgrades, then they should not be required to complete the NIC process, if they had done so previously. To require a second NIC would only add to the administrative burden and is not in line with Agency efforts to reduce reporting burdens. We agree that if Phase 1 sources do not need to make upgrades to comply with the Replacement Standards and if they completed the NIC process before, then it is not necessary to do so again.

In addition to the comment discussed above, a few commenters proposed that for sources who must still comply with the NIC because they wish to make upgrades, that the NIC public notice be combined with the Title V re-opening or renewal public notice. They point out that sources with existing Title V permits will have their permits re-opened or renewed to incorporate the new applicable requirements (i.e., Phase 1 Replacement or even Phase 2 Standards) shortly after the NIC public notice and meeting are to occur. Title V permit re-openings and renewals require: public notice, a minimum of 30

days for comment, and an opportunity to request a hearing.

While we do agree that the Title V re-opening and renewal requirements provide adequate information to the public and an opportunity for the public to comment and request a hearing, we are concerned that the timing requirements for the NIC may not correspond with the timing requirements for title V permit reopenings, revisions, and renewals. The public review of the draft NIC and subsequent public meeting are scheduled to occur 9 and 10 months, respectively, after the rule's effective date. On the other hand, Title V permits for major sources that have a remaining permit term of greater than 3 years from the rule's promulgation date will need to be re-opened, but this re-opening may not occur until 18 months beyond the promulgation date of the rule. Also, Title V permits that have a remaining permit term of less than 3 years from the rule's promulgation date will need to be renewed, but the timing of the renewal is contingent upon the individual permit term, not the timing requirements for public review of the draft NIC and public meeting. Thus, we do not believe there is ample opportunity to combine the requirements of the NIC and Title V process for the vast majority of sources.²⁰⁸ Also, those sources that need to make upgrades to comply with the final standards and that need to modify any applicable conditions in their RCRA permit will not be able to request the streamlined modification procedure (see 40 CFR 270.42(j)) until they meet the NIC requirements. So the earlier they comply with the NIC requirements, the earlier they can begin upgrading their combustion units.

Another commenter suggested a change to the regulations at § 63.1210(c)(1) to account for sources that will cease burning hazardous waste prior to or on the compliance date. The regulations, as proposed, require sources to hold an informal public meeting to discuss anticipated activities described in the draft NIC even if they plan to cease burning hazardous waste. The commenter also suggested a similar change to § 63.1210(b)(2) that requires the draft NIC be made available for public review no later than 30 days

²⁰⁸ We recognize that there may be instances when states can coordinate the Title V permit re-opening, revision, and renewal process with the NIC timeframe requirements. Where this is possible, we encourage states (or other permitting authorities) to coordinate the two processes. By coordinating the two, duplication with respect to material content and public participation would be eliminated for both sources and states.

prior to the public meeting. We agree with the commenter that it does not make sense to require sources that intend to cease burning hazardous waste to submit a NIC that discusses anticipated activities that will allow them to achieve compliance with the standards. We also agree that it is not necessary for those sources to hold an informal public meeting, since there are no MACT compliance activities to discuss. However, we believe that the public should be provided notice of the draft NIC so that they are aware of the source's intentions to cease burning and the steps (and key dates) the source will undertake to stop hazardous waste combustion activities.

With regard to Phase 2 sources, we had proposed that all Phase 2 sources comply with the same NIC requirements as the Phase 1 sources. Commenters did not express opinions in favor or against the NIC for Phase 2 sources. We believe that the NIC is beneficial in several respects. As mentioned previously, it serves as a planning and communication tool in the early implementation stages, it compensates for lost public participation opportunities when using the RCRA streamlined permit modification procedure to make upgrades for MACT compliance, and it is a tool to share information and provide public participation opportunities that would be lost when new units are not required to comply with certain RCRA permit requirements and performance standards. Ultimately, it creates more public confidence in the permitting process and so promotes a more stable regulatory environment.

For today's rule, we are finalizing our decision to re-institute the NIC provisions for Phase 1 and Phase 2 sources. We are including a few minor changes and clarifications to improve the proposed regulatory language based on commenters' suggestions. Section 63.1210(b) is revised so that Phase 1 sources that previously complied with the NIC requirements, and that do not need to make upgrades to comply with the Replacement Standards, are not required to comply with the NIC again. Sections 63.1210(b)(1)(iv) and (b)(2) have been revised and (c)(5) has been added so that sources that intend to cease burning hazardous waste prior to or on the compliance date are only required to prepare a (draft) NIC, make a draft of the NIC available for public review no later than 9 months after the effective date of the rule, and submit a final NIC to the Administrator no later than one year following the effective date of the rule. Last, we have revised language in § 63.1210(b) based upon a

commenter's concerns that the term you "will" implies that sources are required to meet their "estimated" dates for achieving key activities. We have removed "will" and replaced it with "anticipate" to more accurately represent the objective of the NIC, which is for sources to communicate their plans for complying with the standards in two years.

2. Compliance Progress Report

In the proposal, we explained why we thought a compliance progress report would be beneficial. In short, we believed it would help regulatory agencies determine whether Phase 1 and Phase 2 sources were making sufficient headway in their efforts to meet the compliance date. The progress report would be due to the regulatory agency at the midway point of the 3 year compliance period and would serve to update the information the source provided in its NIC. However, because we do not have any experience to draw upon regarding the value of the progress report, we requested comment on whether or not it should be required.

In response to our request for comment, all commenters were opposed to the progress report. They cited several reasons, with the most consistent one being that the progress report serves no useful purpose and imposes unnecessary additional burdens on sources. As we discussed above, sources and regulatory agencies will be focusing on the NIC as well as initial Title V applications, re-openings, revisions, and renewals during this three year compliance period. We agree with the commenter who noted that there is already significant interaction between sources and regulatory authorities during this period. Furthermore, we learned through implementation of the Interim Standards that some regulatory agencies found it difficult to manage the notices, applications, requests, and test plans that were due prior to the compliance date. Therefore, we have decided not to finalize any compliance progress report requirements for today's rule.

F. Startup, Shutdown, and Malfunction Plan

Comment: One commenter states that an exceedance of a standard or operating requirement during a malfunction should be a violation not only because source owners and operators need an incentive to minimize exceedances caused by malfunctions, but also because an exemption for malfunction periods would violate the plain language of the CAA. The commenter notes that an emission

standard is defined by 42 U.S.C. § 7602(k) as a standard that "limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis, including any requirement relating to the operation of maintenance of a source to assure continuous emission reduction, and any design, equipment, work practice or operational standard * * *." The commenter concludes that a standard that contains a malfunction exemption does not apply "on a continuous basis" as required by the statute. Likewise, the commenter concludes that an exemption for startup and shutdown periods would also violate this unambiguous statutory language.

The commenter also notes that, although some courts have held that a technology-based standard must provide some kind of an exemption for unavoidable technology failures, the rationale for such an exemption is that the underlying standard is based on the performance of a particular control technology that cannot be expected to function properly all of the time. The commenter believes that neither the rationale nor the exemption apply to section 112(d) standards, which are not based on the performance of any particular technology but instead must reflect the "maximum degree of reduction" that can be achieved, irrespective of the measures used by a source to achieve that reduction. CAA § 112(d)(2).

The commenter states that, even assuming for the sake of argument that EPA has authority to depart from the statutory language and carve out a startup, shutdown, and malfunction exemption, any such exemption must be narrowly drafted to apply only where a source demonstrates that a violation was unavoidable. See, e.g., *Marathon Oil*, 564 F.2d at 1272-73. As EPA recognizes, emission exceedances that occur during SSM events are frequently avoidable. See 69 FR at 21339/3 (noting that "proper operation and maintenance of equipment" helps avoid exceedances during startup, shutdown, and malfunction events), 69 FR at 21339/2 (describing the industry view that "some" exceedances that occur due to malfunctions are unavoidable). Thus, the commenter concludes that, even if a Marathon Oil-type exemption applies to a § 112(d) standard, it would be unlawful and arbitrary for EPA to exempt sources from liability for all emission exceedances occurring during startup, shutdown, and malfunction events. Rather, such an exemption could only apply where a source demonstrates that a given exceedance was unavoidable.

Many other commenters state that it would be illegal to require compliance with the emission standards and operating requirements during startup, shutdown, and malfunction events. The commenters note that EPA and the courts have long recognized that technology fails at times, despite a source's best efforts to maintain compliance. For this reason, the courts have recognized that technology-based standards such as EPA's § 112(d)(2) MACT standards must account for such unavoidable technology failures if the standards are to be truly "achievable." Thus, the standards must excuse noncompliance with the actual emission standards during startup, shutdown, and malfunction events.

These commenters also note that EPA took the position in the September 1999 final MACT rule for hazardous waste combustors that exceedance of an operating requirement during startup, shutdown, or malfunction events was a violation if hazardous waste remained in the combustion chamber. The commenters note that industry groups challenged the rule, and while the D.C. Circuit did not reach this issue because it vacated the emission standards, it pointed out that "industry petitioners may be correct that EPA should have exempted HWCs from regulatory limits during periods of startup, shutdown, and malfunction, permitting sources to return to compliance by following the steps of a startup, shutdown, and malfunction plan filed with the Agency." *CKRC v. EPA*, 255 F.3d 855, 872 (2001). Commenters conclude that, after reading this language, EPA officials wisely decided that hazardous waste combustors should not be required to meet the MACT emission standards and operating limits during startup, shutdown, and malfunction events.

Response: We agree with commenters who state that sources must be exempt from technology-based emission standards and operating limits during startup, shutdown, and malfunction events. Technology is imperfect and can malfunction for reasons that are not reasonably preventable. The regulations must provide relief for such situations. We believe that existing case law supports this position. See, e.g., *Chemical Mfr's Ass'n v. EPA*, 870 F. 2d at 228–230 (daily maximum limitations established at 99th percentile reasonable because rules also provide for upset defense for unavoidable exceedances); *Marathon Oil v. EPA*, 541 F. 2d at 1272–73 (acknowledged by commenter). As commenters noted, the D.C. Circuit also intimated in *CKRC* that some type of exception from compliance with

standards during startup, shutdown and malfunction periods was required.

We do not agree with the commenter who contends that the § 112(d) MACT standards are not technology-based standards because they are not based on the performance of any particular technology but instead must reflect the "maximum degree of reduction" that can be achieved, irrespective of the measures used by a source to achieve that reduction. On the contrary, the standards must reflect the average performance of the best performing sources, which performance is achieved using technical controls—air pollution control devices, and for some pollutants, hazardous waste feedrate control. Those controls can fail for reasons that are not reasonably preventable. We note further that the situation was the same in the Clean Water Act cases which the commenter seeks to distinguish. Like section 112(d) standards, Clean Water Act standards are technology-based (reflecting Best Practicable Technology or Best Available Technology, see CWA sections 304 (b) and 301 (b)) and do not require use of any particular type of technology. See also *Mossville*, 370 F. 3d at 1242 (EPA must account for foreseeable variability in establishing MACT floor standards).

We agree with the commenter who states that any exemption from the emission standards and operating requirements during malfunctions must apply only where a source demonstrates that a violation was unavoidable. We note that the term malfunction is defined in § 63.2 as "any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions." We believe this definition largely addresses the commenter's concern.

We acknowledge, however, that emissions can increase during malfunctions and potentially exceed the standards and agree that exceedances must be minimized. Accordingly, the final rule (and the current rule for incinerators, cement kilns, and lightweight aggregate kilns) requires that sources maintain compliance with the automatic hazardous waste feed cutoff system during malfunctions and notify the permitting authority if they have 10 or more exceedances of an emission standard or operating limit during a 6-

month block period when hazardous waste is in the combustion chamber. See § 63.1206(c)(2)(v). This will alert the permitting authority that the source's operation and maintenance plan may not be adequate to maintain compliance with the emission standards and that the authority may need to direct the source to revise the plan under § 63.6(e)(3)(vi). Finally, we note that sources must report all excess emissions semiannually under § 63.10(e)(3) if an emission standard or operating limit is exceeded, including during malfunctions.

Comment: One commenter states that any exemption for emission exceedances during startup, shutdown, or malfunction events would violate the RCRA mandate for standards necessary "to protect human health and the environment." 42 U.S.C. 6924(a). The commenter reasons that, because EPA's RCRA standards are health-based rather than technology-based, no unavoidability defense is available. Given that EPA concludes that the hazardous waste combustor MACT rule satisfies both its CAA and RCRA mandates, the emission standards and operating requirements cannot be waived during startup, shutdown, and malfunction events.

Response: We agree that the RCRA mandate to ensure protection of human health and the environment applies at all times, including during startup, shutdown, and malfunction events. Accordingly, the existing MACT requirements for incinerators, cement kilns, and lightweight aggregate kilns give sources the option of continuing to comply with RCRA permit requirements to control emission during these events, or to comply with special MACT requirements that are designed to be proactive and reactive and intended to be equivalent to the incentive to minimize emissions during these events provided by the RCRA requirements. See existing § 63.1206(c)(2)(ii). The special MACT requirements require sources to include proactive measures in the startup, shutdown, and malfunction plan to minimize the frequency and severity of malfunctions and to submit the startup, shutdown, and malfunction plan to the permitting authority for review and approval. We proposed to require boilers and hydrochloric acid production furnaces to comply with those same provisions providing for equivalence between the two sets of requirements, and promulgate those provisions today.

Comment: One commenter states that the rule should clarify the definitions of startup, shutdown, and malfunctions to preclude sources from improperly

classifying as unavoidable exceedances those exceedances that could have been avoided had the source implemented an appropriate operation and maintenance plan. Many other commenters state that the current definitions in § 63.2 clearly define these terms.

Response: We believe the definitions of startup, shutdown, and malfunction are clearly defined in § 63.2, and combined with the startup, shutdown, and malfunction plan requirements, will preclude sources from improperly classifying as malfunctions events that could have been reasonably prevented by following appropriate procedures in the operation and maintenance plan. As discussed above, the definition of malfunction clearly states that failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Comment: One commenter states that all stack bypasses, automatic waste feed cutoffs, and excursions from the operating parameter limits should be considered malfunctions.

Response: All failures resulting in stack bypasses, automatic waste feed cutoff, and excursions from the operating parameter limits are not malfunctions. As discussed above, failures caused in part by poor maintenance or careless operation are not malfunctions.

Comment: One commenter states that the rule should require sources to expand the startup, shutdown, and malfunction plan to address specific proactive measures that the source has considered and is taking to minimize the frequency and severity of malfunctions. Many other commenters believe that it is not necessary to expand the scope of the startup, shutdown, and malfunction plan beyond that required under § 63.6(e)(3) for other MACT source categories.

Response: We do not believe that it is necessary to expand the scope of the startup, shutdown, and malfunction plan generically for all hazardous waste combustors to address specific proactive measures that the source has considered and is taking to minimize the frequency and severity of malfunctions. Imposing additional requirements in particular situations is appropriate, however. For example, as discussed above, this expanded plan is required for sources that elect to meet the RCRA mandate using provisions of the startup, shutdown, and malfunction plan. See § 63.1206(c)(2)(ii). In addition, the plan with expanded scope may be appropriate for sources that have demonstrated an inability to minimize malfunctions. Consequently, the permitting authority should consider

expanding the scope of the startup, shutdown, and malfunction plan on a site-specific basis under authority of § 63.6(e)(3)(vii) if the source has excessive exceedances during malfunctions. See § 63.1206(c)(2)(v)(A)(3) defining excessive exceedances during malfunctions and requiring reporting of the exceedances in the excess emissions report required under § 63.10(e)(3).

Comment: Two commenters state that all startup, shutdown, and malfunction plans should be submitted for review and approval by the delegated authority and made available for a 60-day public review period. Review and approval of the plans is needed in light of EPA's acknowledgment that most excess emissions would occur during startup, shutdown, and malfunctions. One of these commenters also believes that the regulations should provide for the public review period to be extended as necessary to accommodate a thorough public review. The reviewing authority should be required to provide a written response to public comments explaining any decision to reject a public comment suggesting ways for a facility to limit emissions during startup, shutdown, and malfunction events.

Many other commenters have concerns with requiring review and approval of startup, shutdown, and malfunction plans, except as required under § 63.1206(c)(2)(ii) for sources that elect to meet the RCRA mandate using provisions of the startup, shutdown, and malfunction plan as discussed above.

Response: Commenters express the same views here that they expressed under the rulemaking the Agency recently completed to revise the startup, shutdown, and malfunction plan requirements of the General Provisions applicable to all MACT source categories. See 68 FR at 32589–93 (May 30, 2003).

EPA concluded in that final rule that the Administrator may at any time request in writing that the owner or operator submit a copy of any startup, shutdown, and malfunction plan (or a portion thereof). Upon receipt of such a request, the owner or operator must promptly submit a copy of the requested plan (or a portion thereof) to the Administrator. In addition, the Administrator must request that the owner or operator submit a particular startup, shutdown, or malfunction plan (or a portion thereof) whenever a member of the public submits a specific and reasonable request to examine or to receive a copy of that plan or portion of a plan.

These provisions to provide the Administrator and the public with

access to startup, shutdown, and malfunction plans, coupled with the provisions of § 63.6(e)(3)(vii) under which the Administrator must require the source to make changes to a deficient plan, should ensure that startup, shutdown, and malfunction plans are complete and accurate. We note that under § 63.6(e)(3)(vii) the Administrator must require the source to revise the plan if the plan: (1) does not address a startup, shutdown, or malfunction event that has occurred; (2) fails to operate the source (including associated air pollution control and monitoring equipment) during a startup, shutdown, or malfunction event in a manner consistent with the general duty to minimize emissions; (3) does not provide adequate procedures for correcting malfunctioning process and/or air pollution control and monitoring equipment as quickly as practicable; or (4) includes an event that does not meet the definition of startup, shutdown, or malfunction listed in § 63.2.

The commenter advocating that all hazardous waste combustors should be required to submit their startup, shutdown, and malfunction plans for review and approval did not explain why the concerns the Agency expressed in the General Provisions rulemaking (see 68 FR at 32589–93) are not valid for hazardous waste combustors. Accordingly, we do not believe it is appropriate to deviate from the General Provisions to require that all hazardous waste combustors submit their startup, shutdown, and malfunction plans for review.

G. Public Notice of Test Plans

1. What Are the Revised Public Notice Requirements for Test Plans?

Prior to the proposal, it was brought to our attention that the Agency did not provide any direction in the 1999 final rule regarding how and when sources should notify the public, what the notification should include, or where and for how long performance test plans should be made available. Consequently, we proposed to add clarifying language to the § 63.1207(e)(2) public notification requirement for approved performance test and CMS performance evaluation test plans because we believe that providing opportunities for timely and adequate public notice is necessary to fully inform nearby communities of a source's plans to initiate important waste management activities. The proposed clarifications are based upon the *RCRA Expanded Public Participation Rule* (60 FR 63417, December 11, 1995) requirements for

public notification of an impending trial burn test. As a result, we did not feel that the clarifications imposed any new or additional requirements upon sources that will conduct a MACT comprehensive performance test or confirmatory performance test.

Commenters generally supported the clarifications to the public notice.²⁰⁹ However, they suggested a change to the proposed requirement to provide notice of test plan approval no later than 60 days prior to conducting the test. The basis for suggesting a change is that many sources had not received approval of their test plans 60 days prior to the deadline for initiating their test under the Interim Standards. Moreover, several sources did not receive approval until well after the deadline for initiating the test. The problem created for these sources is that the required 60 day notification of the approved test plan effectively determines when the source will be able to begin its test. In other words, its test would need to be postponed until the approved test plan had been noticed for 60 days. Thus, commenters provided several possible alternatives.

One alternative that would avoid causing delays to testing is to require the public notice when the source submits its test plan. Although this fulfills the notification requirement, this alternative has a shortfall: The notice would occur at least one year (barring any extensions) in advance of the test and given this long period of time, the test plan is likely to be modified prior to approval. A second alternative is to provide notice of the test plan 60 days before the test as before, but regardless of approval status. This alternative is improved over the first, but still faces the same problem of potentially not offering the public an opportunity to view a final approved plan. A third alternative is to issue notice of the test plan as soon as it is approved. With this alternative, the public will have the most up-to-date information; however, it may not be until a few days prior to commencement of the test. Ideally, the second and third alternatives could be combined to provide the best possible chance of providing the public with an approved test plan in a reasonable period of time prior to the test. On the other hand, that would potentially require the facility to issue two notices if the test plan is not approved 60 days prior to the test. We do not believe this would be reasonable given that sources will be focused on activities associated with the impending test.

In consideration of practicality, we believe that the second alternative provides an adequate solution. As we mentioned, the drawback is that the public may not have the opportunity to view an approved test plan. However, we believe it is more important that the public be aware of a source's plans (*i.e.*, how and when) for conducting the performance test.²¹⁰ This way, if they have questions, there will be 60 days in which they may contact the regulatory authority or the source before the test is scheduled to begin. This alternative will also eliminate the conflict associated with the confirmatory performance test. The regulations at § 63.1207(e)(1)(ii) specify that a source must submit to the regulatory authority its notice of intent to conduct a confirmatory performance test and the applicable test plans at least 60 calendar days prior to the date the test is to begin. Since we are no longer requiring that the test plans be approved before issuing public notice, sources would then provide notice of their confirmatory performance test plan to the public at the same time they submit their notice of intent and test plans to the regulatory authority. Therefore, we are requiring that sources issue the public notice of test plans 60 days in advance of commencing the performance test, whether their test plans have been approved or not. The regulations at § 63.1207(e)(2) have been revised accordingly.

One last concern related to the public notice of approved test plans involves sources that choose to conduct a performance test without an approved test plan (*e.g.*, both time extensions provided by §§ 63.7(h) and 63.1207(e)(3) have expired or due to other circumstances, the source has elected to begin the test without approval). Because we did not believe any sources would choose or need to do so, we did not propose any guidance or regulations specific to issuing notice to the public of their test plans. Nevertheless, a few commenters raised this possibility indirectly in their discussion of the problematic 60 day notice of approved test plan requirement. The revised proposal addresses this concern by no longer requiring that test plans be approved before issuing public notice. Thus, sources that choose to begin their test without an approved plan will have complied with the requirement to issue

²¹⁰ We expect that some source's test plans may be modified after notice is issued and prior to approval or commencement of their test. However, even under the previous regulations, test plans could be modified after they had been approved and public noticed. It is often a necessary consequence as sources continue to prepare the combustion unit for the test.

public notice. Irrespective of the public notice requirements for noticing test plans, we expect that sources will notify their regulatory authority of their decision to proceed with their test in the absence of plan approval.

2. What Are the Revised Public Notice Requirements for the Petition To Waive a Performance Test?

In the Final Amendments Rule (67 FR 6968, February 14, 2002), the Agency did not provide direction regarding how, when, where, and what should be included in the public notice for a petition for time extension if the Administrator fails to approve or deny test plans.²¹¹ In the proposal, we believed it important to provide clarification regarding when the notice must be issued and what it should contain. Thus, we proposed to revise paragraph § 63.1207(e)(3)(iv).

We received only one comment in response to the proposed requirements. The commenter did not express any concern over the requirements themselves, but rather suggested a change to terminology used. The commenter feels that the terms "to waive a performance test" or "waiver" as used in § 63.1207(e)(3)(iv) could be confusing to readers when we are actually referring to a time extension for commencing the test. Although we agree the terminology could be confusing, 40 CFR 63.1207(e)(3) clearly uses the term "waiver" in the context of an extension of time to conduct the performance test at a later date, implying that the deadline can be waived in this specific situation. The use of the term waiver is derived from the General Provisions requirements for requesting a waiver of performance tests (§ 63.7(h)). Thus, § 63.7(h)(3) provides the basis by which sources may petition, in the form of a waiver, for a time extension under § 63.1207(e)(3). In consideration of the above and that the existing regulations of § 63.1207(e)(3)(i)-(iii) consistently use the term waiver, we do not feel that a change to § 63.1207(e)(3)(iv) is warranted.

H. Using Method 23 Instead of Method 0023A

Comment. Most commenters support our proposal to allow the use of Method 23 instead of Method 0023A if a source includes this request in the comprehensive test plan to the permitting authority. Some commenters believe that Method 23 should be

²¹¹ Sections 63.1207(e)(2) and (e)(3) each require public notice, but neither had provided any direction on how, when, where, and what should be included in their respective notices until today's final rule.

²⁰⁹ See 69 FR 21347-21349.

approved in all cases without prior approval or on a source category basis.

Response. We proposed to allow sources to use Method 23 for dioxin and furan testing instead of SW-846 Method 0023A in situations where the enhanced procedures found in Method 0023A would not increase measurement accuracy. We proposed this change in the July 3, 2001, proposed rule, and again in the April 20, 2004, proposal. See 66 FR at 35137 and 69 FR at 21342.

The final rule promulgates this change as proposed. See § 63.1208(b)(1)(i). You may use Method 23 in lieu of Method 0023A after justifying use of Method 23 as part of your performance test plan that must be reviewed and approved the delegated permitting authority. You may be approved to use Method 23 considering factors including whether previous Method 0023A analyses document that dioxin/furan are not detected, are detected at low levels in the front half of Method 0023A, or are detected at levels well below the emission standard, and the design and operation of the combustor has not changed in a manner that could increase dioxin/furan emissions. We note that coal-fired boilers and combustors equipped with activated carbon injection systems may not be able to support use of Method 23, however, because these sources' stack gas is likely to contain carbonaceous particulate. Thus, these sources are likely to benefit the most from using Method 0023A.

The final rule does not automatically allow use of Method 23 for particular source categories because we cannot assess whether all sources in a category meet the conditions for use of Method 23—generally that quality assurance may not be improved—such as those listed above. These determinations can only be made on a site specific basis by the permitting authority most familiar with the particular source.

Comment: Commenters do not believe that an additional petition process (*i.e.*, under § 63.1209(g)(1)) is necessary before allowing use of Method 23. Instead, EPA should require that the use of Method 23 should be submitted with the test plan to the regulatory agency for approval.

Response: We agree that a separate petition is unnecessary. Sources should include a justification to use Method 23 in the performance test plan that is submitted for review and approval. This will allow the permitting authority to determine whether use of Method 23 is appropriate for the source.

Comment: Two commenters state that “the justification of the use of Method 23 will not be by the existing system of

a petition to EPA, but will be included as a part of the performance test plan that is submitted to the delegated regulatory authority for review and approval. This means that the expertise, training, and decision-making will not be consistent across the country. This is especially a problem because of the severe resource, training and staff reductions among the delegated regulatory authorities across the country and from region to region. The decision to allow or disallow use of Method 23 should come specifically, for each case, from EPA consideration of the submitted justification, based on the knowledge and expertise of trained and experienced EPA staff. This is important for uniformly applying the testing requirements all across the country.”

Response: We disagree, and we believe the responses to comments in today's rule make clear when Method 23 is an acceptable substitute for Method 0023A. If the source has carbon in the flue gas, as is the case with coal-fired boilers, boilers with carbon injection, and other sources likely to have a substantial amount of carbonaceous particulate matter in the flue gas, Method 0023A will generally be preferable because it includes procedures to account for dioxin and furan bound to carbonaceous particulate matter found in the probe and filter. In other situations, Method 23 will generally give the same results at a lower cost.

I. Extrapolating Feedrate Limits for Compliance With the Liquid Fuel Boiler Mercury and Semivolatile Metal Standards

Comment: One commenter questions whether allowing sources to extrapolate metal feedrates downward from the levels achieved during the comprehensive performance test to establish a metal feedrate limit will ensure compliance with the emission standards.

Response: The mercury and semivolatile metals standards for liquid fuel boilers are annual average emission limits where compliance is established by a rolling average mercury feedrate limit with an averaging period not to exceed an annual rolling average (updated hourly).²¹² We use this

²¹² If you select an averaging period for the feedrate limit that is greater than a 12-hour rolling average, you must calculate the initial rolling average as though you had selected a 12-hour rolling average, as provided by § 63.1209 (b)(5)(i). This is reasonable because allowing a longer period of time before calculating the initial rolling average would not effectively ensure compliance with the feedrate limit. You must calculate rolling averages thereafter as the average of the available one-minute values until enough one-minute values are available

approach because the emissions data used to establish the standards are more representative of normal emissions than compliance test emissions.²¹³

As we explained at proposal, to ensure compliance with the mercury and semivolatile metal emission standards for liquid fuel boilers, you must document during the comprehensive performance test a system removal efficiency for the metals and back-calculate from the emission standard a maximum metal feedrate limit that must not be exceeded on an (not to exceed) annual rolling average. See 69 FR at 21311–12. If your source is not equipped with an emission control system (such as activated carbon to control mercury) for the metals in question, however, you must assume zero system removal efficiency. This is because, although a source that is not equipped with an emission control system may be able to document a positive system removal efficiency in a single test, that removal efficiency is not likely to be reproducible. Rather, it is likely to be an artifact of the calculation of emissions and feeds rather than a removal efficiency that can reliably be repeated.

To ensure that you can calculate a valid, reproducible system removal efficiency for sources equipped with a control system that effectively controls the metal in question, you may need to spike metals in the feed during the comprehensive performance test at levels that may result in emissions that are higher than the standard. This is appropriate because compliance with an emission standard derived from normal emissions data is based on compliance with an (not to exceed) annual average feedrate limit calculated as prescribed here, rather than compliance with the emission standard during the comprehensive performance test.²¹⁴

The commenter is concerned that downward extrapolation from the levels achieved during the comprehensive performance test to establish a metal feedrate limit may not ensure

to calculate the rolling average period you select. We note that this is an approach allowed for calculating rolling averages under different modes of operation at § 63.1209(q)(2)(ii). At that time and thereafter, you update the rolling average feedrate each hour with a 60-minute average feedrate.

²¹³ See USEPA, “Technical Support Document for HWC MACT Standards, Volume III: Selection of HWC MACT Standards,” September 2005, Section 13.

²¹⁴ The emission standard accounts for long-term variability by incorporating an (not to exceed) annual averaging period that is implemented by an (not to exceed) annual average chlorine feedrate limit. Thus, because the emission level achieved during the performance test relates to daily (or hourly) variability, an exceedance of the emission standard during the test is not a violation.

compliance with the standard because system removal efficiency may be lower at lower feedrates.

This is a valid concern, and we have investigated it since proposal. We conclude that downward extrapolation of feedrates for the purpose of complying with the mercury and semivolatile metals emission standards for liquid fuel boilers will ensure compliance with the emission standards under the conditions discussed below.

We investigated the theoretical relationship between stack gas emissions and feedrate considering vapor phase metal equilibrium, the chlorine, mercury, and semivolatile metal feedrates for liquid fuel boilers in our data base, and the mercury and semivolatile emission standards for liquid fuel boilers.²¹⁵ We considered sources equipped with dry particulate matter controls and sources equipped with wet particulate matter controls.

Sources Equipped with Dry Controls. For sources equipped with dry controls other than activated carbon, mercury is not controlled. Thus, you must assume zero system removal efficiency. Consequently, if you are in the low Btu subcategory and comply with the mercury standard expressed as a mass concentration ($\mu\text{g}/\text{dscm}$), the mercury feedrate limit expressed as an MTEC (maximum theoretical emission concentration, $\mu\text{g}/\text{dscm}$) is equivalent to the emission standard.²¹⁶ If you are in the high Btu subcategory and comply with the mercury standard expressed as a hazardous waste thermal emission concentration ($\text{lb}/\text{MM Btu}$), the mercury feedrate limit expressed as a hazardous waste thermal feed concentration ($\text{lb}/\text{MM Btu}$) is also equivalent to the emission standard.

For semivolatile metals, the theoretical relationship between emissions and feedrate indicates that downward extrapolation introduces only a trivial error²¹⁷ of 0.17% at an emission rate 100 times the standard irrespective of the level of chlorine present. *Id.* Nonetheless, to ensure the error is minimal and to be practicable, you should limit semivolatile emissions during the comprehensive performance test to five times the emission standard.

Sources Equipped with Wet Scrubbers. For sources equipped with wet scrubbers, we conclude that the

approach we use for semivolatile metals for dry scrubbers will also be appropriate to extrapolate a semivolatile metal feedrate limit for wet scrubbers. To ensure that downward extrapolation of the feedrate limit is conservative and to be practicable, you should limit semivolatile metal emissions during the comprehensive performance test to five times the emission standard.

For mercury, ensuring control with wet systems is more complicated because the level of chlorine present affects the formation of mercuric chloride which is soluble in water and easily controlled by wet scrubbers. Elemental mercury has very low solubility in scrubber water and is not controlled. The worst-case situation for conversion of elemental mercury to soluble mercuric chloride would be when the chlorine MTEC is lowest and the mercury MTEC is highest. We conclude that downward extrapolation of mercury feedrates is conservative for feedstreams that contain virtually no chlorine, *e.g.*, below an MTEC of $100 \mu\text{g}/\text{dscm}$. In addition, we conclude that downward extrapolation is appropriate²¹⁷ for boilers feeding chlorinated feedstreams provided that during the performance test: (1) Scrubber blowdown has been minimized and the scrubber water has reached steady-state levels of mercury prior to the test (*e.g.*, by spiking the scrubber water); (2) scrubber water pH is minimized (*i.e.*, you establish a minimum pH operating limit based on the performance test as though you were establishing a compliance parameter for the total chlorine emission standard); and (3) temperature of the scrubber water is maximized (*i.e.*, you establish a maximum scrubber water temperature limit).

J. Temporary Compliance With Alternative, Otherwise Applicable MACT Standards

Comment: One commenter requests clarification on the requirements applicable to a source that switches to an alternative mode of operation when hazardous waste is no longer in the combustion chamber under the provisions of § 63.1206(b)(1)(ii). The commenter suggests that § 63.1206(b)(1)(ii) can imply that the complete compliance strategy needs to be switched over to the alternative section 112 or 129 requirements, even though compliance with the Subpart EEE requirements for monitoring, notification, reporting, and recordkeeping remains environmentally

protective under Subpart EEE. For example, the commenter notes that § 63.1206(b)(1)(ii) could be incorrectly interpreted to require a source to comply with illogical requirements when the source temporarily switches to alternative, otherwise applicable standards, including standards testing and opacity monitoring under the alternative section 112 or 129 requirements. The commenter states that this interpretation makes little sense because a source that temporarily changes its mode of operation will continue to do testing under Subpart EEE, Part 63, or, in the case of opacity, the alternative section 112 requirements for cement kilns would necessarily require duplicate systems and compliance with redundant limits because a source may already be using a bag leak detection system or a particulate matter detection system. The commenter suggests only requiring sources to comply with the otherwise applicable emission standards under the alternative section 112 or 129 requirements while still operating under the various associated compliance requirements of Subpart EEE, part 63.

Response: The commenter requests clarification of § 63.1206(b)(1)(ii), which states that if a source is not feeding hazardous waste to the combustor and the hazardous waste residence time has expired (*i.e.*, the hazardous waste feed to the combustor has been cut off for a period of time not less than the hazardous waste residence time), then the source may elect to comply temporarily with alternative, otherwise applicable standards promulgated under the authority of sections 112 and 129 of the Clean Air Act.²¹⁸ As we have explained in previous notices,²¹⁹ sources that elect to invoke § 63.1206(b)(1)(ii) to become temporarily exempt from the emission standards and operating requirements of Subpart EEE, Part 63, remain an affected source under Subpart EEE (and only Subpart EEE) until the source is no longer an affected source by meeting the requirements specified in Table 1 of § 63.1200. Of course, a source can elect not to use the alternative requirements for compliance during periods when

²¹⁵ USEPA, "Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the HWC MACT Standards," September 2005, Section 2.5 and Appendix B.

²¹⁶ Note, however, that you convert the MTEC ($\mu\text{g}/\text{dscm}$) to a mass feedrate (lb/hr) by considering the average gas flowrate of the test run averages during the comprehensive performance test to simply implementation and compliance.

²¹⁷ Mercury SRE is constant as the mercury feedrate decreases.

²¹⁸ Examples include 40 CFR part 60, subparts CCCC and DDDD for commercial and industrial solid waste incinerators, 40 CFR part 63, subpart LLL for Portland cement manufacturing facilities, 40 CFR part 63, subpart DDDDD for industrial/commercial/institutional boilers and process heaters, and 40 CFR part 63, subpart NNNNN for hydrochloric acid production facilities.

²¹⁹ This provision has been discussed in several Federal Register notices including 64 FR at 52904 (September 30, 1999), 66 FR at 35090, 35145 (July 3, 2001), 67 FR at 6979 (February 14, 2002), and 69 FR at 21203 (April 20, 2004).

they are not feeding hazardous waste, but, if so, the source must comply with all of the operating and monitoring requirements and emission standards of Subpart EEE at all times.²²⁰ To implement § 63.1206(b)(1)(ii) a source defines the period of compliance with the otherwise applicable sections 112 and 129 requirements as an alternative mode of operation under § 63.1209(q). In order to be exempt from the emission standards and operating requirements of Subpart EEE, a source documents in the operating record that they are complying with the otherwise applicable Section 112 and 129 requirements specified under § 63.1209(q).

The commenter recommends that the complete compliance strategy need not be switched over to the alternative section 112 and 129 requirements when temporarily switching to the alternative standards. In general, we disagree. The intent of § 63.1206(b)(1)(ii) is to ensure that a source is complying with all requirements of sections 112 and 129 as an alternative mode of operation in lieu of the requirements under Subpart EEE. In the 1999 final rule we stated that the source must comply with all otherwise applicable standards under the authority of sections 112 and 129. Specifically, the source must comply with all of the applicable notification requirements of the alternative regulation, comply with all of the monitoring, recordkeeping, and testing requirements of the alternative regulation, modify the Notice of Compliance (or Documentation of Compliance) to include the alternative mode(s) of operation, and note in the operating record the beginning and end of each period when complying with the alternative regulation. See 64 FR at 52904. A source that elects to comply with otherwise applicable standards under § 63.1206(b)(1)(ii) must specify all requirements of those standards, not only the emission standards applicable under the sections 112 and 129 standards, but also the associated monitoring and compliance requirements and notification, reporting, and recordkeeping requirements in the operating record under § 63.1209(q).

The commenter suggests that a source should be able to comply with the otherwise applicable emission standards, while continuing to operate under the associated compliance requirements for the HAP under Subpart

EEE. An example would be a cement kiln source complying with the dioxin and furan monitoring requirements under § 63.1209(k) of Subpart EEE for the dioxin and furan standards under § 63.1343(d) under Subpart LLL. We did not determine, when promulgating the provisions of §§ 63.1206(b)(1)(ii) and 63.1209(q)(1), that the monitoring provisions under Subpart EEE are equivalent to the associated monitoring requirements under the otherwise applicable 112 and 129 standards, or indeed, whether they are even well-matched. Such a determination would require notice and opportunity for comment, which we have not provided. However, this should not be interpreted to mean that a similar determination could not be made on a site-specific basis given that the MACT general provisions allow a source to request alternative monitoring procedures under § 63.8(f)(4). Certainly, a source can apply under this provision that the compliance requirements under Subpart EEE satisfy the associated monitoring requirements under the otherwise applicable 112 and 129 standards.

We also disagree with the commenter that emissions testing under the alternative standards of sections 112 and 129 is an example of an illogical requirement under § 63.1206(b)(1)(ii). Performance testing generally is required to demonstrate compliance with the emission standards and to establish limits on specified operating parameters to ensure compliance is maintained. In order to take advantage of the alternative under § 63.1206(b)(1)(ii), a source needs to show that compliance with and establish operating parameter limits for the otherwise applicable standards of sections 112 and 129. Thus, testing in order to establish operating parameter limits will be necessary. However, this does not mean that a separate performance test with the alternative sections 112 or 129 standards is necessarily required. We note that a source can make use of the performance test waiver provision under § 63.7(h) of the general provisions to request that the performance test under the alternative sections 112 and 129 standards be waived because the source is meeting the relevant standard(s) on a continuous basis by continuing to comply with Subpart EEE for the relevant HAP. This approach may be practicable for sources that can demonstrate that their level of performance during testing under Subpart EEE, including the associated operating and monitoring limits, will undoubtedly ensure continuous

compliance with the emissions standards and the associated operating limits of alternative sections 112 and 129 standards.

Finally, the commenter notes that Subpart LLL (the alternative section 112 standards for cement kilns) includes opacity monitoring while Subpart EEE may not. The commenter states that this unnecessarily would require duplicate systems and compliance with redundant limits because of the bag leak detection and particulate matter detection system requirements under Subpart EEE. We respond that Subpart LLL specifies opacity as a standard (see § 63.1343(b)(2)), and, therefore, cement kilns subject to Subpart EEE must comply with the opacity standard when electing to comply temporarily with the requirements of Subpart LLL. We note that the opacity standard under Subpart EEE does not apply to cement kilns that are equipped with a bag leak detection system under § 63.1206(c)(8) and to sources using a particulate matter detection system under § 63.1206(c)(9). However, a cement kiln may use an opacity monitor that meets the detection limit requirements as the detector for a bag leak detection system or particulate matter detection system. See Part Four, Section VIII.A-C of the preamble.

K. Periodic DRE Testing and Limits on Minimum Combustion Chamber Temperature for Cement Kilns

Comment: Several commenters oppose the need for cement kilns that burn at locations other than the normal flame zone to demonstrate compliance with the destruction and removal efficiency (DRE) standard during each comprehensive performance test. These commenters recommend that EPA remove the requirement of § 63.1206(b)(7)(ii) for cement kilns citing that existing rule provisions (i.e., the requirements under § 63.1206(b)(5) pertaining to changes that may adversely affect compliance) are sufficient to require additional DRE testing after changes are made that may adversely affect combustion efficiency. Commenters question EPA's position that cement kilns that burn hazardous waste at locations other than the normal flame zone demonstrate a variability in DRE sufficient to justify the expense of re-testing for DRE with each performance test. Commenters point to EPA's data base that includes DRE results from over 30 tests with nearly 250 runs showing consistent DRE results, including sources burning hazardous waste at locations other than the normal flame zone, being achieved by cement kilns. The commenters note several burdens associated with DRE

²²⁰ However, the operating requirements do not apply during startup, shutdown, or malfunction provided that hazardous waste is not in the combustion chamber. See § 63.1206(b)(1)(i).

testing that do not result in improved environmental benefit including the purchase of expensive exotic virgin chemicals for performance testing, the risks to workers and contractors associated with the handling of these chemicals, and increasing the length of operation at stressful kiln operating conditions necessary to conduct DRE testing at minimum combustion chamber temperatures. Alternatively, commenters recommend that EPA revise the DRE requirements such that periodic testing is no longer required for cement kilns (that burn at locations other than the normal flame zone) after they have successfully achieved the DRE standard over multiple testing cycles (e.g., two or three) under similar testing regimes. That is, the source should only be required to demonstrate compliance with the DRE standard a maximum of two or three times until the source (that burns at locations other than the normal flame zone) modifies the system in a manner that could affect the ability of it to achieve the DRE standard.

Response: We are revising the requirements of § 63.1206(b)(7)(ii) such that cement kilns that feed hazardous waste at locations other than the normal flame zone need only demonstrate compliance with the DRE standard during three consecutive comprehensive performance tests provided that the source has successfully demonstrated compliance with the DRE standard in each test and that the design, operation, and maintenance features of each of the three tests are similar. These revisions do not affect sources that burn hazardous waste only in the normal flame zone.²²¹

Prior to today's change, we required sources that feed hazardous waste in locations other than the flame zone to perform periodic DRE testing every 5 years to ensure that the DRE standard continues to be achieved over the life of the unit. See § 63.1206(b)(7)(ii). We justified this requirement because of concerns that sources that feed hazardous waste at locations other than the flame zone have a greater potential of varying DRE performance due to their hazardous waste firing practices. As we stated in the 1999 rule, we were concerned that the DRE may vary over time due to the design and operation of

the hazardous waste firing system, and that those variations may not be identical or limited through operating limits set during a single DRE test (similar to what we concluded for sources that burn hazardous waste only in the normal flame zone). See 64 FR at 52850.

Commenters now question the need for subsequent DRE testing at cement kilns that feed hazardous waste at locations other than the normal flame zone once a cement kiln demonstrates compliance with the MACT DRE standard. The regulatory requirement for the destruction and removal efficiency standard has proved to be an effective method to determine appropriate process controls necessary for the combustion of hazardous waste. We are not convinced that only one DRE test is sufficient to ensure that a cement kiln that burns hazardous waste at locations other than the normal flame zone will continue to meet the DRE standard because temperatures are lower and gas residence times are shorter at the other firing locations. This is especially true given the industry trend to convert to the more thermally efficient preheater/precalciner kiln manufacturing process.²²² Precalciner kilns use a secondary firing system (i.e., flash furnace) at the base of the preheater tower to calcine the raw material feed outside the rotary kiln. This results in two separate combustion processes that must be controlled "one in the kiln and the other in the flash furnace. The gas temperature necessary for calcining the limestone raw material in the flash furnace is lower than the temperature required making the clinker product. We conclude, therefore, that it is necessary, in spite of the concerns raised by commenters, to retain periodic DRE testing to ensure continued compliance with the DRE standard necessary for the control of nondioxin/furan organic HAP.

We also acknowledge, however, the concerns raised by the commenters. Our DRE data base of operating cement kilns includes results from approximately 25 DRE tests and nearly 200 runs.²²³ All data show compliance with the DRE

standard. Of these, approximately one-quarter of the data are from cement kilns that burned hazardous waste at locations other than the normal flame zone (e.g., injecting waste at midkiln in a wet process kiln), but we do not have DRE results from every operating cement kiln. Considering available DRE data and the concerns of the commenters, we believe that DRE testing during three consecutive comprehensive performance tests is sufficient to provide needed certainty about DRE performance while reducing the overall costs and toxic chemical handling concerns to the regulated source. Thus, we are revising the requirements of § 63.1206(b)(7)(ii) such that cement kilns that feed hazardous waste at locations other than the normal flame zone need only demonstrate compliance with the DRE standard during three consecutive comprehensive performance tests provided that the source has successfully demonstrated compliance with the DRE standard in each test and that the design, operation, and maintenance features of each of the three tests are similar. If a facility wishes to operate under new operating parameter limits that could be expected to affect the ability to meet the DRE standard, then the source would need to conduct another DRE test. Once the facility has conducted another three DRE tests under the new operating limits, then subsequent DRE testing would not be required. Accordingly, we are revising the requirements of § 63.1206(b)(7)(ii).

Comment: Several commenters support EPA's proposal to delete the requirement to establish an operating limit on the minimum combustion chamber temperature for dioxin/furans under § 63.1209(k)(1) for cement kilns. These commenters point to the high temperatures of approximately 2500°F required to make the clinker product. These high temperatures are fixed by the reaction kinetics and thermodynamics occurring in the burning zone and cannot be reduced below minimum values at the whim of the operator and still make a marketable product. In addition to deleting the minimum combustion chamber temperature limit for dioxin/furans, commenters also recommend, for similar reasons, that EPA delete the minimum combustion chamber temperature requirement under § 63.1209(j)(1) associated with the destruction and removal efficiency standard. Commenters note that demonstrating the minimum temperature requires operating under stressful operating conditions that can

²²¹ The DRE demonstration for these sources need be made only once during the operational life of a source, either before or during the initial comprehensive performance test, provided that the design, operation, or maintenance features do not change in a manner that could reasonably be expected to affect the ability to meet the DRE standard. See §§ 63.1206(b)(7) and 63.1207(c)(2)(ii). The source would ensure continued compliance by operating under the operating parameter limits established during this DRE test.

²²² For example, Ash Grove Cement in Chanute, KS replaced their two wet process cement kilns with one preheater/precalciner kiln in 2001. Holcim Inc in Holly Hill, SC has also recently constructed a new preheater/precalciner kiln to replace two wet process cement kilns. Keystone Cement Company in Bath, PA is considering replacing their two wet process cement kilns with a new preheater/precalciner kiln. See docket item OAR-2004-0022-0384.

²²³ U.S. EPA, "Final Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards and Technologies," Section 23.4, September 2005.