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**National Emission Standards for
Hazardous Air Pollutants From the
Portland Cement Manufacturing Industry;
Final Rule and Proposed Rule**

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 63

[EPA-HQ-OAR-2002-0051; FRL-8256-4]

RIN 2060-AJ78

National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: On June 14, 1999, under the authority of section 112 of the Clean Air Act (CAA), EPA promulgated national emission standards for hazardous air pollutants (NESHAP) for new and existing sources in the Portland cement manufacturing industry. On December 15, 2000, the United States Court of Appeals for the District of Columbia Circuit (D.C. Circuit) remanded parts of the NESHAP for the Portland cement manufacturing industry to EPA to consider, among other things, setting standards based on the performance of

the maximum achievable control technology (MACT) floor standards for hydrogen chloride (HCl), mercury, and total hydrocarbons (THC), and metal hazardous air pollutants (HAP).

EPA published a proposed response to the court's remand on December 2, 2005. We received over 1700 comments on the proposed response. This action promulgates EPA's final rule amendments in response to the court's remand and the comments received on the proposed amendments.

DATES: This final rule is effective on December 20, 2006.

ADDRESSES: EPA has established a docket for this action under Docket ID No. EPA-HQ-OAR-2002-0051. All documents in the docket are listed on the www.regulations.gov Web site. Although listed in the index, some information is not publicly available, e.g., confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form.

Publicly available docket materials are available either electronically through www.regulations.gov or in hard copy at EPA Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for EPA Docket Center is (202) 566-1742.

FOR FURTHER INFORMATION CONTACT: Mr. Keith Barnett, EPA, Office of Air Quality Planning and Standards, Sector Policies and Programs Division, Metals and Minerals Group (D243-02), Research Triangle Park, NC 27711; telephone number (919) 541-5605; facsimile number (919) 541-3207; e-mail address barnett.keith@epa.gov.

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does this action apply to me? Entities potentially affected by this action are those that manufacture Portland cement. Regulated categories and entities include:

TABLE 1.—REGULATED ENTITIES TABLE

Category	NAICS ¹	Examples of regulated entities
Industry	32731	Owners or operators of Portland cement manufacturing plants.
State	None	None.
Tribal associations	None	None.
Federal agencies	None	None.

¹ North American Industry Classification System.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that may potentially be regulated by this action. To determine whether your facility is regulated by this action, you should carefully examine the applicability criteria in 40 CFR 63.1340 of the rule. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. Judicial Review. The NESHAP for the Portland Cement Manufacturing Industry were proposed in December 2, 2005 (70 FR 72330). This action announces EPA's final decisions on the NESHAP. Under section 307(b)(1) of the CAA, judicial review of the final NESHAP is available only by filing a petition for review in the U.S. Court of Appeals for the D.C. Circuit by February 20, 2007. Under section 307(d)(7)(B) of the CAA, only an objection to a rule or

procedure raised with reasonable specificity during the period for public comment can be raised during judicial review. Moreover, under section 307(b)(2) of the CAA, the requirements established by the final NESHAP may not be challenged separately in any civil or criminal proceeding brought to enforce these requirements.

C. How is this Document Organized? The information presented in this preamble is organized as follows:

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 - F. Executive Order 13175, Consultation and Coordination With Indian Tribal Governments
 - G. Executive Order 13045, Protection of Children From Environmental Health Risks and Safety Risks
 - H. Executive Order 13211, Actions That Significantly Affect Energy Supply, Distribution, or Use
 - I. National Technology Transfer and Advancement Act
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II. Background

Section 112(d) of the CAA requires EPA to set emissions standards for major stationary sources based on performance of the MACT. The MACT standards for existing sources must be at least as stringent as the average emissions limitation achieved by the best performing 12 percent of existing sources in the category or subcategory or the best performing five sources for source categories with less than 30 sources (CAA section 112(d)(3)(A) and (B)). This level is called the MACT floor. For new sources, MACT standards must be at least as stringent as the control level achieved in practice by the best controlled similar source (CAA section 112(d)(3)). EPA also must consider more stringent "beyond-the-floor" control options. When considering beyond-the-floor options, EPA must consider not only the maximum degree of reduction in emissions of HAP, but must take into account costs, energy, and non-air quality health environmental impacts when doing so.

On June 14, 1999 (64 FR 31898), in accordance with these provisions, EPA published the final rule entitled "National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry" (40 CFR part 63, subpart LLL).¹

The legacy public docket for the final rule is Docket No. A-92-53. The final rule provides protection to the public by requiring Portland cement manufacturing plants to meet emission standards reflecting the performance of the MACT. Specifically, the 1999 final rule established MACT-based emission limitations for particulate matter (as a surrogate for non-volatile HAP metals), dioxins/furans, and for greenfield² new sources, THC (as a surrogate for organic HAP). We considered, but did not establish limits for, THC for existing sources and HCl or mercury for new or existing sources. In response to the mandate of the D.C. Circuit arising from litigation summarized below in this preamble, on December 2, 2005, we proposed amendments addressing standards for these pollutants. We received over 1700 comments on the proposed amendments. Most of these comments were from the general public and addressed the lack of a mercury

emission limitation in the proposed amendments. This final action reflects our consideration of these comments. We have previously amended the Portland Cement NESHAP. Consistent with the terms of a settlement agreement between the American Portland Cement Alliance and EPA, EPA adopted final amendments and certain interpretative clarifications to the rule on April 5, 2002 (76 FR 16614), July 5, 2002 (67 FR 44766), and December 6, 2002 (67 FR 72580). These amendments generally relate to the rule's applicability, and to the performance testing, and monitoring provisions of the rule. In this action, we are also amending the rule to re-insert two paragraphs relating to the applicability of the Portland cement new source performance standards that were deleted in error in a previous amendment.

It should be noted that the rule text presented in this notice includes parts of the rule that are not being amended. This is done because, in some cases, adding additional rule text reduces the possibility of errors in updating the Code of Federal Regulations.

III. Summary of the National Lime Association v. EPA Litigation

Following promulgation of the NESHAP for Portland cement manufacturing, the National Lime Association and the Sierra Club filed petitions for review of the standards in the D.C. Circuit. The American Portland Cement Alliance, although not a party to the litigation, filed a brief with the court as *amicus curiae*. The court denied essentially all of the petition of the National Lime Association, but granted part of the Sierra Club petition.

In *National Lime Association v. EPA*, 233 F. 3d 625 (D.C. Cir. 2000), the court upheld EPA's determination of MACT floors for particulate matter (PM) (as a surrogate for non-volatile HAP metals) and for dioxin/furan. However, the court rejected EPA's determination that it need not determine MACT floors for the remaining HAP emitted by these sources, namely, mercury, other organic HAP (for which THC are a surrogate), and HCl (233 F. 3d at 633). The court specifically rejected the argument that EPA was excused from establishing floor levels because no "technology-based pollution control devices" exist to control the HAP in question (*Id.* at 634). The court noted that EPA is also specifically obligated to consider other pollution-reducing measures including process changes, substitutions of materials inputs, or other modifications (*Id.*). The court remanded the rule to EPA to set MACT floor emission

standards for HCl, mercury, and THC. (*Id.* At 641.)

The Sierra Club also challenged EPA's decision not to set beyond-the-floor emission limits for mercury, THC, and non-volatile HAP metals (for which PM is a surrogate). The court only addressed the absence of beyond-the-floor emission limits for non-volatile HAP metals since EPA was already being required to reconsider MACT floor emission standards for mercury, THC, and HCl, and thus, by necessity, also must consider whether to adopt beyond-the-floor standards for these HAP. The Sierra Club argued, and the court agreed, that in considering beyond-the-floor standards for non-volatile HAP metals, EPA considered cost and energy requirements but did not consider non-air quality health and environmental impacts as required by the CAA (*Id.* at 634-35). The court also found EPA's analysis of beyond-the-floor standards deficient in its assertion that there were no data to support fuel switching (switching to natural gas) as a viable option of reducing emissions of non-volatile HAP metals (*Id.* at 635).

IV. EPA's Final Action in Response to the Remand

A. Determination of MACT for Mercury Emissions

1. Floor Determinations

In developing the proposed amendments we systematically evaluated all possible means of developing a quantified floor standard for mercury emissions from these sources, including both back end technology-based pollution control devices and front end feed and fuel control. See *National Lime*, 233 F. 3d at 634 (finding that EPA had erred in examining only technological (i.e., back-end) controls in considering a level for a mercury floor). We also were unable to devise any type of work practice standard that would result in mercury emissions reductions (70 FR 72332-72335, December 2, 2005).³

In response to comments on the proposed standards, we have performed additional evaluations of potential floors for mercury emissions (and also performed additional evaluations of

¹ Cement kilns which burn hazardous waste are in a separate class of source, since their emissions differ from Portland cement kilns as a result of the hazardous waste inputs. Rules for hazardous waste-burning cement kilns are found at subpart EEE of part 63.

² A new greenfield kiln is a kiln constructed after March 24, 1998 at a site where there are no existing kilns.

³ Indeed, most of the options EPA considered are really beyond-the-floor alternatives, because they reflect practices that differ from those now in use by any existing source (including the lowest emitters). (Coal switching, switching to natural gas, and raw material switching are examples.) In EPA's view, a purported floor standard which forces every source in a category to change its practices is a beyond-the-floor standard. Such a standard may not be adopted unless EPA takes into account costs, energy, and non-air health and environmental impacts. 70 FR 72335.

beyond-the-floor options for mercury control). We obtained additional mercury emissions test data during and after the two comment periods on the proposed amendments and once again evaluated setting a floor based on the median of the 12 percent of the kilns demonstrating the lowest mercury emissions in stack tests. We discuss each of these possibilities in turn below.

a. Control of Mercury in Primary⁴ Raw Materials and Fossil Fuels. i. Mercury Emission Levels Reflecting Raw Material and Fossil Fuel Contributions are Inherently Site-Specific.

As stated at proposal, mercury emissions come from the predominant input to a cement kiln by volume: The limestone which is the chief raw material for the kiln.⁵ Small amounts of mercury also are found in other raw material inputs to the process.⁶ Fossil fuel, almost always coal, is the other source of mercury emissions. Mercury levels in limestone vary enormously, both within a single quarry and between quarries, the result being that a single source may be unable to replicate its own performance in different tests, and could not duplicate a second source's performance since a kiln lacks access to any other kiln's limestone. Mercury levels in coal likewise vary significantly, although mercury emissions due to coal are normally swamped by the emissions attributable to limestone (70 FR 72333–34).

In an attempt to quantify the potential variability, we looked to see if there

were facilities with multiple stack tests for mercury. We do have multiple test results for one of the lowest mercury emitters in the data base. During the first test with the raw mill on⁷ the facility was one of the lower emitting facilities in the source category demonstrating emissions of 7.8 micrograms per dry standard cubic meter ($\mu\text{g}/\text{dscm}$) (all test values are corrected to seven percent oxygen). During a second test 8 years later (reflecting raw materials from the same quarry) mercury emissions with the raw mill on were 60 $\mu\text{g}/\text{dscm}$, a variability factor of roughly 8 times. We could identify no facility operational changes between the times of the two tests that would account for this large difference in mercury emissions.

We also obtained data from a facility that was retested for mercury in July 2005, within 3 months of an initial test. With the raw mill on, mercury emissions averaged 0.00138 pounds per hour in the April test and 0.00901 pounds per hour in the July test, a variability factor of 7. With the raw mill off, emissions averaged 0.00823 pounds per hour in the April test and 0.0189 pounds per hour in the July test. We also noted that during the April test mercury emissions with the raw mill off were below mercury emissions with the raw mill on in the July test. Because it is known that when the raw mill is on the raw meal adsorbs mercury, thereby reducing measured mercury emissions in the short term, we can only assume that the uncontrolled variation in the mercury levels in the raw materials—all of which come from the same quarry—was so great between the two tests that it negated the effect of the operating condition of the raw mill.

We also assessed potential variability by examining daily variations in cement kilns' raw materials and fuel mercury contents. We obtained data from an operating facility that analyzed samples of raw material and fuel each day over a 30 day period. We calculated average daily emissions assuming all the mercury in the raw materials and fuel was emitted. The average daily emissions would vary from a low of 0.09 lb to a maximum of 16.44 lb, or a factor of 183 (See Summary of Mercury Test data in Docket 2002–0051).

These are enormous swings in variability.⁸ Moreover, it is virtually

certain that the variability reflected in these results fails to cabin the total raw material and emissions variability experienced by the plants in the source category, since we have only a handful of results. These data confirm our tentative conclusion at proposal that constantly changing concentrations of mercury in kiln inputs leave no reliable way to quantify that variability. 70 FR 72333.

In the proposed amendments we also evaluated requiring facilities to switch from coal to natural gas as a method to reduce mercury emissions, or requiring use of so-called clean coal (70 FR 72333–34). We tentatively concluded that this was not feasible on a national basis due to insufficient supply and lack of infrastructure, and reiterate that conclusion here. One commenter noted that petroleum coke was another fuel that is lower in mercury and is currently used as a cement kiln fuel. However, a mercury standard based on requiring fuel switching to petroleum coke suffers from the same defects as requiring facilities to switch to natural gas. This fuel may not be available in all areas of the country and there may not be sufficient availability of the fuel to replace a significant percentage of the coal burned in cement kilns. Petroleum coke is a byproduct of petroleum refining, therefore the supply is limited by the demand for refined petroleum fuels. Petroleum coke has a low volatile matter content which can lead to ignition problems if burned without a supplemental fuel. It also typically has a higher sulfur content than coal. This can adversely affect kiln refractory life and increase internal corrosion of the kiln shell. As previously noted, each individual facility has specific requirements for raw material additives based on the chemical composition of its limestone. The minerals present in the coal ash fulfill part of those requirements. Therefore, replacing part or all of the coal currently used at a facility with petroleum coke, which has almost no ash, may force the facility to incorporate additional raw material additives containing mercury to compensate for the loss of the coal ash.

Thus, we adhere to the tentative conclusion reached at proposal: front end feed and fuel control of cement kilns is inherently site specific, and basing limits on kiln performance in individual performance tests which reflect only those inputs will result in limitations that kilns can neither duplicate (another kiln's performance) nor replicate (its own).

reduction or outlet emissions levels and to account for variations in inlet conditions.

⁴ We discuss in section IV.A.1.c below floor determinations for cement kilns using secondary materials (utility fly ash) as raw materials, in place of primary materials.

⁵ Limestone makes up approximately 75 percent of the mass input to the kiln. Typically the way a cement plant is sited is that a limestone quarry suitable for cement production and that is expected to provide many years of limestone is identified and the plant is built next to the quarry. There are cases where a cement plant may purchase small amounts of limestone to blend with the limestone from its quarry. However, this close proximity of the quarry and cement plant is an inherent part of the cement manufacturing process and, therefore, a cement plant does not have the flexibility to obtain the bulk of its limestone from any other source. See 70 FR 72333.

⁶ Post-proposal review of available data on other mercury raw materials indicates that other feed materials also contribute some mercury, though, in most cases, less than limestone. Other raw materials include (but are not limited to): shale or clay to provide alumina; iron ore to provide iron; and sand to provide silica. These raw materials are used in lesser amounts than limestone, and a cement plant may have some flexibility in the sources of other raw materials. As noted in the preamble to the proposed amendments, there are cases where a facility made changes to their raw materials (other than limestone) to reduce mercury emissions. However, this type of control is site specific based on the available materials and the chemical composition of the limestone. The site specific factors preclude using this as a basis for a national rule (70 FR 72334).

⁷ See section c. below discussing operation of the in-line raw mill and its implication for mercury control.

⁸ Variability of emissions based on the operation of air pollution controls are typically lower than those shown above because air pollution controls are typically designed to meet certain percent

ii. *Implications of Permit Limits for Mercury.* There are currently 19 cement kilns (out of 70 cement kilns for which we reviewed permit requirements) that have permit limits for mercury. At first blush, it might be argued that these permit limits demonstrate that variability of mercury emissions can be controlled, since sources must comply with the limitations. It might further be argued that these permit limits are “emission limitations achieved,” the statutory basis for establishing floors for existing sources under section 112(d)(3). Likewise, for new sources, the lowest permit limit is arguably a measure of performance of the “best controlled similar source” (the permit itself being the means of control). We have determined, however, that for most facilities, the permit limit was established based on an estimate provided by the facility of the annual amounts of mercury that would enter the kiln with the raw materials and fuels. One facility had a mercury limit based on its estimated annual emission from an emissions test, and one facility had a limit based on a State law, although in neither case did the resulting permit cause a cement kiln source to alter or otherwise modify its existing practices to meet the limit. Thus, we find no cases where a facility actually has had to take any steps, either through the imposition of process changes or add-on controls, to reduce its mercury emissions as a result of any of these permit limits. See “Summary of Cement Kiln Permit Data for Mercury” in the docket.

We considered the option of setting an emissions limit, either on a pounds per year (lb/yr) or a pound per ton of clinker basis, based on the median of the top 12 percent of the 17 kilns with permit limitations. However, we repeat that none of the facilities with permit limits were required to actually take action to reduce mercury emissions. Their limits were all based on site specific factors (expected maximum conceivable levels of mercury emissions), and were set at a level that did not require the imposition of add-on controls, feed or fuel substitution, or any other constraint. Any limit we set based on these permits would require that at least some facilities apply beyond-the-floor control technology to meet the limit since feed and fuel control via substitution is not possible. Such a standard would impermissibly apply beyond-the-floor emission control without consideration of costs and other non-air health and environmental impacts.

We also considered a limit where each facility would set their own site

specific limit based on the same procedures the facilities with permits used: determining in the course of the permitting process what its maximum conceivable mercury emissions are likely to be based on the facility’s raw material and fuel inputs, and tacking on an additional variability factor. However, this would require that we set a separate limit for each facility, with each facility being its own subcategory (i.e. a different type of facility) based on its site specific raw materials and fuels. See 70 FR 72334, alluding to this possibility. EPA has great discretion in deciding whether or not to subcategorize within a source category. We do not believe a decision to individually subcategorize is warranted considering the fact that the result will be no discernable environmental benefit because conduct will be unaltered. *Chemical Mfr’s Ass’n v. EPA*, 217 F. 3d 861, 866–67 (D.C. Cir. 2000) (arbitrary and capricious for EPA to impose costly regulatory obligations without some showing that the requirement furthers the CAA’s environmental goals).

Therefore, we have determined that even though these permit limits exist, they have not resulted in a quantifiable reduction of mercury emissions. Any option to develop a MACT floor for mercury with these limits would either result in an unnecessarily complex rule with no environmental benefit, or a rule which improperly imposes a *de facto* beyond-the-floor standard without the required consideration of costs, energy and non-air quality impacts.

iii. *Why not Average the Performance Test Data?* Some commenters stated that EPA must simply average the results of the 12 per cent lowest mercury performance test data to establish the floor for existing sources, and establish the new source performance floor at the level of the lowest test result. We rejected this approach at proposal, and do so here, because it fails to account for the variability of mercury levels in raw materials and fuels and hence variability in performance. See 70 FR 72335; see also 70 FR 59436 (Oct. 12, 2006). We must, of course, account for sources’ variability in establishing a MACT floor. *Mossville Environmental Action Now v. EPA*, 370 F. 3d 1232, 1241–42 (D.C. Cir. 2004). The only way all kilns, including the kilns with the lowest emission levels in individual tests, could meet this type of standard continuously, as required, would be to install backend technology-based control equipment. However, this would be a *de facto* beyond-the-floor standard, adopted impermissibly because of failure to assess cost, energy, and non-

air quality health and environmental impacts. See 70 FR 72335.

We are aware that in the case of the NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters (Boiler NESHAP), we used short term emissions data and applied a variability factor to determine a floor for mercury emissions (69 FR 55236, September 13, 2004). We do not believe that approach is applicable to the Portland cement source category. First, in the case of the Boiler NESHAP the floor was based on performance of a control technology, fabric filters, which means that facilities were exercising some control over mercury emissions and variability could be realistically cabined and quantified, so that an emission limit could be replicable and duplicable. Though the majority of cement kilns also use fabric filters, the collected particulate in this source category consists of product and, to some extent, unprocessed raw materials. As a result most of the collected particulate is recycled back to the process, largely negating any impact of the particulate control technology on mercury emissions.⁹ Second, the variabilities seen as a result of fuel inputs in the Boiler NESHAP are much lower than the variabilities indicated in the Portland cement industry where the mercury fuel variability is a distant second to the enormous variability of mercury in the raw materials. We do not believe the data exist to accurately quantify this variability.

Another option we considered was using long term data to set a floor. However, since, to our knowledge, continuous emission monitors for mercury have not been demonstrated on cement kilns, and none currently exist on cement kilns, there is no long term stack performance data on mercury emissions from cement kilns that we could use to set a numerical emissions limit. The only available long term data of which we are aware is from several facilities which have a requirement to perform monthly analyses of composited daily samples of fuels and raw materials to calculate a 12 month mercury emissions total. However, all these kilns are located in one state (Florida) with unrepresentatively low levels of mercury in limestone (so far as we can determine). We do not believe these data would be representative of

⁹ As explained in the following section of the preamble, however, EPA has determined that the floor for both existing and new sources involves the removal from the kiln system of collected particulate under designated circumstances. In addition, the floor for new sources reflects reductions in mercury based on performance of a wet scrubber.

the source category as a whole. More basically, basing a standard on one set of kilns' raw material inputs still suffers from the defect that no facility has access to another's raw materials.

b. *Floors for Facilities Using Utility Fly Ash as Raw Material.* Some cement kilns use utility fly ash as an alternative raw material to replace shale or clay.¹⁰ These kilns replace a natural material, shale or clay, with a secondary material (i.e. a recycled air pollution control residue), fly ash. Approximately 34 cement manufacturing facilities are currently using utility boiler fly ash as a feedstock. We reviewed the available data and have come to the conclusion that cement kilns using fly ash are a different type of kiln, within the meaning of section 112 (d) (1) of CAA, and that for cement kilns currently using fly ash, the current use would be considered the MACT floor. Our reasoning is as follows.

Use of fly ash can have an effect on mercury emissions since fly ash contains mercury in varying amounts. As discussed below, mercury emissions may be higher or lower depending on the amounts of mercury involved vis-à-vis the raw materials that would otherwise be used (if available). But as also explained more fully below, some cement kilns using fly ash do not have an alternative raw material source. Given that these kilns use a different raw material, not always replaceable, and that the material affects mercury emissions, we believe that these kilns are a separate kiln type, and hence a separate subcategory, for purposes of mercury emissions. For a similar conclusion see 64 FR at 52871 (Sept. 30, 1999) (cement kilns that choose to burn hazardous waste in place of fossil fuels are a separate source category for MACT purposes).

We attempted to determine if, in general, facilities that use fly ash have higher emissions of mercury than those that do not. An analysis of data for EPA's toxic release inventory and the National Emissions Inventory did not show differences significant enough that we could draw any definitive conclusions. We considered reviewing the available mercury emissions test data to determine if we could discern a trend. However, as previously discussed, we do not believe these data are representative of long term mercury emissions. We also attempted to obtain data on the important issue of the amounts and mercury contents of fly

ash used relative to other raw materials. These data apparently do not exist, with one exception discussed in the next paragraph. We do know that the two highest mercury emitting facilities (in individual performance tests) do not use fly ash. Without data on the actual mercury contributions of all materials, we do not believe we can draw any valid general conclusions on the impact of the use of fly ash on mercury emissions.

We do have detailed data from one facility that used fly ash where 50 percent of the total mercury input to the kiln is in the fly ash. However, even for this facility, we cannot accurately quantify the impact on mercury emissions of the decision to replace the shale used at this facility with fly ash because we have been unable to obtain data on the mercury content of the shale the fly ash replaced. We also have no mercury analysis data from the time period when the facility used shale.

There are other factors to consider when we evaluate the environmental effects—generally quite positive—of substituting fly ash for shale or clay. First, fly ash in general has a lower organic material content than shale or clay. At the facility just mentioned, replacing the shale with fly ash reduced emissions of THC from around 80 parts per million by volume (ppmv) to 3 ppmv. Because fly ash can reduce kiln fuel consumption, it reduces emissions of sulfur dioxide (SO₂), oxides of nitrogen (NO_x), and carbon monoxide (CO₂). Using fly ash as a kiln feed reduces the landfill requirements for disposal of utility fly ash. Use of fly ash reduces cement plant power consumption because it is usually fine enough that it can be added directly to the kiln rather than being ground in a mill. Use of fly ash also reduces fuel consumption because compared to the raw materials it typically replaces it is already highly calcined; it does not have the same types of large crystals as the raw materials it replaces (this improves burnability); some fly ashes have lower metal alkali content, thus avoiding hard burning to drive off alkali metals and reducing the need to operate the alkali bypass; it is drier than quarried materials, thus saving fuel used to dry materials. Many domestic cement plants have high pyrites in their quarry, especially in the shale or clay. In most cases, this pyrite is the main source of SO₂ emissions from the kiln. Using fly ash can significantly reduce the SO₂ emissions that result from pyrite in the raw materials. It also reduces the energy required for the quarrying, milling, and transporting of the shale or clay prior to

its use as a feedstock, as well as the associated air emissions.

It should also be noted that there are at least two new facilities whose permits specifically require use of fly ash as their alumina source, as they have no source for shale or clay, the primary material alternatives for alumina. Finally, a facility that currently uses fly ash may not be able to return to using the natural (i.e. primary) raw materials it replaced. For example, if the replaced raw materials were shale, the shale quarry may now be closed and the facility may not have access to a suitable shale supply.

Given the lack of any data to positively state the impact of fly ash on mercury emissions for the source category in general, as well as the positive environmental effects of using fly ash, there is no basis for a floor standard based on substituting other potential raw materials (such as shale or clay) for fly ash. At the same time, we do not see any means of identifying a floor for existing fly ash users based on substituting different fly ash types reflecting different mercury content. The recycled fly ash is not fungible. Cement kilns must carefully select only fly ash with needed properties within a relatively small tolerance. Cement kilns also usually are limited to fly ash available from boilers which are reasonably close to the kiln (typically within a few hundred miles) or shipping expense becomes prohibitive. The fly ash selection process is involved; it has taken years for kilns to identify a suitable fly ash source. Accordingly, we evaluate fly ash like the other raw material inputs into cement kilns, and do not believe that a floor that is based on substitution of either raw materials or other fly ash is justified because the input is variable and uncontrollable. We discuss in section IV.A.2 below the one exception to this conclusion for fly ash where the mercury content has been artificially increased by sorbent injection.

c. *Control of Collected Particulate (Cement Kiln Dust).* There are two operation factors that impact measured mercury emissions at the kiln stack. These are the use of in-line raw mills and the recycling of cement kiln dust (CKD).

Many (but not all) kiln systems have in-line raw mills. In these systems the kiln exhaust gas is routed through the raw mill to dry the raw materials. This process results in mercury contained in the flue gas being adsorbed by the raw meal.¹¹ This results in an apparent

¹⁰ Though these are also raw materials inputs, the mass of clay or shale is typically less than 15 percent of the mass input to the kiln. Limestone makes up approximately 80 percent of the mass input.

¹¹ More specifically, when the mill is on-line, the kiln gas containing volatilized mercury is used to

reduction if mercury emissions are being measured at the kiln stack. However, the captured mercury is reintroduced into the kiln which creates a recycle loop of mercury until the captured mercury eventually escapes and is emitted to the atmosphere. Also, raw mills do not run continuously. When the raw mill is turned off, this effect of raw meal adsorption of mercury is negated and mercury emissions appear to increase. However, the increase is actually mercury that would have previously been emitted but was captured by the raw meal and returned to the kiln. The net effect is that an in-line raw mill does not increase or reduce mercury emissions over the long term; it simply alters the time at which the mercury is released.

Mercury is also adsorbed on the CKD collected in the particulate control device, typically a fabric filter or an electrostatic precipitator (ESP). Because the collected CKD mainly consists of product, and sometimes small amounts of raw materials, the collected CKD is recycled back to the kiln to the extent possible. The portion that cannot be recycled to the kiln is either sent to a landfill, or used in some other manner (i.e. some type of beneficial use). Most facilities require that a portion of the CKD be removed from the kiln system rather than returned to the kiln. This is done to bleed the kiln system of alkali materials that build up as they circulate which would otherwise contaminate product and damage the kiln lining. This practice necessarily reduces the overall volume of mercury emitted by cement kilns, as noted by several commenters, since the entrained mercury in the CKD is no longer available for release from the kiln. The amount of reduction is kiln-specific, based on the level of alkali materials in the kiln's raw materials and required product specifications, and therefore not quantifiable on a national basis. Nor would kiln-by-kiln site-specific emission standards be warranted, for the same reasons that site-specific limits based on mercury levels on raw material and fuel inputs are not justified. EPA is instead determining that a floor standard for

sweep the mill of the finely ground raw feed particles. Since the mill temperature is only about 90 to 120 °C during this operational mode, the fine PM can adsorb the mercury in the gas stream, and the particles containing condensed mercury are stored in the raw feed silos. This stored raw mix then is fed to the kiln. The captured mercury is again volatilized and returned in the gas stream to the raw mill, only to be captured again in the raw mill, as described above. This process continues as long as the raw mill is on-line, and the raw feed continues to adsorb additional mercury through this process.

both existing and new sources is the work practice that cement kiln dust be removed from the kiln system at the point that recirculation causes adverse effect on product.

d. *Standards Based on Performance of Wet Scrubbers.* There are at least five cement kilns that have limestone (wet) scrubbers installed for control of SO₂. Commenters noted that based on experience with utility boilers, and other similar combustion devices, there is reason to expect that the scrubbers installed on cement kilns also remove oxidized mercury.

To our knowledge, we obtained all the available data on wet scrubber controlled facilities after the comment period on the proposed amendments. This consists of data from 2004 and 2005 tests at two facilities measured exclusively at the scrubber outlet. These data range from 0.42 to 30 µg/dscm. Variability of mercury emissions at the scrubber-equipped kilns for which we have multiple test data differs by orders of magnitude. These data fall within the range of test data from all kilns (those with wet scrubbers and those without wet scrubbers). We have no test data for mercury measured at the scrubber inlet. As a result, we cannot, on the basis of the current data, determine with absolute certainty (though we believe it is reasonably certain) if the outlet mercury emissions from the wet scrubber equipped kilns are a result of mercury removal by the scrubber, or simply reflect the amounts of mercury in the raw materials. We now discuss the implications of this information for purposes of existing and new source floors. Note that the following discussion assumes the scrubbers remove oxidized mercury for reasons discussed below.

First, there are an insufficient number of wet-scrubber equipped kilns on which to base an existing source floor. The scrubber-equipped kilns would represent the best performing sources since data from other kilns simply reflect the mercury levels in kiln inputs on the day of the test. There are 158 operating kilns, and the information available to us indicates that only five of them are equipped with wet scrubbers. The median kiln of the top 12 percent would, therefore, not be a scrubber equipped kiln.¹²

¹² Choosing the median source for assessing an existing source floor here is a reasonable manner of determining "the average emission limitation achieved by the best performing 12 percent of existing sources" (section 112 (d)(3)). Not only can the statutory term "average" be reasonably interpreted to mean median, but it is appropriate to do so here in order not to adopt a *de facto* beyond the floor standard. If one were simply to combine

However, for new sources mercury emissions would not be uncontrolled—solely dependent on raw material mercury content—but rather would reflect performance of "the best controlled similar source" (section 112 (d)(3)). A kiln so-equipped would thus have the best performance over time, since variability in mercury attributable to raw material and fuel inputs would be controlled in part.¹³

We believe there is a reasonable basis that wet scrubbers remove oxidized mercury from cement kiln emissions. First, wet scrubbers are known to remove oxidized mercury in most combustion applications though removal rates vary. We have speciated mercury test data on two kilns that indicate that there is a significant amount of oxidized mercury in at least some cement kilns. See mercury emission test data for Holcim, Dundee, MI and Lafarge, Alpena, MI, in docket EPA-HQ-OAR-2002-0051. Second, the limited data we have from cement kilns equipped with wet scrubbers is among the lowest end-of-stack mercury data in our data base (although not the lowest), which could indicate that some removal mechanism is involved. An important caveat, however, is that these data are exclusively end-of-stack, without paired inlet concentrations. These data thus do not with absolute certainty demonstrate that mercury removal is occurring or how much.

We estimated the performance of the best performing scrubber, and hence the new source MACT floor, to be 41 µg/dscm (corrected to 7 percent oxygen) using the following rationale. First, we limited the analysis to data from wet scrubber equipped kilns because, as just

the mercury emission levels of the kilns equipped with wet scrubbers with other kilns whose mercury levels reflect raw material and fuel mercury levels at the time of the performance test, the resulting limit would not be achievable over time by any source other than one with a wet scrubber. Ostensible best performers would consequently have to retrofit with back end control, since otherwise they could not consistently achieve the results of their own performance tests.

¹³ That is, variability would no longer be purely a function of the happenstance of the amount of mercury in raw materials (and fossil fuels) used in the test condition. As explained more fully below, performance of wet scrubbers, however, is variable, based not only on operation of the device but on mercury levels in input materials. Wet scrubbers on utility boilers, for example, are documented to remove between 0 to 72 percent of incoming mercury. See Control of Mercury Emissions from Coal-Fired Electric Utility Boilers: Interim Report Including Errata available at <http://www.epa.gov/nrmrl/pubs/600r01109/600r01109.htm>. We should note, however, that because utility boilers do not have the significant levels of alkaline materials that are present in cement kilns, which alkaline materials would impede mercury oxidation and scrubber efficacy, we do not view utility boilers as a "similar source" for purposes of section 112(d)(1).

discussed, the wet scrubber equipped kilns represent the best performing sources, regardless of their actual outlet emissions levels in individual performance tests. Second, we ranked all the wet scrubber mercury emissions with the raw mill off. We believe this is appropriate because the condition of raw mill off represents a normal operating mode for a cement kiln (albeit the operating mode when mercury emissions would be highest, as discussed above in section a.i). We then took the mean raw mill off value for mercury emissions from a cement kiln in our (limited) data base, and added to it a variability factor to account for normal variation in emissions. This variability factor is the standard deviation of the data multiplied by 2.326 (the z statistic) to produce the 99th confidence interval. We looked to all of the data, rather than to the data from the single lowest emitting kiln, because there are too few data points from that kiln (or from any one kiln) to estimate that kiln's variability. Given that variability is known to occur, we believe that this is the best approximation of variability of the best performing kiln presently available.

The result of this analysis is a new source floor of 41 µg/dscm that must be met continuously (raw mill on and raw mill off) (see further discussion in section A.3 below). This is an emissions limit that we believe will not be exceeded 99 percent of the time by the best performing kiln whose performance is used to set the standard.

Because of the limited performance data characterizing performance of the lowest-emitting scrubber-equipped kiln, the rule also contains an alternative new source mercury floor. The best performing kiln is equipped with a wet scrubber, although there could be questions about its performance over time. Therefore, if a new source installs a properly designed and operated wet scrubber, and is unable to achieve the 41 µg/dscm standard, then whatever emission level the source achieves (over time, considering all normal sources of variability) would become the floor for that source. Based on the design of the wet scrubber that is the basis of the new source floor, this would be a packed bed or spray tower wet scrubber with a minimum liquid-to-gas ratio of 30 gallons per thousand cubic feet of exhaust gas.

In sum, we conclude that floors for mercury for all existing cement kilns should be to remove accumulated mercury-containing cement kiln dust from the system at the point product quality is adversely affected. The floor for new sources is to utilize this same

work practice, and in addition, to meet a standard of either 41 µg/dscm or a site-specific limit based on performance of a properly designed and operated wet scrubber.

As just explained, the mercury data on which the new source floor is based are not only limited, but fails to definitively answer the critical question of whether wet scrubbers are removing oxidized mercury, and, if so, to what extent. We are taking immediate steps to address this issue and augment the data base. In an action published elsewhere in this **Federal Register**, we are granting reconsideration of the new source standard adopted in this rule, both due to substantive issues relating to performance of wet scrubbers and because information about their performance in this industry has not been available for public comment. We also have initiated actions to obtain inlet and outlet test data for cement kilns equipped with wet scrubbers in order to determine if these controls remove mercury, and to what extent. In addition, we are committing to completing this reconsideration process within one year from December 20, 2006.

2. Beyond-the-Floor Determinations

During development of the original NESHAP for Portland cement manufacturing, we conducted MACT floor and beyond-the-floor analyses for kiln and in-line kiln/raw mill mercury emissions (63 FR 14182, March 24, 1998 and 64 FR 31898, June 14, 1999). We also conducted a beyond-the-floor analysis for mercury, based on the performance of activated carbon injection with an additional PM control device. Costs for the system would include the cost of the carbon injection system and an additional fabric filter (FF) to collect the carbon separately from the CKD. Based on the low levels of mercury emissions from individual Portland cement kilns, as well as the high cost per ton of mercury removed by the carbon injection/FF system, we determined that this beyond-the-floor option was not justified (63 FR 14202, March 24, 1998).

At proposal, EPA again concluded tentatively that a beyond the floor standard based on performance of activated carbon is not justified (70 FR 72335). We have since reevaluated beyond-the-floor control options for mercury emissions. This evaluation included both process changes and add-on control technology.

There are two potential feasible process changes that have the potential to affect mercury emissions. These are removing CKD from the kiln system

and, for the subcategory of kilns that currently use fly ash as a raw material, replacing the fly ash with a lower mercury raw material. Substituting raw materials or fossil fuels with lower-mercury inputs could in theory reduce mercury emissions, but this alternative is infeasible for the reasons explained at 70 FR 72333–72334.

Generally, once mercury enters a kiln system, it has five potential fates: it may remain unchanged and become part of the final product; it may react with raw materials and exit the kiln in the clinker; it may vaporize in the high temperature of the kiln and/or preheater; it may condense or react with the cement kiln dust and be removed from the system; or it may exit the kiln system in vapor form or be adsorbed to a dust particle through the stack. In general, mercury in the fuel becomes volatilized near the kiln's combustion zone and is carried toward the feed end of the system along with combustion gases. Some of the mercury compounds pass through the entire system and exit in vapor phase through a stack. However, as the flue gas cools, some mercury may adsorb/condense onto dust particles in the cooler regions of the kiln system. Much of this dust containing condensed mercury would then be captured by the PM control device and for most kiln systems, returned to the kiln.

We evaluated, requiring a facility to further reduce the recycling of CKD beyond the wastage already needed to protect product quality, the floor for both existing and new sources. For a 600,000 tpy (tpy) kiln the estimated total annual cost would be \$3.7 million just for replacement of CKD (which is actually product) and disposal of additional solid waste. This cost does not account for the increased raw materials costs and energy costs associated with reducing the recycling of the CKD. The mercury emissions reduction would range from 0.012 to 0.055 tpy based on assumed CKD mercury concentrations of 0.33 and 1.53 parts per million (ppm) respectively. The cost per ton of mercury reduction would range from \$67 million to \$308 million. See Costs and Impacts of Wasting Cement Kiln Dust or Replacing Fly Ash to Reduce Mercury Emissions in docket EPA-HQ-OAR-2002-0051. We note that the median value for the mercury content of recycled CKD for one study was only 0.053 ppm. See the report Mercury and Lead Content in Raw Materials in docket EPA-HQ-OAR-2002-0051. This would indicate that for the majority of the facilities the costs per ton would be even higher than those presented above. In addition, we

estimate that wasting 50 percent of the recycled CKD would reduce the energy efficiency of the process by six percent due to the need to process and calcine additional feed to replace the wasted CKD. It is possible that in some cases the wasted cement kiln dust could be mixed with the cement product rather than landfilled, or that some other beneficial use could be found. This would reduce the costs and non-air adverse impacts of this option. However, there are currently barriers to directly mixing CKD with clinker due to product quality and product specification issues. We do not have data available to evaluate the potential for beneficial use of the CKD. Based on these costs, the adverse energy impacts, and the increased adverse waste disposal impacts (see 64 FR 45632, 45635–36 (Aug. 20, 1999) for examples of potential hazards to human health and the environment posed by disposal of cement kiln dust), we do not believe this beyond-the-floor option is justified and therefore are not selecting it.

As previously noted, for the subcategory of facilities that use utility boiler fly ash as a kiln feed we determined that the current use represented the MACT floor. We considered two beyond-the-floor options for this subcategory. One option was to ban the use of any fly ash if it resulted in a mercury emissions increase over a raw material baseline, and the second was to only ban the use of fly ash whose mercury content had been artificially increased through the use of a sorbent to capture mercury in the utility boiler flue gas.

If we were to ban the use of utility boiler fly ash for any case where it has been shown to increase mercury emissions from the kiln over a raw material baseline, facilities would have to revert to using their previous raw materials, or to find alternative raw materials that provide the same chemical constituents as the fly ash. As previously noted, if a facility replaces their shale or clay with fly ash, the quarry for that material may now be closed and it may not be possible to cost-effectively obtain the previously used raw materials. And for at least two new facilities, the original raw materials used at startup will include fly ash, so there is no previously used material with which to compare the mercury content of the fly ash. Due to the site specific costs associated with raw materials, we don't have any data to calculate the costs of the beyond-the-floor option for the industry as a whole. In one example, we estimated the cost as approximately \$136 million per ton of mercury reduction. See Costs and

Impacts of Wasting Cement Kiln Dust or Replacing Fly Ash to Reduce Mercury Emissions in docket EPA-HQ-OAR-2002-0051. Also, this option would mean that all the fly ash currently being used as a cement kiln feed would now potentially have to be landfilled. This would generate an additional 3 million tpy of solid waste, with potential adverse health and environmental impacts associated with management of these wastes. There would also be adverse environmental air and non-air quality health and environmental impacts associated with the mining of additional raw materials that would have to be utilized. In addition, the overall kiln efficiencies (i.e. the amount of fuel required per ton of clinker produced) at the facilities using fly ash would be expected to decrease if the fly ash were replaced with shale or clay. This decrease may be as large as 10 percent (See Site Visit to Lafarge Cement in Alpena Michigan in the docket).

Based on the cost, energy, and adverse non-air quality health and environmental impacts, we believe that banning the current use of utility boiler fly ash is not justified.

We also separately evaluated the use of fly ash from a utility boiler where activated carbon, or some other type of sorbent injection, has been used to collect mercury. This practice does not currently occur. See 70 FR 72344 (voicing concern about potential for increased mercury emissions from cement kilns were such fly ash to be used). The mercury concentration in this type of fly ash will vary widely. However, full scale testing of fly ash from utility boilers using various sorbent injection processes has indicated there is a potential for sorbent injection to significantly increase fly ash mercury content (Characterization of Mercury-Enriched Coal Combustion Residues from Electric Utilities Using Enhanced Sorbents for Mercury Control in the docket EPA-HQ-OAR-2002-0051). Testing to date has shown increases by a factor of 2 to 10, and in one case of a very low mercury fly ash the increase was by a factor of 70.

Data from 16 cement facilities currently using fly ash not reflecting sorbed mercury showed mercury concentrations in the fly ash from 0.002 ppm to 0.685 ppm with a median of 0.136 ppm. Data on the fly ash mercury content of currently operating utility boilers testing sorbent injection showed levels ranging from 0.071 ppm up to 1.529 ppm with a median level of 1.156 ppm, significantly higher than the fly ash currently in use. Therefore, we see a potential for fly ash with enhanced

mercury content due to sorbent injection at the utility site to increase mercury emissions from cement kilns, and for the increase to be much more significant than emissions attributable to the current fly ash being used.

We do not see a ban on the use of this type of fly ash as significantly affecting the overall current beneficial uses of fly ash. First, we do not anticipate the widespread use of activated carbon injection ACI in the utility industry until 2010 or later. Therefore, both the cement industry and the utility industry will have a significant amount of time to adjust to this requirement. Second, a utility boiler that decides to apply ACI for mercury control has the option of collecting the fly ash from sorbent injection systems separately from the rest of the facility's fly ash (e.g., EPRI'S TOXECON system). Therefore, the utility boiler could continue to supply non-sorbent fly ash to a cement kiln even after the application of ACI for mercury control. Finally, technology is being developed that would allow the mineral-rich portion of fly ash to be separated from the high carbon/high mercury portion.

Based on these factors, we are banning the use of utility boiler fly ash in cement kilns where the fly ash mercury content has been increased through the use of activated carbon or any other sorbent unless the facility can demonstrate that the use of that fly ash will not result in an increase in mercury emissions over baseline emissions (i.e., emissions not using the mercury increased fly ash). The facility has the burden of proving there has been no emissions increase over baseline. This requirement, adopted as a beyond-the-floor control, applies to both existing and new sources.

We also reevaluated our analysis of potential control options based on add-on control technology. These were control options based on the use of a limestone scrubber, and ACI.

As previously noted there are at least five cement kilns that have limestone (wet) scrubbers. As discussed in section IV.A.1.d above, there is a reasonable basis for believing that the wet scrubbers remove the oxidized mercury. There are no data available to allow us to definitively estimate the percent reduction expected. We performed a cost analysis based on an assumed mercury removal efficiency of 42 percent, which is transferred (solely for purposes of analysis)¹⁴ from

¹⁴ As explained in section 1.d, there are no data to definitively state that the percent reduction achieved by wet scrubbers in the utility industry are

performance of wet scrubbers in the utility boiler category and represents the greatest degree of removal one could expect to be consistently achieved for Portland cement kilns. We also note that

the wet scrubber will achieve cobenefits of reducing SO₂ and dioxins (although dioxin removal would be relatively modest since any removal would be incremental to that required by the

existing MACT dioxin standard for Portland cement kilns). The results of that analysis for an existing model large kiln are as follows:

TABLE 1.—PACKED BED SCRUBBER—COSTS AND EMISSION REDUCTIONS

Clinker production in tpy (tpy)	Total annualized cost (\$/yr)	Emissions reduction		
		SO ₂ (tpy)	D/F (g/yr)	Hg (lb/yr)
600,000	1,542,000	297	0.11	16.8–147

Based on this analysis the cost per ton of mercury removed ranges from \$21 million per ton to \$184 million per ton, a result that is not at all cost effective. In addition, a wet scrubber for a large kiln will generate approximately 45,500 tpy of solid waste and require approximately 980,000 kilowatt hour per year (kWhr/year) of electricity.

Based on the significant cost impacts per ton of emission reduction, and the adverse energy and solid waste impacts, and the uncertainty of the actual mercury emission reductions, we do not consider this control option to be reasonable for existing sources.

At proposal, EPA discussed and rejected a beyond-the-floor option based on the use of activated carbon injection. See 70 FR 72335. Commenters noted that our costs for ACI had not been updated from the costs calculated in development of the original NESHAP. In response, we have now updated our ACI costs based on more recent information. The total annualized costs for a large new or existing kiln ranges from \$510,000 to \$676,000 per year. Assuming an 80 percent reduction in mercury emissions, the cost per ton of mercury removal ranged from \$4 million to \$42 million per ton for existing kilns. The wide range in cost per ton of removal is mainly influenced by the baseline mercury emissions. Based on the wide variation we have seen in actual mercury emissions in this source category, the actual cost per ton would also vary widely from site to site as shown above.

We also evaluated a beyond-the-floor option for new kilns based on combining ACI and a wet scrubber. The incremental cost of ACI in this application is \$9 to \$89 million per ton of mercury removed, which we regard as a very high cost.

Our cost estimates assumed 80 percent emissions reduction for mercury. Though we are reasonably certain that ACI will remove mercury

from cement kiln exhaust gas, we have no data on the actual expected removal efficiency. Data are available for one emissions test on a cement kiln burning hazardous waste. In this test the mercury removal efficiency averaged 89 percent removal. However, the inlet mercury concentration during the test varied from 65 to 267 µg/dscm. A review of the data for the individual test runs implies that the percent reduction decreases as the inlet concentration decreases. Almost all the non-hazardous waste cement kilns tested had mercury concentrations well below 65 µg/dscm. Therefore, the long term performance of ACI on mercury emissions from cement kilns is very uncertain. We also note that the application of ACI to a cement kiln (either alone or in combination with a wet scrubber) will generate approximately 1,600 tpy of solid waste for a new or existing large kiln. Recycling of the waste would be unlikely due to the toxics content.

For existing sources we rejected a control option based on the performance of ACI due to the significant cost per ton of mercury removed, increased energy use, and the adverse non-air quality health and environmental impacts (in the form of additional mercury and organic-laden waste generated). For new sources we rejected the option based on the performance of ACI combined with a wet scrubber for essentially the same reasons: significant cost per ton of mercury removed, increased energy use and adverse non-air quality health and environmental impacts. For both new and existing sources we also rejected this control option due to the uncertainty of the actual performance levels achieved, which leads to uncertainty of the actual cost per ton of mercury emissions reduction. We also note that the application of ACI potentially could result in a THC emission reduction of up to 117 tpy per kiln, though in most cases the reduction

would be approximately 30 tpy or less. This THC emissions reduction is based on an assumed control efficiency of 50 percent. We do not see these small THC emission reductions (of which organic HAP are a small subset) to be a reason to alter our tentative decision at proposal that a standard based on performance of ACI is not justified as a beyond-the-floor control option.

Finally, for greenfield new sources (sources being newly built at a site without other cement kilns), we considered the option of requiring such a kiln to be sited at a low-mercury quarry. This concept has intuitive appeal: such a new kiln is not tied to an existing source of limestone, and so can choose where to be sited. The difficulty is in quantifying this type of standard. We cannot presently quantify what 'high mercury quarry' or 'low mercury quarry' means, and cannot responsibly select an arbitrary number that might make it impossible to build a new cement kiln in major parts of the country.

3. Conclusion

In sum, we conclude that the standards for mercury for all existing cement kilns are to remove accumulated mercury-containing cement kiln dust from the system at the point product quality is adversely affected. The standard for new sources is to utilize this same work practice, and in addition, to meet a standard of either 41 µg/dscm or a site-specific limit based on performance of a properly designed and operated wet scrubber.

In addition, we are banning the use of utility boiler fly ash in cement kilns where the fly ash mercury content has been increased through the use of activated carbon or any other sorbent unless the facility can demonstrate that the use of that fly ash will not result in an increase in mercury emissions over baseline emissions (i.e., emissions not using the mercury increased fly ash).

representative of the percent reduction in the Portland cement source category. We used this

figure in beyond-the-floor analyses as an upper bound best case for potential emission reductions.

Because the final standard is more stringent than the standard EPA proposed, the compliance date for sources which commenced construction after December 2, 2005, and before promulgation of this final rule is three years from December 20, 2006. See section 112(i)(2). New sources that commence construction after the date of promulgation of today's action must comply with the final rule upon start-up. However, as we are reconsidering the new source mercury standard and plan to take final action on that reconsideration in no more than a year and as construction of a new kiln generally takes at least 20–24 months, it is unlikely that any new source will be subject to the standard before completion of reconsideration.

We are also requiring that new sources demonstrate compliance by doing mercury emission testing with the raw mill off and with the raw mill on. The reason to test under both conditions is that (as explained in section A.1.c above) one other operation factor besides wet scrubber performance affecting emissions is the recycling of CKD. A facility could cut off CKD recycling for purposes of meeting the emission limit during testing with raw mill off, and then start recycling after the test which could result in the emissions limit being exceeded. We could simply limit CKD recycling to the level during the raw mill off test, but we believe this would potentially and needlessly restrict the ability of a facility to recycle CKD during raw mill on operation. During the test under each condition, the facility must record the amount of CKD recycle. The amount of CKD recycle becomes an operating limit not to be exceeded.

The limit for new sources adopted here also applies to both area and major new sources. We have applied this limit to area sources consistent with section 112(c)(6).

For facilities that elect to meet mercury emissions limits using ACI, we are incorporating the operating and monitoring requirements for ACI that are applicable when ACI is used for dioxin control.

B. Determination of MACT for HCl Emissions

In developing the 1999 Portland Cement NESHAP we concluded that no add-on air pollution controls were being used whose performance could be used as a basis for the MACT floor for existing Portland cement plants. For new source MACT, we identified two kilns that were using alkaline scrubbers for the control of SO₂ emissions. But we concluded that because these devices

were operated only intermittently, their performance could not be used as a basis for the MACT floor for new sources. Alkaline scrubbers were then considered for beyond-the-floor controls. Using engineering assessments from similar technology operated on municipal waste combustors and medical waste incinerators, we estimated costs and emissions reductions. Based on the costs of control and emissions reductions that would be achieved, we determined that beyond-the-floor controls were not warranted (63 FR 14203, March 24, 1998).

In the proposed amendments, we reexamined establishing a floor for control of HCl emissions from new Portland cement sources. Since promulgation of the NESHAP, wet scrubbers have been installed and are operating at a minimum of five Portland cement plants. See section IV.A.1.d above. For the reasons described above, this is an insufficient number of scrubbers on which to base an existing source floor for this category (id.). We did, however, propose to base the floor for new sources on the performance of continuously operated alkaline scrubbers, and proposed emissions levels of 15 ppmv at the control device outlet, or a 90 percent HCl emissions reduction measured across the scrubber, as the new source floor.

We also reexamined the MACT floor for existing sources. The only potential controls identified as a floor option was the operation of the kiln and PM control device themselves. Because the kiln and PM control system contain large amounts of alkaline CKD, the kilns themselves remove a significant amount of HCl (which reacts with the CKD and is captured as particulate). See 70 FR 72337 and 69 FR 21259 (April 20, 2004). We proposed as a floor the operation of the kiln and PM control as a work practice standard.

We also evaluated requiring the use of an alkaline scrubber as a beyond-the-floor control option for existing sources. We found that the costs and non-air quality health and environmental impacts were not reasonable for the emissions reductions achieved.

We also solicited comment on adopting alternative risk-based emission standards for HCl pursuant to section 112(d)(4) of the CAA (70 FR 72337). We suggested two possible approaches for establishing such standards. Under the first approach an alternative risk-based standard would be based on national exposure standards determined by EPA to ensure protection of public health with an ample margin of safety, and to be protective of the environment. For reasons discussed below we have

decided to adopt this approach. Under the second approach, which we are not adopting, site specific risk analyses would be used to establish standards on a case-by case basis.

After careful consideration of the comments on the proposed amendments, we are not requiring control of HCl emissions from cement kilns under section 112(d). Under the authority of section 112(d)(4) of the CAA, we have determined that no further control is necessary because HCl is a “health threshold pollutant,” and human health is protected with an ample margin of safety at current HCl emission levels. The following explains the statutory basis for considering health thresholds when establishing standards and the basis for today's decision, including a discussion of the risk assessment conducted to support the decision.

Section 112 of the CAA includes exceptions to the general statutory requirement to establish emission standards based on MACT. Of relevance here, section 112(d)(4) allows us to develop risk-based standards for HAP “for which a health threshold has been established” provided that the standards achieve an “ample margin of safety.” Therefore, we believe we have the discretion under section 112(d)(4) to develop standards which may be less stringent than the corresponding technology-based MACT standards for threshold hazardous air pollutants emitted by some source categories. See 67 FR 78054, December 20, 2002 and 63 FR 18765, April 15, 1998.

In evaluating potential standards for HCl for this source category, we seek to assure that emissions from every source in the category result in exposures not causing adverse effects, with an ample margin of safety, even for an individual exposed at the upper end of the exposure distribution. 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. We believe that 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).

Our decision not to develop standards for HCl from cement kilns is based on the following. First, we consider HCl to be a threshold pollutant. See 63 FR 18767, 67 FR 78054, and 70 FR 59407, October 12, 2005. Second, we have defined threshold values for HCl in the

form of an Inhalation Reference Concentration (RfC) and acute exposure guideline level (AEGL). Third, HCl is emitted from cement kilns in quantities that result in human exposure in the ambient air at levels well below these threshold values with an ample margin of safety. Finally, there are no adverse environmental effects associated with HCl emissions from cement kilns. The bases and supporting rationale for these conclusions are as follows.

For the purposes of section 112(d)(4), several factors are considered in our decision on whether a pollutant should be categorized as a health threshold pollutant. These factors include evidence and classification of carcinogenic risk and evidence of noncarcinogenic effects. For a detailed discussion of factors that we consider in deciding whether a pollutant should be categorized as a health threshold pollutant, please see the April 15, 1998, **Federal Register** document (63 FR 18766). In the April 15, 1998, action cited above, we determined that HCl, a Group D pollutant, is a health threshold pollutant for the purpose of section 112(d)(4) of the CAA (63 FR 18753).

The Portland Cement Association (PCA) conducted a risk assessment to determine whether the emissions of HCl from cement kilns at the current baseline levels resulted in exposures below the threshold values for HCl. We reviewed the risk assessment report prepared by the PCA and believe that it uses a reasonable and conservative methodology, is consistent with EPA methodology and practice, and reaches a reasonable conclusion that current levels of HCl emissions from cement kilns would be well under the threshold level of concern even for assumed worst-case human receptors.

The PCA analysis evaluated long-term and short-term ambient air concentrations resulting from emissions of HCl from Portland cement kilns in order to quantify potential non-cancer risks associated with such emissions, as well as to characterize potential ecological effects of those emissions. The approach is based on the USEPA guidance document entitled "A Tiered Modeling Approach for Assessing the Risks Due to Sources of Hazardous Air Pollutants" (USEPA 1992) (Tiered Modeling Approach) and is consistent with EPA risk characterization guidance "Air Toxics Risk Assessment Reference Library—Volume 2—Facility-Specific Assessment" (USEPA, 2004). The PCA conducted dispersion modeling for 67 cement plants and 112 cement kilns, representing about two-thirds of all operating cement plants in the U.S., using stack parameter data provided by

cement companies and conservative assumptions regarding (among other factors) HCl stack concentrations, operating conditions, receptor locations, and dispersion characteristics. The kilns for which data were provided cover a full range of kiln types, operating conditions, and stack parameters. The three-tiered modeling approach consists of:

- Tier 1—Lookup tables.
- Tier 2—Screening dispersion modeling.
- Tier 3—Detailed dispersion modeling.

The concentration estimates from each modeling tier should be more accurate and less conservative than the previous one. As a result, the level of complexity of the modeling and data input information required for each tier is greater than for the previous tier. If a plant showed emissions below the threshold concentration in any tier, that plant was not included in the next tier of modeling.

In order to evaluate potential health impacts it is necessary to establish long term concentration thresholds. The RfC is a long-term threshold, defined as an estimate of a daily inhalation exposure that, over a lifetime, would not likely result in the occurrence of significant noncancer health effects in humans. We have determined that the RfC for HCl of 20 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) is an appropriate threshold value for assessing risk to humans associated with exposure to HCl through inhalation (63 FR 18766, April 15, 1998). Therefore, the PCA used this RfC as the threshold value in their exposure assessment for HCl emitted from cement kilns.

The general approach was that actual release characteristics were used for stack height, stack diameter, exit temperature, and exit velocity, based on information provided by the individual facilities modeled by the PCA. The analyses performed under each tier assumed worst case operating scenarios, such as maximum production rate and 24 hours per day, 365 days per year operation, and that all kilns were located 10 meters from the property boundary line. HCl emission rates were assumed to be 130 ppmv for all kiln types. This is an extremely conservative number. Hydrogen chloride emission rates are below 10 ppmv at most facilities, and the highest value for which we have data is below 45 ppmv. In the Tier 2 analyses, worse case meteorological conditions were assumed. Further, it is important to note that these predicted impacts are located adjacent to facility property lines, many times in locations where chronic

exposure is not expected. Impacts at potential residential locations would be expected to be significantly below those presented in the analysis.

The PCA study generated estimates of chronic (annual average) concentrations for comparison to the relevant health reference values or threshold levels. Chronic exposures were compared to the RfC of 20 $\mu\text{g}/\text{m}^3$ for long-term continuous exposure.

Noncancer risk assessments typically use a metric called the Hazard Quotient (HQ) to assess risks of exposures to noncarcinogens. The HQ is the ratio of exposure (or modeled concentration) to the health reference value or threshold level (i.e., RfC or REL). HQ values less than 1 indicate that exposures are below the health reference value or threshold level and are likely to be without appreciable risk of adverse effects in the exposed population. HQ values above 1.0 do not necessarily imply that adverse effects will occur, but that the potential for risk of such effects increases as HQ values exceed 1.0.

For the PCA assessment, if the HQ was found to be less than one for any of the tiers using conservative defaults and modeling assumptions, the analysis concluded with that tier. On the other hand, if the HQ exceeded one, analysis proceeded to subsequent tiers.

The Tier 1 modeling resulted in an HQ above 1 for most facilities. Therefore, a Tier 2 analysis was required. In the Tier 2 analysis, all facilities except for five showed an HQ below 1.

For the five facilities with an HQ above 1, additional data were obtained on the actual HCl and stack moisture concentrations at these facilities and the Tier 2 modeling analysis was rerun. The refined Tier 2 analysis resulted in HQ values of 0.30 or less for all five facilities.

Thus, we have evaluated and are comfortable with PCA's calculations and feel confident that exposures to HCl emissions from the facilities in question are unlikely to ever exceed an HQ of 1.0. Therefore, we believe that the predicted exposures from these facilities should still be protective of human health with an ample margin of safety. Put another way, total exposures for nearby residents would not exceed the short-term or long-term health based threshold levels or health reference values. Similarly, based on the PCA analysis we believe that the acute exposure to HCl for these facilities would not exceed the short-term, health-based threshold level.

The standards for emissions must also protect against significant and widespread adverse environmental

effects to wildlife, aquatic life, and other natural resources. The PCA did not conduct a formal ecological risk assessment. However, we have reviewed publications in the literature to determine if there would be reasonable expectation for serious or widespread adverse effects to natural resources.

We consider the following aspects of pollutant exposure and effects: toxicity effects from acute and chronic exposures to expected concentrations around the source (as measured or modeled), persistence in the environment, local and long-range transport, and tendency for biomagnification with toxic effects manifest at higher trophic levels.

No research has been identified for effects on terrestrial animal species beyond that cited in the development of the HCl RfC. Modeling calculations indicate that there is little likelihood of chronic or widespread exposure to HCl at concentrations above the threshold around cement manufacturing plants. Based on these considerations, we believe that the RfC can reasonably be expected to protect against widespread adverse effects in other animal species as well.

Plants also respond to airborne HCl levels. Chronic exposure to about 600 $\mu\text{g}/\text{m}^3$ can be expected to result in discernible effects, depending on the plant species. Further, in various species given acute, 20 minute exposures of 6,500 $\mu\text{g}/\text{m}^3$, field studies report different sensitivity to damage of foliage. The maximum modeled long-term HCl concentration (less than 100 $\mu\text{g}/\text{m}^3$) is well below the 600 $\mu\text{g}/\text{m}^3$ chronic threshold, and the maximum short-term HCl concentration (less than 1600 $\mu\text{g}/\text{m}^3$) is well below the 6,500 $\mu\text{g}/\text{m}^3$ acute exposure threshold. Therefore, no adverse exposure effects on plant species are anticipated.

HCl is not considered to be a strongly persistent pollutant or one where long range transport is important in predicting its ecological effects. In the atmosphere, HCl can be expected to be absorbed into aqueous aerosols, due to its great affinity for water, and removed from the troposphere by rainfall. Toxic effects of HCl to aquatic organisms would likely be due to the hydronium ion, or acidity. Aquatic organisms in their natural environments often exhibit a broad range of pH tolerance. Effects of HCl deposition to small water bodies and to soils will primarily depend on the extent of neutralizing by carbonates or other buffering compounds. Chloride ions are essentially ubiquitous in natural waters and soils so minor increases due to deposition of dissolved

HCl will have much less effect than the deposited hydronium ions.

In conclusion, acute and chronic exposures to expected HCl concentrations around cement kilns are not expected to result in adverse environmental toxicity effects. HCl is not persistent in the environment. Effects of HCl on ponds and soils are likely to be local rather than widespread. Finally, HCl is not believed to result in biomagnification or bioaccumulation in the environment. Therefore, we do not anticipate any adverse ecological effects from HCl.

The results of the exposure assessment showed that exposure levels to baseline HCl emissions from cement production facilities are well below the health threshold value. Additionally, the threshold values, for which the RfC and AEGL values were determined to be appropriate values, were not exceeded when considering conservative estimates of exposure resulting from cement kiln emissions as well as considering background exposures to HCl and therefore, represent an ample margin of safety. Furthermore, no significant or widespread adverse environmental effects from HCl are anticipated. Therefore, under authority of section 112(d)(4), we have determined that further control of HCl emissions from new or existing cement manufacturing plants under section 112(d) is not necessary.

C. Determination of MACT for THC Emissions

1. Floor Determinations

THC serve as a surrogate for non-dioxin organic HAP emissions for this source category. During the development of the 1999 Portland Cement NESHAP, EPA identified no add-on air pollution control technology being used in the Portland cement industry whose performance could be used as a basis for establishing a MACT floor for controlling THC emissions from existing sources. EPA did identify two kilns using a system consisting of a precalciner (with no preheater), which essentially acts as an afterburner to combust organic material in the feed. The precalciner/no preheater system was considered a possible basis for a beyond-the-floor standard for existing kilns and as a possible basis for a MACT floor for new kilns. However, this system was found to increase fuel consumption relative to a preheater/precalciner design, to emit six times as much SO_2 , two and one half times as much NO_x , and 1.2 times as much CO_2 as a preheater/precalciner kiln of equivalent clinker capacity. Taking into

account the adverse energy and environmental impacts, we determined that the precalciner/no preheater design did not represent MACT (63 FR 14202, March 24, 1998). We also considered feed material selection for existing sources as a MACT floor technology and concluded that this option is not available to existing kilns, or to new kilns located at existing plants because these facilities generally rely on existing raw material sources located close to the source due to the cost of transporting the required large quantities of feed materials. However, for new greenfield kilns, feed material selection as achieved through appropriate site selection and feed material blending is demonstrated and is the basis for new source MACT (63 FR 14202, March 24, 1998).

In our proposed amendments we reexamined MACT for THC for both new and existing facilities. We proposed to adopt the same standards for Portland cement kilns as are applicable to kilns that fire hazardous waste (40 CFR 63.1220(a)(5)). Those standards are based on using good combustion conditions to destroy hazardous air pollutants in fuels. Our rationale for proposing to adopt these standards was that the THC and carbon monoxide (CO) standards guarantee that the kiln will operate under good combustion conditions and will minimize formation (and hence, emissions) of non-dioxin organic HAP from fuel combustion. We believed that the control of THC emissions from cement kilns which do not fire hazardous waste should be no more difficult to control than emissions for kilns that do fire hazardous waste because GCP are maintainable by either type of kiln, and the hazardous waste cement kilns would be the more challenged in that regard. Because we had no data upon which to set a different standard, and because we believed these levels were indicative of good combustion in any case, the adoption of the standards for cement kilns firing hazardous waste was deemed appropriate.

We continue to believe that good fuel combustion conditions are indicative of the performance of the median of the best performing 12 percent of existing sources for controlling non-dioxin organic HAP. However, based on comments received on the proposed amendments, and additional emission data analysis, we believe our proposed quantified method of monitoring good fuel combustion, i.e. setting specific THC or CO levels, was flawed.

Industry commenters had noted that the majority of the THC emissions from a cement kiln main stack result from the

introduction of feed materials into the cold end of the kiln. These emissions are essentially a function of the organic content of the raw materials, and cannot be controlled using GCP, which is the basis of our MACT floor. At proposal we agreed with this assessment (and continue to agree with it), but believed that the fact that cement kilns that burn hazardous waste can meet these standards indicated that the proposed level could be met by all cement kilns under good combustion conditions, even considering the fact that good combustion cannot control THC or CO emissions emanating from organic materials in the feed. We also believed that by allowing a facility to monitor CO as a surrogate for THC, we had provided sufficient flexibility to account for variations in feed material organic content.

We have reevaluated these assumptions. First, we obtained additional THC emission data from several facilities. These data demonstrate that there are certain cement facilities where THC emissions, with no indication of poor fuel combustion practices, exceed 20 ppmv. The data also indicate that achieving the 100 ppmv CO level, even for cement kilns with low organic content feed and good fuel combustion conditions, is not possible without use of a control device. See Lehigh CO and THC data in docket EPA-HQ-OAR-2002-0051. Moreover, the analogy with hazardous waste-burning cement kilns breaks down. If a cement kiln that fires hazardous waste cannot meet the THC or CO limits in the Hazardous Waste Combustor (HWC) NESHAP due to organic materials in their feed, they can (and have) simply stopped firing hazardous waste. This can either be done permanently, or temporarily anytime the kiln operator notes that THC or CO emissions are approaching the emission limits. This option is not available to cement kilns that do not fire hazardous waste; they cannot stop making cement without ceasing business altogether. This would mean that facilities with higher levels of organic materials in the raw materials would be forced to adopt some type of add-on control to meet the emissions limits. As we have previously stated, we believe this would result in the imposition of a beyond-the-floor standard without the mandated consideration of costs and other impacts. See 70 FR 72335.

As a result, although we adhere to our approach at proposal that the MACT floor for control of non-dioxin organic HAP at existing sources is operating under good combustion conditions, we are adopting a different means of

demonstrating that good fuel combustion conditions exist.

In the final amendments, we are requiring that existing kilns and in-line kilns/raw mills must implement GCP designed to minimize THC from fuel combustion. GCP include training all operators and supervisors to operate and maintain the kiln, calciner, and pollution control systems in accordance with good engineering practices. The training shall include operating the kiln, calciner, and pollution control system in a manner to minimize excess emissions.

We have also reexamined the proposed MACT floor for new sources. There are currently two cement kilns with add-on controls which reduce emissions of THC. At one facility, activated carbon is injected into the flue gas and collected in the PM control device. The carbon adsorbs some of the THC. The collected carbon is then reinjected into the kiln in a location that ensures destruction of the collected THC. However, the THC emissions from this facility are the highest for any facility for which we have data. Therefore, we do not consider this to represent the best controlled source. This same facility also has an alternative control scheme for THC of a limestone scrubber followed by a regenerative thermal oxidizer (RTO). However, these control devices have not operated continuously due to significant operation problems caused by the site specific constituents in the flue gas. (See e-mail from Michael D. Maillard, Michigan Department of Environmental Quality in docket EPA-HQ-OAQ-2002-0051.) Because these controls have not been demonstrated to have the ability to operate continuously, we cannot consider them as the basis for a new source MACT floor (or an emission standard, for that matter).

A second facility also has a limestone scrubber followed by an RTO. The scrubber is necessary to prevent fouling, plugging, and corrosion of the RTO. In this case the scrubber/RTO operates continuously and efficiently. This facility has been tested and showed VOC (essentially the same as THC) emission levels of 4 ppmv (at 7 percent oxygen), and currently has a permit limit for VOC of approximately 9 ppmv. The RTO has a guaranteed destruction efficiency of 98 percent of the combined emissions of CO and THC. Based on this information we believe this facility is the best controlled source, and that the performance of a limestone scrubber followed by an RTO is the basis for new source MACT floor for non-dioxin organic HAP, measured as THC. We explain below how we assess the long-

term performance capabilities of this control device considering variable organic levels in raw materials and other process variabilities.

We are retaining the proposed THC emission limit of 20 ppmv measured at the main kiln stack as the MACT floor for all new or reconstructed kilns and inline raw mill/kilns. An alternative to the 20 ppmv floor level is that a facility may demonstrate a 98 percent reduction in THC emissions from uncontrolled levels—the level of emission reduction required by permit for the best performing source in the category. We have determined in other rules that a 20 ppmv outlet emissions level or 98 percent destruction efficiency represent the long term performance of an RTO under the varying conditions typically encountered in industrial applications. See Thermal Incinerators and Flares in Docket EPA-HQ-OAR-2002-0051. As noted above, the one cement facility with an RTO operating full-time has actual and permitted emission levels which are below 20 ppmv. However, the performance guarantee at this facility is based on the combined emissions of CO and THC. Therefore, all new facilities could meet the permitted emission levels of the one facility that has an RTO only if they all have the same levels of CO in the exhaust gas. We have no data to support that all new kilns will have sufficient CO in the exhaust streams to guarantee that they can meet the same level of performance as the one facility noted above, or, conversely that this one facility would continue to meet the same THC levels if CO levels in its exhaust gas differed. We thus believe long term performance for THC alone is better characterized based on the well-established data documenting performance of RTO for THC. Moreover, the percent reduction achievable by an RTO is dependent on the inlet concentration of organics. See Thermal Incinerators and Flares in Docket EPA-HQ-OAR-2002-0051. Thus, we believe that a limit based on the demonstrated performance of RTO under a variety of circumstances is the best measure of the long term performance of this device under the circumstances likely to be encountered by new cement kilns, especially varying levels of organics in the feed.

2. Beyond-the-Floor Determinations

In the December 2005, proposed amendments we considered beyond-the-floor options for existing sources of substituting raw materials with lower organic contents, but we determined this beyond-the-floor option was not feasible (70 FR 72340). We also considered a beyond-the-floor THC

standard of 20 ppmv based on the use of the scrubber/RTO control system. Based on the available data, we estimate that approximately 75 percent of existing kilns could meet a 20 ppmv standard without the addition of controls. For an existing preheater/precalciner kiln that could not meet a 20 ppmv standard without controls, the capital cost would be approximately \$10.7 million and the total annualized cost would be approximately \$3.9 million. The cost per ton of THC reduction would be in the area of \$20,000, assuming an inlet concentration of about 63 ppmv. We estimate that approximately 5 percent of the THC is actually organic HAP. Therefore, the cost of organic HAP reduction would be \$398,000 per ton. In addition, the energy use for one large kiln to operate an RTO would be approximately 99.7 billion British thermal units per year, a very high energy consumption rate. The wet scrubber required upstream of the RTO would also result in 40 million gallons per year of additional water usage and create 45,500 tpy of solid waste (from dewatered scrubber sludge). Based on the costs, significant adverse energy impacts, and adverse non-air quality health and environmental impacts, we do not believe a beyond-the-floor standard is justified.

We also examined a beyond-the-floor regulatory option based on the use of ACI for THC control. The total annual cost for this option would be \$470,000 to \$600,000 for an existing preheater/precalciner kiln. The cost per ton of THC reduction would be in the area of \$5,000, assuming an inlet concentration of about 63 ppmv. We estimate that approximately 5 percent of the THC is actually organic HAP. Therefore, the cost of organic HAP reduction would be \$100,000 per ton. In addition, this control option would generate approximately 850 tpy of solid waste. Based on the high costs, energy impacts, and adverse non-air quality health and environmental impacts, we do not believe a beyond-the-floor standard is justified.

We did not examine a beyond-the-floor regulatory option for new sources because there are no controls that would, on average, generate a greater THC reduction than a combination of a wet scrubber/RTO. Thus, the floor level is also new source MACT.

3. Conclusion

In sum, we conclude that the standards for THC for all existing cement kilns is implementing GCP designed to minimize THC emissions from fuel combustion. The compliance

date for this standard is one year from December 20, 2006. Because all facilities already have some type of training program, we believe one year is sufficient to comply with this requirement. See section 112(1)(3) (compliance dates for MACT standards “shall provide for compliance as expeditiously as practicable”).

The standard for new sources is to meet a THC standard of either 20 ppmv or a 98 percent reduction in THC emissions from uncontrolled levels. However, as explained above, performance of a back-end control device (*i.e.* the RTO, preceded by an enabling scrubber) was not the basis of the proposed new source standard. Information that one kiln utilizes an RTO, as well as information regarding the technical capabilities of RTO, emerged following the public comment period and therefore has not previously been available for public comment. To afford opportunity for comment, EPA is itself immediately granting reconsideration of the new source standard for THC in a notice published elsewhere in today's **Federal Register**.

The original Portland Cement NESHAP contains a 50 ppmv THC emissions limit for new greenfield kilns, kilns/inline raw mills, and raw materials dryers. There are no situations we can identify where a 50 ppmv limit would be more stringent than a 98 percent reduction limit. Since this 50 ppm limit is less stringent than the new source standard we are adopting in this rule reflecting performance of an RTO, it is obviously not appropriate to retain it. We are thus finding that the floor for greenfield new sources (and all other new sources under this rule) is 20 ppm/98 percent THC, with one exception. This new source limit will, at least for some new facilities, require the application of a back end control. For this reason, we do not believe this limit should be applied retroactively to sources constructed prior to December 2, 2005, the date of proposal for the amendment. See the response to comment concerning new sources in section VI for our rationale for this decision. So for sources constructed prior to December 2, 2005, we are not amending the 50 ppmv THC limit.

Consistent with section 112(c)(6) we are applying the 20 ppmv/98 percent reduction limit to both major and area new sources. We are also applying the limit to raw materials dryers. We anticipate that all new kilns will be preheater/precalciner kilns with an inline raw mill (*i.e.* there will be no separate dryer exhaust). This is the design of the kilns that form the basis of new source MACT for THC. However,

we see no reason that the floor level of control should not apply in the case where there is a separate raw material dryer. We note that in the original NESHAP, the 50 ppmv standard also applied to raw material dryers.

We are adopting our proposed requirement that compliance for a THC standard will be demonstrated using a CEM and a 1-hour averaging period. See 70 FR 72340. The previous 50 ppmv standard for new greenfield sources was based on a monthly average. We believe a monthly average was appropriate for that standard (and are retaining monthly averaging for kilns subject to that standard) because the standard's basis is selection of raw materials. There can be significant short term variations in raw materials, even if a facility can meet the standard in the long term. In the case of these final amendments the required level of performance is based on an emissions control technology. Therefore, we do not anticipate the same type of short term variability that existed with the previous 50 ppmv standard.

Because the final standard is more stringent than the standard EPA proposed, the compliance date for sources which commenced construction after December 2, 2005, and before promulgation of this final rule is 3 years from December 20, 2006. See section 112(i)(2). We consider the final standard to be more stringent than the proposed standard because it is based on the performance of a control device (notwithstanding that the numeric limit is the same as proposed), and now controls both THC emissions from fuel combustion and THC emissions resulting from the organic materials in the kiln feed, and is more likely to result in significant costs and changes in operation than the proposed standard.

For new sources that elect to meet THC emissions limits using ACI, we are incorporating the operating and monitoring requirements for ACI that are applicable when ACI is used for dioxin control.

D. Evaluation of a Beyond-the-Floor Control Option for Non-Volatile HAP Metal Emissions

In our MACT determination for PM (the surrogate for non-volatile HAP metals), we concluded that well-designed and properly operated FF or ESP designed to meet the new source performance standards (NSPS) for Portland cement plants represent the MACT floor technology for control of PM from kilns and in-line kiln/raw mills. Because no technologies were identified for existing or new kilns that would consistently achieve lower

emissions than the NSPS, EPA concluded that there was no beyond-the-floor technology for PM emissions (63 FR 14199, March 24, 1998).

In *National Lime Association v. EPA*, the court held that EPA had failed to adequately document that substituting natural gas for coal was an infeasible control option, and also that EPA had not assessed non-air quality health and environmental impacts when considering beyond-the-floor standards for HAP metals (233 F. 3d at 634–35).

As a result, the court remanded the beyond-the-floor determination for HAP metals for further consideration by EPA.

We presented our reexamination of a beyond-the-floor MACT control standard for HAP metals in the preamble to the proposed amendments, addressing the remand by showing that substitution of fuel or feed materials are either technically infeasible or cost prohibitive and therefore that a beyond-the-floor standard for HAP metals is not reasonable. (See 70 FR 72340–72341). We also indicated that non-air health and environmental impacts would be minimal, as would energy use implications (*id.* at 72341). We received no data in the comments on the proposed amendments that have altered our previous analysis. Therefore, we are not including a beyond-the-floor PM standard in these final amendments.

V. Other Rule Changes

On April 5, 2002, we amended the introductory text of 40 CFR 63.1353(a) to make it more clear that affected sources under the Portland Cement NESHAP were not subject to 40 CFR part 60, subpart F (67 FR 16615, April 20, 2002). In making this change, we inadvertently deleted paragraphs (a)(1) and (2) of 40 CFR 63.1353. The language in these paragraphs is still necessary for determining the applicability of 40 CFR part 60, subpart F. We proposed to reinstate these paragraphs as originally written in the final rule. We received no comments on this issue and are therefore reinstating the two paragraphs as proposed.

In the proposed amendments we requested comment on amending language published on April 5, 2002, whose purpose was to clarify that crushers were not subject to this NESHAP. The PCA believed that there had been misinterpretation of the amended rule text. However, we explained in the proposed amendments that we believe the PCA interpretation is not reasonable when reading the entire final NESHAP. However, we agreed that the rule language as written is conceivably open to more than one interpretation. See 70 FR 72341.

We proposed two resolutions to this issue. They were:

(1) Changing the wording of 40 CFR 63.1340(c) to make it clear that all raw materials storage and handling is covered by the NESHAP, but that crushers (regardless of their location) are not.

(2) Including crushers as an affected source in the Portland Cement NESHAP and incorporating the current requirements applicable to crushers contained in 40 CFR part 60, subpart OOO (and correspondingly, exempting crushers covered by the Portland Cement NESHAP from 40 CFR part 60, subpart OOO).

We received several comments from State and local agencies supporting our contention that the intent of the rule language at issue was to exclude crushers, and that our interpretation of the rule language was correct. We considered simply deleting the (potentially) confusing language and adding clarifying language that a crusher located after raw materials storage would be covered by this subpart. However, we have not been able to identify any facilities where the crusher is located after raw materials storage. In addition, we do not have data to determine the impacts of adding coverage of this piece of equipment to this subpart. For that reason, we are modifying the language in § 63.1340(c) to state that crushers are not covered by this subpart regardless of their location. There are currently no regulations that regulate existing crushers in this application. New crushers would potentially be subject to the requirements of 40 CFR 60, subpart OOO.

VI. Responses to Major Comments

This section presents a summary of responses to major comments. A summary of the comments received and our responses to those comments may be found in Docket ID No. EPA–HQ–OAR–2002–0051.

Comment: According to several commenters, EPA's proposal did not satisfy the mandate issued by the DC Circuit Court of Appeals. On EPA's analysis of MACT for mercury, HCl, and THC; EPA's beyond-the-floor analysis; and the risk-based exemptions from HCl standards, one commenter states they are unlawful, arbitrary, capricious, and irrelevant. These commenters state that the court was clear in its directive to EPA that the absence of technology-based pollution control devices for HCl, mercury, and THC did not excuse EPA from setting emission standards for those pollutants.

Response: Although we disagree with the premise of this comment, the comment is moot because we are setting standards for all HAP which was addressed by the court's mandate. We agree that the court stated the absence of technology-based pollution control devices for HCl, mercury, and THC did not excuse EPA from setting emission standards for those pollutants. In response to the court's opinion, we have evaluated all possibilities of setting standards, including technology based control, fuel and raw materials changes, and process modifications. We believe this evaluation is what the court intended. See 70 FR 72335.

Comment: Regarding EPA's rejection of beyond-the-floor standards for each HAP, one commenter states that EPA's reasoning is both unrelated to the relevant statutory mandate and arbitrary and capricious, as well as completely ignoring currently available control measures of which EPA is aware and which would result in reductions of emissions of mercury, HCl, THC and other HAP.

Response: Where we have rejected beyond-the-floor standards we have evaluated all available control methods that have been demonstrated for this source category. We also evaluated control technologies that have not been demonstrated, but that we have reason to believe may be effective (such as ACI). With one exception, which is banning the use of fly ash with elevated mercury contents that result from sorbent injection where such a practice would increase mercury emissions, in no case did we find that a beyond-the-floor standard was justified ("achievable" in the language of section 112(d)(2)) taking into consideration costs, energy, and non-air quality health and environmental impacts.

Comment: According to one commenter, EPA's refusal to set mercury standards demonstrates contempt of court. The commenter states that EPA's reconsideration of MACT for mercury did not satisfy the court's directive to establish emissions standards and not just reconsider the issue.

Citing the CAA's requirements to set emission standards for each HAP listed in 112(b) and, as directed in 112, for each category of sources for the HAP applying the maximum achievable degree of reduction, the commenter states that EPA's decision to not set mercury emission standards is unlawful.

Response: EPA strongly disagrees with the commenter's characterization of the proposed standards in the proposed rule. EPA issued the proposed rule consistent with the court's

instructions in the remand. In response to comments received, however, EPA has modified the proposal and adopted specific standards for each HAP covered by the court's mandate. Thus, this comment is moot, even accepting the commenter's premise (which EPA does not), since EPA is establishing standards (in the sense the commenter uses the term) for each HAP covered by the court's mandate. Moreover, as explained in other parts of this preamble, EPA has carefully analyzed many different possibilities for setting standards for the HAP covered by the remand, examining not only technology-based back end controls but control of inputs to cement kilns as well. We believe that our action fully satisfies both the letter and spirit of the court's mandate.

Comment: The commenter above states that EPA's arguments for not setting mercury standards are without merit and provide several justifications for its view. First the commenter states that EPA's arguments for not setting mercury standard are irrelevant because EPA has a clear statutory obligation to set mercury standard and any reason for not doing so must be invalid.

Response: This comment is now moot, as just explained.

Comment: According to the same commenter, EPA's view as to what is achievable cannot replace the CAA requirement to set MACT floors reflecting what the best performing sources are achieving. The commenter states that the CAA mandates a floor reflecting the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information) and not what EPA believes would be achievable. The commenter states that the court expressly required EPA to set emission standards based on what the best performers are actually achieving and not what EPA thinks is achievable.

Response: As *Mossville* and earlier cases make clear, because MACT standards (based on floors or otherwise) must be met at all times, the standards must reflect maximum possible variability (assuming proper design and operation of the various control mechanisms). See discussion at 70 FR 72335 and 70 FR 59436.

Comment: The same commenter disagrees with EPA's argument that the governing case law (*National Lime Ass'n* and *CKRC*) did not involve facts where the levels of performance tests are dependent entirely on composition of raw materials and fuel and cannot be replicated or duplicated. The commenter states that the governing case law addresses that exact issue:

EPA's decision not to set mercury standards; and fourth the commenter claims EPA mistakenly cites the Copper Smelters (*Sierra Club*) and PVC MACT cases (*Mossville*) as justification for its approach. According to the commenter, these cases pertain to beyond-the-floor standards and do not apply to floor standards, which require EPA to set floors at emission levels that the best sources achieved, regardless of what EPA thinks is achievable.

Response: The commenter's reading of *Mossville* is not correct. The case involved a floor standard. See 370 F. 3d at 1240–42. We explained at proposal why we believe the discussion of raw materials in *Sierra Club* is also applicable to a floor determination. See 70 FR at 72335 n. 4.

Comment: The commenter further states that EPA's argument that its emissions data do not reflect performance over time, merely relates to the sufficiency of EPA's data. The commenter states that EPA is required to develop an approach to setting a floor standard, including collecting more emissions data if needed.

Response: Floor standards are to reflect the performance of sources "for which the Administrator has emissions information" (section 112(d)(3)), which provision does not create an obligation to gather a specified amount of information. Moreover, not only must MACT standards, including standards reflecting the MACT floor, reflect performance variability but EPA may reasonably estimate what that variability can be, and is not limited to stack emissions measured in single performance tests as the commenter apparently believes. See *Mossville*, 370 F. 3d at 1242 (setting standard at a level slightly higher than the highest data point experienced by a best performing source "reasonably estimates the performance of the best * * * performing sources"). Most basically, because MACT standards must be met at all times, a standard must reflect performance variability that occurs at all times, and this variability is simply not accounted for in single stack test results for mercury from a cement kiln.

Comment: The same commenter disagrees with EPA's position that setting the floor at emission levels achieved by the relevant best sources would require kilns to install back-end controls, thus bypassing beyond-the-floor requirements of achievability, considering cost and other statutory factors. Contrary to EPA's position, the commenter argues that sources are using low mercury fuel and feed and some kilns are using controls that reduce mercury emissions, albeit they may not

be doing so deliberately to reduce mercury emissions. According to the commenter, whether the sources are achieving low mercury emissions levels through deliberate measures or coincidentally are statutorily irrelevant.

Response: We disagree with all the points raised in the comment above and preceding comments that EPA's arguments for not setting mercury standards are without merit. As noted above, we believe we have met the court's directive by evaluating all available methods of mercury control, including changes to fuels, raw materials, and process controls. We do not agree that the court directed us to set standards regardless of the facts, nor do we agree that section 112(d)(3) of the CAA requires us to set floor standards that cannot be met without requiring even the best performing facilities to apply beyond-the-floor controls—controls not used by any sources in the source category, even those which are ostensibly the best performing (i.e. the lowest emitters in individual performance tests).

The commenter correctly noted that we are required to set standards based on facilities for which the administrator has emissions information. However, as explained previously in the notice, the emissions levels in the data available to the administrator are mainly influenced by factors that are beyond the control of the facilities tested, and the test results can neither be replicated by the individual facilities nor duplicated by other facilities. In addition, these are short term data that we believe are not indicative of the sources' long term emissions. The commenter states that we should get better data. However, they do not indicate how we would be able to perform this task given the fact that there are no long term data available for mercury emissions from cement kilns: We know of no case where any cement facility has applied mercury continuous emission monitoring (CEM) technology, or gathered any long term emissions data we could use to set a national standard. (We do note, however, that we are ourselves granting reconsideration of the new source standard for mercury, in part to initiate field testing of cement kilns equipped with wet scrubbers.)

The commenter further states that docket records for Portland cement, the hazardous waste standards, and electric utilities demonstrate that various pollution controls have the ability to reduce mercury emissions. We agree with this comment in part. We believe both ACI and wet scrubbers will reduce mercury from cement kilns (and the floor for mercury for new sources is

based on performance of a wet scrubber). We did evaluate these controls as beyond-the-floor control options and determined, based on what we consider reasonable assumptions of their performance, that requiring facilities to apply these controls was not achievable, within the meaning of section 112(d)(2) of the CAA, after considering costs, energy impacts, and non-air quality health and environmental impacts.

We also agree that fabric filters and ESPs can reduce mercury emissions because there is some mercury retained in the collected CKD. As explained earlier, we agree that this forms the basis of a MACT floor (and standard), although the degree of mercury reduction is site-specific based on the rate of recycling per kiln. Because the amount of emission reduction associated with the practice is site specific and not directly measurable, we are expressing the standard as a work practice. We also explained why requiring further reductions based on more CKD wastage is not justified as a beyond-the-floor standard based on considerations of cost and adverse non-air quality health and environmental impacts (increased waste generation and disposal), as well as increased energy use.

In no case did we find that any of the control options discussed by the commenter could be considered as the basis for a MACT floor for new or existing sources (with the two exceptions just noted) for reasons previously discussed.

We also note that the HWC NESHAP does have mercury limits. However, these limits are achieved by controlling the mercury input of the hazardous waste feed (through source separation, blending, or other means). Therefore, any comparison of the mercury limits for cement kilns that burn hazardous waste with cement kilns that do not is misplaced.¹⁵

The commenter notes that cement kilns are achieving superior mercury emissions through a variety of different means, and further states that whether they are doing this intentionally is legally irrelevant. The comment is correct that the reason for application of a particular control technique is irrelevant. *National Lime*, 233 F. 3d at 640. But the commenter fails to consider that even in the case where a facility applies some type of control scheme, and that scheme happens to also reduce

a particular HAP, the facility is taking specific actions that results in a reduction of the pollutant. For example, a facility that installs a thermal oxidizer to reduce total hydrocarbons also reduces organic HAP, even though the thermal oxidizer may not have been installed for purposes of HAP reduction. However, the facility is still taking a specific action that reduces HAP emissions. Also, another facility can install a similar control device and expect to achieve the same result. Results thus can be duplicated from site to site.

In the case of cement kilns, the "actions" being taken that in some cases may reduce mercury emissions are the result of site specific factors that cannot necessarily be duplicated elsewhere. For example, facility A may achieve lower mercury emissions than facility B simply because the limestone quarry used by facility A has a lower mercury content (at least on the day of the respective performance tests). Facility A is not achieving lower mercury emissions deliberately, but it is still achieving a lower level. However, because facility B does not have access to facility A's quarry, it would have to use some other control technique to match facility A's mercury emissions. The commenter never disputes that requiring facility B (and quite possibly A) to match the performance will require installation of a control device not used in the industry. As explained at proposal and earlier in the preamble, this amounts to an impermissible de facto beyond-the-floor standard.

The commenter also states that the best performing kilns are achieving lower mercury emission using a variety of methods, but does not offer any data or analysis as to what these methods are, or how other facilities could duplicate the performance of the lower emitting facilities without adding some type of back end controls. In addition, due to the wide variation in emissions level due to variations in raw materials, we have no data to show conclusively that even if back end controls were applied that kilns with higher mercury emissions due to higher mercury contents in their limestone could achieve the same emissions levels as facilities with naturally occurring low mercury limestone used in the (one-time, snapshot) performance test.

Comment: Regarding EPA's rejection of a beyond-the-floor mercury standard on the basis of low levels of mercury emissions and high costs of reducing emissions, one commenter states that the CAA requires that EPA's standards must reflect the "maximum degree of reduction that is achievable"

considering the "cost of achieving such emission reduction" and other enumerated statutory factors. According to the commenter, the only relevant factors regarding the cost measures are: (1) Whether it is too costly to be "achievable"; and (2) whether it would yield additional reductions, i.e., without the measure, the standard would not reflect the "maximum" achievable degree of reduction. The commenter states that EPA does not claim that the use of ACI would not be achievable, only that ACI is not "justified." This position, according to the commenter, contravenes the CAA and exceeds EPA's authority and would allow EPA to avoid properly determining the maximum degree of reduction achievable considering cost and the other enumerated factors.

Response: We disagree with the commenter's interpretation.

The statute requires that EPA consider "the cost of achieving such emission reduction" (section 112 (d)(2)) in determining the maximum emission reduction achievable. This language does not mandate a specific method of taking costs into account, as the commenter would have it, but rather leaves EPA with significant discretion as to how costs are to be considered. See *Husqvarna AB v. EPA*, 254 F. 3d 195, 200 (D.C. Cir. 2001). In that case, the court interpreted the requirement in section 213 (a) (3) of the CAA (which mirrors the language in section 112(d)(2)) that nonroad engines "achieve the greatest degree of emission reduction achievable through the application of [available] technology * * * giving appropriate consideration to the cost of applying such technology", and held that this language "does not mandate a specific method of cost analysis". The court therefore "[f]ound] reasonable EPA's choice to consider costs on the per ton of emissions removed basis".

Moreover, where Congress intended that economic achievability be the means of assessing the reasonableness of costs of technology-based environmental standards, it says so explicitly. See Clean Water Act section 301 (b) (2) (A) (direct dischargers of toxic pollutants to navigable waters must meet standards reflecting "best available technology economically achievable" (emphasis added). There is no such explicit directive in section 112 (d)(2). EPA accordingly does not accept the commenter's interpretation.

Comment: Several comments support EPA's decision not to develop either an existing or new source floor for mercury. The commenters state that an achievable floor cannot be developed

¹⁵ Indeed, the entire reason that hazardous waste burning cement kilns are a different source category is the impact and potential controllability of the hazardous waste inputs. See 64 FR at 52871.

because wide variation in mercury concentrations in raw materials and fuels used by cement kilns would make compliance impossible. One commenter also agrees with EPA's statement that a national conversion of cement kilns to natural gas is not possible due to serious supply problems and the lack of an adequate natural gas infrastructure.

Response: We agree with these comments that the Agency cannot establish a floor based on raw material or fuel inputs.

Comment: One commenter restates its original position that EPA's arguments regarding its inability to establish floors are irrelevant, unlawful and arbitrary. The commenter states that evidence made available since the original comment period closed confirms that: (1) Some kilns perform better than others; (2) consistent and predictable differences in emission levels can be attributed to differences in the raw materials, fuel, kiln design and control technology; and (3) additional measures for controlling mercury emissions are available to kilns. The commenter states that there is evidence that: (a) Some kilns use raw materials that are consistently higher or lower in mercury than other kilns as evidenced by a cement kiln in Tehachapi, California that uses limestone from a quarry adjacent to an abandoned mercury mine and consistently reports high (2000 lb/yr) mercury emissions—other kilns have consistently lower mercury levels because they use raw materials with low mercury levels; (b) there are many measures by which mercury emissions can be reduced as exemplified by Holcim's statement that mercury emissions can be controlled by careful input control and EPA's acknowledgement that mercury emissions are affected by the use of mercury-contaminated fly ash—as only 39 of 112 plants choose to use fly ash, the commenter states that a plant's deliberate choice about using fly ash (as well as the choice by some to burn tires, or choosing to burn a rank of coal lower in mercury, and use of by products from steel mills and foundries and flue gas dryer sludge) results in consistent and predictable differences in their mercury emissions; (c) wet kilns emit more mercury than dry kilns (twice as much according to EPA), showing that the kiln design results in a consistent and predictable difference in mercury emissions; and (d) additional emissions data confirm that some kilns are achieving consistently better emission levels than others. Several comments were received regarding the adequacy of the emissions data used in EPA's analyses. Several commenters state that

EPA should collect data on mercury emissions and then determine mercury limits based on data. Recommendations for collecting additional data included soliciting test data from State and local agencies. Several commenters state that EPA should conduct a new MACT floor and beyond-the-floor evaluation based on current and complete data—including data from state and local agencies where cement plants are located—on mercury emissions from Portland cement plants. According to one commenter, EPA explained that its decision not to set mercury standards was due to a lack of emissions data while in reality it chose not to gather data under an incorrect statutory interpretation that it did not have to set standards if it believed there was no control technology available. The commenter states that now EPA has access to more mercury emissions data than it initially claimed including: (1) Toxic release inventory (TRI) data based on mercury stack monitoring by 35 plants and, (2) as indicated by EPA, data on mercury content of coal fly ash, shale, and clay that is either already available or can be easily obtained from existing sources—the commenter notes that Florida DEP reports that kilns collect several samples of the mercury levels in their raw materials on a daily basis.

Response: We disagree that our arguments regarding the inability to establish floors are irrelevant, unlawful and arbitrary. We agree that some kilns emit less mercury than others in individual performance tests. The argument that these kilns consistently perform better over time than other kilns is not correct, however, as shown in section IV.A.1.a above, where we showed that one of the lowest emitting kilns in a single test was one of the highest emitting in a later test due to raw material mercury variability. We thus do not believe it is appropriate to use the term "perform better than others" because this implies that the emission levels achieved are the result of some controllable action or otherwise will perform over time at some predictable level. A facility cannot achieve a performance level similar to another facility by varying its inputs because, as previously discussed, one facility does not have access to another's raw materials (or fuels), and therefore cannot be expected to necessarily achieve the same mercury emissions levels based on input control. The commenter acknowledges that facilities have significant variations in raw materials mercury content.

The commenter also notes that only some facilities choose to use fly ash

which results in predictable and consistent differences in mercury emissions. While the statement that only some facilities use fly ash is correct, there are no data to indicate that the use of fly ash results in consistent and predictable differences in mercury emissions. All the raw materials and fuels that enter the kiln affect mercury emissions. The decision to use fly ash may or may not affect mercury emissions based on the mercury content of the raw materials the fly ash replaces. The only way to predict the impact on mercury emissions of fly ash for the plant currently using this material would be to obtain long term detailed raw materials and fuel analyses for every plant, including analyses of the replaced materials. However, in many cases the replaced materials may no longer be available. Neither are the data available for the current materials being used. In no way does the use of fly ash make the mercury emissions any more consistent than for facilities not using fly ash, or vice versa. All kilns are still subject to uncontrollable variations in raw materials and fuels, of which fly ash is only a small part. In fact, the two facilities with the highest measured mercury emissions do not use fly ash, and one of these facilities, which happens to have 30 days of feed materials analyses for mercury, shows significant variations in mercury emissions. There are no data to support any contention that using fly ash will inevitably result in a mercury emissions increase at any specific site.

The commenter also stated that kiln design—wet versus dry—affects mercury emissions. There are no data to support that statement, nor are we aware of any reason a wet or dry kiln would perform differently with respect to mercury emissions. The information referred to by the commenter is from the TRI. These data do not differentiate between kilns that burn hazardous waste, which are a different class of kiln subject to different regulations, and those that do not. Cement kilns that burn hazardous waste tend to be wet kilns and also tend to have higher mercury emission than kilns that do not burn hazardous waste, because of higher mercury levels in the hazardous waste fuels burned by these kilns. Therefore, the data cited by the commenter do not support their conclusion.

Several commenters also suggested that EPA collect additional emission test data from State and local agencies. We collected additional data, and have begun the process of gathering more. See section IV.A.1.b above, and the separate notice in today's **Federal Register** announcing reconsideration of

the new source standard for mercury. We believe data in the record conclusively show that because of the variations in raw materials mercury content show that any mercury limit based on these data would not be achievable on a continuous basis, even by the kilns that form the basis of the floor, without the requirement of applying beyond-the-floor back end control technology. The TRI monitoring data referenced by one commenter is actually short term tests. To our knowledge, there are no cement kilns using mercury continuous monitors. The data the commenter referenced from Florida are daily samples, but they are only analyzed on a monthly basis. In any case, any emission limit based on these data would not solve the problem that other facilities do not have access to the same raw materials.

Comment: In commenting on the adequacy of EPA analysis of the MACT floor for existing and new sources, several comments were received recommending that EPA give further consideration to requiring the use of emission control technology for reducing mercury emissions.

Several commenters state that EPA's analysis should have considered wet scrubbers, dry scrubbers, wet absorbent injection, dry absorbent injection, and fly ash retorting with mercury controls. One commenter states that in evaluating the MACT floor, EPA should establish a link between mercury emissions and existing controls for sulfur and particulate matter and examine potential co-benefit reductions. According to the commenter, this would be similar to the approach used by EPA in establishing the initial mercury caps in the Clean Air Mercury Rule (CAMR). The commenter believes that specific control equipment will result in a percent reduction of mercury whether the mercury is from feedstock or from fuel. Standards could be expressed as a desired percent control achieved using a specific control technology combination for sulfur and particulate matter as was done in the coal-fired electric steam generating unit determinations. The commenter states that such an approach is necessary to determine a new source standard for Portland cement kilns. The commenter included the tables that were developed for the percent reduction determination for electric utilities. One commenter states that more than 60 U.S. and 120 international waste-to-energy plants fueled with municipal or industrial waste or sewage sludge use sorbent injection ahead of fabric filters to remove mercury from flue gases. The sorbents used include activated carbon,

lignite coke, sulfur containing chemicals, or combinations of these compounds. Sorbent injection systems are demonstrated at the Holcim Dundee plant which is limited by its permit to 115 lb/yr mercury, most of which is assumed to be from coal. Mercury limits are also in place under the hazardous waste combustor rule (70 FR 59402): 120 µg/dscm for new or existing cement kilns; 130 µg/dscm for hazardous waste incinerators; 80 µg/dscm for large municipal waste combustors. The commenter states that these limits set a precedent for establishing more stringent mercury emission limits and that there are abatement technologies available to exceed requirements. The commenter provided emissions data for several U.S. cement kilns as well as emissions data from cement kilns operating in Europe. The commenter states that sorbent injection control technology is proven for mercury control and states that this technology has been demonstrated on full-scale demonstrations in the electric generating sector. According to the commenter, activated carbon is also used to remove SO₂, organic compounds, ammonia, ammonium, HCl, hydrogen fluoride, and residual dust after an ESP or FF and that the spent or used sorbent can be used as a fuel in the kiln and the particles are trapped in the clinker. The commenter notes that a cement manufacturer in Switzerland, fueled with renewable sludge waste, used activated carbon to achieve up to 95 percent reduction in SO₂ which correlates to an emission rate of less than 50 µg/m³.

One commenter states that EPA should also consider pre-combustion technology for coal that has been demonstrated in the utility sector. One such technology, pre-combustion coal beneficiation, transforms relatively low cost, low rank western coal (lignite or subbituminous) into a cleaner more efficient energy source (k-Fuel™). This technology applies heat and pressure to reduce moisture and can increase heat value by 30–55 percent for low rank coals. The result is higher output per ton of coal while lowering emissions including reduction in mercury content by up to 70 percent or more and reduced emissions of SO₂ and NO_x.

Response: We have reevaluated the available emission control technology for reducing mercury emissions. The commenters mentioned numerous control technologies including wet scrubbers, dry scrubbers, wet sorbent injection, dry sorbent injection, and fly ash retorting. Dry sorbent injection and fly ash retorting have not been applied to cement kilns. Therefore, they cannot

be considered the basis of a MACT floor. Dry scrubbers and wet sorbent injection systems have been applied at one location each, but these systems do not operate continuously and would therefore not be considered as a floor technology. We evaluated the carbon injection system mentioned by the commenter. However, the configuration of this system is different from the configuration required to achieve a mercury reduction. The fact that the facility meets a specific mercury limit is not attributable to the sorbent injection system, which is configured for control of total hydrocarbons. (See section IV.C. on why this facility does not represent new source MACT for THC emissions.)

We also are aware that wet scrubber technology has been applied to at least five cement kilns, and therefore we did evaluate wet scrubbers as a floor technology for both new and existing sources and as a beyond-the-floor technology for existing sources. Our analysis and conclusions are set out in sections IV.A.1.d and IV.A.2 above.

We did not evaluate control technologies other than wet scrubbers and ACI as a potential beyond-the-floor technology. We have no data to indicate that these controls are any more efficient or cost effective than the controls we did evaluate. In addition the performance of these controls is less certain than either wet scrubbers or ACI.

The commenter also notes that mercury limits have been applied to other source categories and to cement kilns that burn hazardous waste. The application of an emission limit to another source category or class of cement kiln does not, in and of itself, indicate that a mercury emissions limit is required or appropriate here. With respect to the mercury standards for cement kilns that burn hazardous waste, as noted earlier, these standards are based exclusively on control of mercury levels in the hazardous waste fuel inputs, and hence are not applicable to the Portland cement kiln category. See 70 FR 59648. In addition, we note that the limits mentioned are well above the emission test data for all but two cement kilns that do not burn hazardous waste. Cement kilns that burn hazardous waste typically have stack gas concentrations of 43 to 196 µg/dscm resulting from the hazardous waste alone (69 FR 21251, April 20, 2004). These levels, which reflect only the mercury emissions attributable to the hazardous waste, are themselves higher than the majority of the emission levels from cement kilns that do not burn hazardous waste, the majority of which are below 43 to 196 µg/dscm. See "Summary of Mercury Test Data" in Docket EPA-HQ-OAR-

2002-0051. Therefore, we believe it is reasonable to assume that cement kilns that do not fire hazardous waste are much lower emitters of mercury than the hazardous waste-firing cement kilns.

The commenter also mentioned pre-combustion technology for mercury control, including k-Fuel. Coal cleaning is another option for removing mercury from the fuel prior to combustion. In some states, certain kinds of coal are commonly cleaned to increase its quality and heating value.

Approximately 77 percent of the eastern and midwestern bituminous coal shipments are cleaned in order to meet customer specifications for heating value, ash content and sulfur content. See Mercury Study Report to Congress: Volume VIII: An Evaluation of Mercury Control Technologies and Costs, December 1997. Given the fact that most coal is already cleaned, we believe that any benefits of mercury reduction from coal cleaning are already being realized. There is only one k-Fuel production plant of which we are aware, so this fuel is not available in sufficient quantities to be considered as a potential alternative fuel. We are not aware of any widely available coals that have been subjected to more advanced coal cleaning techniques. We also note that advanced coal cleaning techniques have an estimated cost of approximately \$140 million per ton of mercury reduction. These costs per ton of removal are higher than costs of other potential beyond-the-floor technologies such as ACI and wet scrubbers.

Comment: Several comments were received regarding the need for EPA to include in its analysis of the MACT floor the use of work practices alone or in combination with control technologies to reduce mercury emissions. Two commenters state that the work practice of wasting a portion of the control device catch, that is disposing of a portion of the catch rather than recycling it back to the kiln, can reduce total mercury emissions. One commenter cites a European report showing that lowering the gas temperature upstream of the baghouse accompanied by disposing of part of the catch is an effective measure in reducing mercury emissions. According to the commenter, material removal is already practiced at many kilns in the U.S. for other reasons than mercury removal. This occurs for example when CKD is wasted or when a bypass is used at kilns with preheaters to relieve buildups of volatile components, e.g., chlorides or sulfates. The commenter states that such kilns emit less mercury through the stack than kilns that do not waste CKD. The commenter cites a

publication of the PCA documenting this. The two commenters state that one opportunity to avoid the recycling of CKD is by mixing it with clinker to make masonry and other types of cement. One commenter states that CKD has numerous beneficial uses and can be sold as a byproduct by cement plants. The commenter addresses some of the barriers to the practice of mixing materials with clinker to make materials for sale. In response to comments that the industry apply various non-ACI controls or work practices to reduce mercury emissions, one commenter states that none of these practices have been demonstrated to be effective in controlling mercury emissions from cement kilns.

One commenter states that EPA could consider prohibiting or limiting CKD recycling in cement kilns while requiring ACI in conjunction with existing particulate matter control devices. According to the commenter, this approach would avoid the expense of an additional control device and its associated waste stream. The commenter recognizes that there is a possibility that the mercury and carbon level in the CKD may cause it to be considered a hazardous waste.

Two commenters support the use of alternative feed and fuel materials as techniques for reducing mercury emissions. One commenter states that EPA's evaluation of low-mercury fuels should have included petroleum coke. According to the commenter, testing at one kiln has shown that petroleum coke contained significantly less mercury than the coal previously used to fuel the kiln. The commenter also suggested evaluating the increasing use of tire-derived fuel and its impact on mercury emissions. One commenter states that data are available that indicate that mercury content of fuel and feed used by kilns is not so variable that an upper limit for mercury in coal and feed could not be set by EPA. One commenter states that EPA should collect sufficient data on the variability of mercury in feed and fuel materials to actually determine what the variability is.

One commenter responded to comments recommending that kilns switch from coal to petroleum coke, fuel oil, and tire-derived fuel because these have lower mercury concentrations. The commenter states that limited supply, long distances, and permitting issues make it impossible to replace a significant percentage of the coal burned with alternative fuels. The commenter states, however, that the industry could utilize a much larger amount of these fuels if permitting barriers were lowered.

Response: We agree that reducing the recycling of CKD has, in some cases, been shown to reduce mercury emissions and that this practice creates a floor for both existing and new sources. See section IV.A.1.c above. The amount of CKD recycled versus the CKD wasted at any facility is based on the concentration of alkali metals in the raw materials. Also, the effect of this practice on mercury emissions will be highly variable because the amount of mercury present in the cement kiln dust varies from facility to facility. Thus, we have adopted a work practice standard which will reflect these site-specific practices. We also have evaluated a beyond-the-floor control option based on further reducing the recycling of CKD back to the cement kiln and determined it was not achievable (within the meaning of section 112(d)(2)) after considering costs, energy impacts, and non-air quality health and environmental impacts. This would also be the case if one combined ACI and reduced or eliminated the recycling of CKD.

One commenter also suggested the use of lower mercury fuels, specifically petroleum coke, and setting a limit for mercury emission based on the upper bounds of the limits of mercury in the feed and fuel. The comment on petroleum coke is addressed above in section IV.A.1.a.i. We rejected this later option because it would set a limit that has no environmental benefit because it achieves no emissions reduction. See section I.A.1.b above. Another commenter mentioned the problems with setting a limit based on changes to fuels, namely that limited supply would preclude any MACT floor based on fuel switching, and would likewise preclude any beyond-the-floor option. We agree with those comments. See 70 FR 72334.

Comment: Several comments support EPA's decision not to set "beyond-the-floor" mercury standards for the following reasons: (1) Any possible activated carbon injection "back-end" control technology would be prohibitively expensive; (2) the cost per mass of mercury emissions reduced would be astronomical; and (3) the application of such possible activated carbon injection would generate additional solid waste and increase energy use.

Response: We agree with these comments for the reasons previously discussed.

Comment: A commenter states that in the beyond-the-floor evaluation, EPA failed to consider other control measures that reduce mercury emissions. The commenter cited coal cleaning, mercury-specific coal

treatments, optimization of existing control (the commenter supplied a list of optimizing technologies), as well as currently available control technologies such as enhanced wet scrubbing, Powerspan-ECO®, Advanced Hybrid Filter, Airborne Process, LoTox process, and MerCAP. According to the commenter, mercury reductions for these technologies range from 20 percent to over 90 percent. According to the commenter, EPA's failure to evaluate any of these measures is arbitrary and capricious and contravenes CAA 112(d)(2) which requires the agency to set standards reflecting the maximum degree of reduction achievable through the full range of potential reduction measures.

In a later comment, the same commenter states that EPA failed to satisfy the CAA by not considering end-of-stack controls. As an example of a controlled source, the commenter states that Holcim's Zurich plant successfully uses the Polvitec system, a carbon filter system that controls mercury as well as organic pollutants.

One commenter objects to EPA's refusal to set beyond-the-floor mercury standards as unlawful and arbitrary. The commenter states that EPA failed to consider eliminating the use of fly ash as a beyond-the-floor standard even though it is possible for kilns not to use fly ash—a majority of kilns do not use any fly ash—and not using fly ash would reduce mercury emissions. For example, the commenter states that more than half the mercury emissions from an Alpena, MI kiln are from fly ash. According to the commenter, kilns could also reduce mercury emissions by using cleaner fuel (e.g., natural gas), using coal with lower mercury content, refraining from the use of other mercury containing by-products from power plants, steel mills, and foundries, and refraining from the use of flue gas dryer sludge. One commenter recommends that EPA conduct a new beyond-the-floor evaluation based on up-to-date and complete data.

Response: We have conducted additional beyond-the-floor analyses for all demonstrated control techniques for cement kilns. This included banning use of utility boiler fly ash as feed to cement kilns, reducing the recycling of CKD, use of wet scrubbers, and use of ACI. The statement that not using fly ash would reduce mercury emissions is not supported by existing data, as explained in section IV.A.1.b above. These are discussed in section I.A.2 above. The commenters mentioned other additional control techniques including both add-on controls and coal cleaning. These are not demonstrated

control technologies for this source category. In the case of any coal cleaning technology, we did not specifically evaluate these technologies. We know of no case where these technologies have been used in the cement industry, or any other industry, as the basis for control of mercury emissions, therefore they cannot be considered a floor technology. We also do not consider these technologies to be demonstrated to the point where we would consider them as the basis of a beyond-the-floor standard. As noted above, most coals are already cleaned. Coals that have been cleaned using advanced cleaning techniques are not generally available. In addition, data from an evaluation of advanced coal cleaning indicated that the costs were approximately \$140 million per ton of mercury reduction. See Mercury Study Report to Congress: Volume VIII: An Evaluation of Mercury Control Technologies and Costs, December 1997.

Comment: Citing the information used to estimate costs and mercury reductions associated with ACI as outdated, unsupported and unexplained, one commenter states that EPA's estimates are inadequate and, furthermore, ignores the more recent ACI data used in EPA's power plant rulemaking.

Response: We have updated our ACI costs based on more recent information. As explained above in discussions of potential beyond-the-floor options based on performance of ACI, we still do not find such standards to be achievable within the meaning of section 112(d)(2).

Comment: One commenter states that recent tests for mercury emission from Portland cement plants in New York and Michigan show that EPA does not have an accurate picture of mercury emissions from this industry. The commenter states that the lack of accurate information affected EPA's analysis of ACI as a beyond the floor control. The commenter recommends that EPA conduct additional stack testing to collect accurate emissions data.

One commenter also states that EPA does not provide information on the amount of mercury that would be reduced by ACI. The commenter states that self-reported mercury emission data provided by industry in EPA's TRI, appear to grossly underestimate actual kiln mercury emissions and provides examples of such under-reporting. Based on the limited emissions test data, the commenter states that actual mercury emissions data could be ten times greater than the TRI estimates.

The commenter states that EPA's estimate of the cost of ACI and the amount of mercury that would be reduced are arbitrary and capricious and, therefore, so is EPA's reliance on cost per ton estimates as a basis for rejecting ACI as a beyond-the-floor technology.

Two commenters state that, given mercury's toxicity and the significant mercury emissions from Portland cement plants, they strongly disagree with EPA's conclusion that standards to limit mercury emissions are "not justified."

Response: The commenters did not provide data to support their claims that mercury emissions from this source category are significantly underestimated. We are aware that recent tests at several facilities have indicated that they had significantly underestimated their mercury emissions. In some cases the mercury emissions were significantly higher. We are also aware of recent tests where the measured mercury emissions were low, and in at least one case was actually below previous estimates. We do not agree that these few cases indicate that our current estimates of mercury emissions are significantly in error.

Comments: Several commenters state that EPA has ignored or undervalued non-air impacts. Commenters state that EPA should consider non-air environmental, economic, and societal impacts resulting from contamination of water bodies and their lost recreational and commercial fishing uses negatively affecting tourism and jobs; and neurological effects on children caused by mercury exposures among females of child-bearing age. According to commenters, local advisories against eating fish due to mercury tissue levels undercut efforts to encourage fish consumption as a way to reduce risk of heart disease. One commenter states that in failing to set maximum degree of reduction standards that are achievable, EPA did not consider the costs of not setting mercury standards, including the public health costs of increased exposure to mercury in children as well as the societal costs of contaminated water bodies, fish, and other wildlife.

Response: The purpose of 112(d) standards is to apply maximum achievable control technology. The consideration of impacts such as those discussed above is performed during the section 112(f) residual risk phase. See *Sierra Club v. EPA*, 353 F. 3d 976, 989–90 (D.C. Cir. 2004) (rejecting the commenter's argument). We have begun this analysis for this source category. The results of this analysis will be included in a separate rulemaking.

Comment: Several commenters raised concerns related to the local impacts of industrial mercury emissions.

According to one commenter, the high temperature of cement kilns results in mercury emissions that fall out and are deposited much closer to the source than was previously thought. One commenter cites research that confirms that mercury disproportionately affects nearby residents and that shows that nearly 70 percent of the mercury in an area's rainwater comes from nearby coal-burning industrial plants. One commenter states that EPA did not consider impacts of mercury hot spots, citing Florida and EPA research showing a reduction in local and regional fish mercury levels when MACT standards for medical and municipal incineration were implemented. The commenter provided documentation of impacts on local environments of lowering local or regional mercury emissions. One commenter states that they are concerned over the documented levels of mercury in fish in their county and the fact that three recently permitted Portland cement plants in their county are permitted to emit over 400 lb/yr of mercury in addition to a coal fired electrical generating plant that emits over 70 lbs of mercury annually.

Response: These factors will be considered in the section 112(f) residual risk analysis discussed above. It is impermissible to consider these risk-based factors in setting the technology-based standards at issue here.

Comment: EPA solicited comments on a potential ban of the use of mercury-containing fly ash from utility boilers as an additive to cement kiln feed. Numerous commenters state that a ban is premature for several reasons, with their objections falling into one of several groupings: anti-Resource Conservation and Recovery Act (RCRA) policy to encourage recycling that is protective of human health and the environment, CAMR in litigation, mercury removal technology not yet developed, substitutes may be more harmful, and cost of a ban has not been considered. Due to these concerns about the completeness of data they believe are relevant to banning the use of fly ash as a cement plant raw material, the commenters suggest the fly ash ban be postponed and studied further for now.

Two commenters add that banning fly ash use, thereby requiring cement manufacturers to use substitutes for raw materials, cannot be used as the basis of a national rule due to the variability of mercury content of fly ash. These commenters also state that banning the use of fly ash could result in power

companies having trouble finding ways to manage fly ash that would not increase impacts on land use and other ecosystem values. These commenters state that further study of such trade-offs is necessary.

Another commenter notes that approximately 2.5 million tons of fly ash is used annually in cement kilns, thus reducing the need for an equivalent amount of natural materials that would come from virgin sources. Another commenter notes that some configurations of coal-fired electric generating unit control equipment can reduce the level of ash-bound mercury, and that research is being conducted on methods that capture and stabilize mercury, producing a secondary waste product separate from the ash stream.

One commenter adds that the costs of replacing fly ash with other materials could be in excess of \$10 million per ton of mercury removed. This commenter also states that the use of some alternate materials could result in emissions of HAP, including mercury, and increased emissions of criteria pollutants either directly or as the result of increased fuel usage per ton of clinker produced. One commenter agrees with EPA that fly ash from electric utility boilers may progressively contain more mercury as the electric utility industry reduces its mercury emissions. According to the commenter, some boiler fly ash is of a quality that allows it to be added directly as a raw material for concrete where most of the mercury is permanently bound; lower quality fly ash is unusable in concrete and instead is added as a raw material additive to the cement kiln. This commenter, however, recommends that EPA consider work practices, monitoring, and mercury controls rather than a ban on fly ash.

Two commenters state that data from TRI showing that 64 percent of kilns not using fly ash account for 60 percent of mercury emissions, while the 36 percent that do use fly ash account for about 40 percent of mercury emissions, do not justify a conclusion that fly ash feedstock from utility boilers that control mercury is a culprit in mercury emissions from cement kilns.

Two commenters, citing EPA's positing that wet kilns may emit more mercury than dry kilns, suggest that the driver for mercury emissions from kilns may be the type of kiln rather than the feedstock.

Two commenters note that EPA acknowledges that the proposed ban fails to consider the solid waste and economic impacts of diverting 2–3 million tons/yr from beneficial use to disposal in landfills, including the

economic impacts of lost revenue from the sale of fly ash, landfill disposal fees, and the potential rate increases for electricity consumers; and the environmental impacts of relying on virgin feedstock—which contains mercury as well as organic compounds—including increased energy use, additional air emissions, and impacts on natural resources.

One commenter states that there are many advantages (a list of the environmental and energy benefits is included as part of the comment) associated with the use of fly ash as an alternative for some naturally occurring raw materials. The commenter states that they also understand the impacts that the use of fly ash may have on mercury emissions and are looking at approaches that may be used to minimize mercury emissions from use of fly ash. They state that they will provide additional information on a preferred approach should one be identified.

One commenter opposes a blanket ban on use of fly ash without regard to its source or the use of analysis to determine mercury content. The commenter agrees that setting mercury emission limits is inappropriate given the variability in concentration in raw materials and that it would be contrary to case law under CAA section 112. The commenter lists the manufacturing and environmental benefits of using fly ash as a substitute for other raw materials: reduced fuel consumption in kiln; reduced power consumption for grinding; reduce emissions of organics (THC) and combustion emissions (NO_x, SO₂, and CO); reduce need to dispose of fly ash; and reduced SO₂ emissions from reduced use of raw materials containing pyrites. The commenter states that in some regions, fly ash is the only source of aluminum for some cement plants. Also, they state that like other raw materials, the mercury content of fly ash can vary widely. The commenter recommends an approach that allows the use of fly ash if companies can demonstrate that mercury emissions will not be significantly impacted. Such an approach is being developed by the commenter and will be submitted to EPA as a supplement to their comments.

Response: We have considered the comments above and have come to the conclusion that a ban on the current use of utility boiler fly ash is not warranted. See section I.A.1.b above.

Comment: Several commenters are opposed to allowing the use of fly ash if it means increased mercury emissions. One commenter cited a study showing that fly ash mercury content can vary from 0.005 to 120 micrograms

per cubic gram of ash as evidence that EPA needs to limit the use of fly ash in cement and should also evaluate other additives, including cement kiln dust, for their mercury emissions potential. One commenter states that if the mercury in fly ash will cause the fly ash to be classified as a hazardous waste, its use should be banned until the fate of mercury in the cement manufacturing process is better understood.

One commenter states that EPA should take into consideration future increases in the mercury content of coal combustion products (CCP) resulting from the Clean Air Interstate Rule and the CAMR. They state that the higher mercury content of CCP used in producing Portland cement as well as the recycling of cement kiln dust could cause mercury emissions to increase.

Several commenters understand that fly ash is a necessary component in the manufacturing process, but believe measures should be implemented to avoid increased mercury emissions. One commenter recommends the use of fly ash as long as control requirements are included in the rule, e.g., work practice standards and other strategies to prevent an increase in mercury emissions from the fly ash. One commenter states that EPA should require either: (1) Carbon injection with fabric filtration without insufflation; or (2) treatment of the ash to remove and capture the mercury. According to the commenter, if these do not adequately reduce mercury emissions, the fly ash should not be used. Another commenter states that EPA should include provisions for pollution prevention plans, in which monitoring and testing of mercury sources are conducted and appropriate work practices or other measures are evaluated and implemented to control mercury emissions. The commenter states that the facility can then determine the least cost approach for achieving mercury reductions.

One commenter states that EPA needs to further investigate the practice of adding fly ash to understand the concentration of mercury being added and subsequent emissions of mercury. The commenter states that if alternatives are available, EPA should consider banning the use of fly ash.

Response: We received comments both for and against the use of utility boiler fly ash. As previously noted in this notice, we performed our own evaluation of the practice based on the available data. The result of our analysis was that even though we are aware of one facility where the use of fly ash contributes to approximately half of the facility's mercury emissions, we cannot state that this occurs at other cement

kilns using fly ash. We also note numerous positive environmental effects of using fly ash in lieu of shale and clay, including increases in overall kiln energy efficiency, and a potential reduction in THC emissions. Given the lack of data that the use of fly ash adversely affects mercury emissions (i.e. causes an increase in emissions over raw materials that would be used in place of the fly ash) other than at one facility, and the other positive environmental benefits, we do not believe any action is warranted on fly ash use as currently practiced in the industry.

The commenters also expressed concern that as utility boilers apply ACI or other sorbents to reduce their mercury emissions, utility boiler fly ash will have significantly increased mercury concentrations, likely well in excess of levels in clay and shale that would be used in its place. We agree with this concern. As previously noted the available data indicate that ACI (or other sorbent) can significantly increase fly ash mercury content. For this reason, we have added a provision in the final rule to ban the use as a cement kiln feed utility boiler fly ash whose mercury content has been artificially increased through the use of sorbent injection, unless it can be shown that the use of this fly ash will not increase mercury emissions over a cement kiln's raw material baseline.

Comment: Regarding EPA's decision to not set HCl standards for existing kilns, a commenter states that EPA's action is unlawful, contemptuous of court, and arbitrary for all of the reasons cited above by the commenter in their comment on EPA's action on the mercury rule. In addition, the commenter also finds EPA's proposal regarding HCl unlawful and arbitrary for the following reasons.

The commenter states that EPA asserts that it "reexamined" the MACT floor for existing sources whereas the court directed EPA to "set" HCl standards. Thus, according to the commenter, EPA's stated reason for not setting HCl standards for existing kilns (the number of kilns equipped with scrubbers is insufficient to constitute 12 percent of the kilns) is irrelevant. According to the commenter, the approach EPA is required to take is to average the emission levels with those of the other best performing sources to set the floor. The commenter states that such a level would not reflect the performance of scrubbers, rather it would reflect the level achieved by the best performing sources as required by the CAA. The commenter states also that EPA's reasoning that the

unavailability of low-chlorine feed or fuel justifies a decision not to set HCl standards for existing kilns is irrelevant, because EPA has an unambiguous legal obligation to set floors reflecting the HCl emission levels achieved by the relevant best performing kilns.

One commenter states that in setting work practice standards for HCl, EPA did not satisfy the CAA criteria that apply when it is "not feasible to prescribe or enforce an emission standard." The commenter states that a work practice standard is unlawful because EPA did not and could not claim that: (1) HCl cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant or that such conveyance would be inconsistent with any existing law; or (2) the application of measurement methodology is not practicable due to technological and economic limitations.

Response: The comment is moot. EPA is not requiring section 112(d) control of HCl emissions since emissions of this HAP from cement kilns will remain protective of human health with an ample margin of safety and will not result in adverse effects on the environment, even under highly conservative worst case assumptions as to potential exposure. See section IV.B above, and CAA section 112(d)(4). The court's opinion does not address the possibility of using the section 112(d)(4) authority on considering technology-based standards for HCl and EPA's use of that authority violates nothing in either the letter or spirit of the court's mandate.

Comment: Two commenters took issue with EPA's proposed definition of "new" sources as it applies to the proposed HCl limits for new kilns. Regarding EPA's new source standards for HCl (15 ppmv or 90 percent HCl reduction), one commenter states that EPA has created a compliance loophole for kilns that commenced construction before December 2, 2005 and is unlawful. According to the commenter, the CAA defines new source where construction or reconstruction commenced after the Administrator "first" proposes regulations. The commenter states that EPA first proposed standards on March 24, 1998, and that any kiln at which construction or reconstruction was commenced after March 24, 1998, is a new source and must meet new source standards. The commenter states that EPA ignores that its violation of a clear statutory duty, (i.e., its failure to promulgate HCl standards in the 1998 rulemaking), is the reason that sources built after March 24, 1998, have not already installed

pollution controls necessary to meet new source HCl standards.

Response: We disagree with these comments. First, the comment is moot with respect to an HCl new source standard because, based on the authority of section 112(d)(4), EPA has determined that no such standard is required because emissions will be at levels which are protective of human health with an ample margin of safety, and will not have an adverse effect on the environment. However, the same issue of the applicability date for new sources is presented for mercury and THC, so we are responding to the comment.

The whole premise of new source standards being potentially more strict than for existing sources, and requiring new sources to comply immediately with those requirements (see section 112(d)(3) (new source floor criteria are more stringent than those for existing sources) and 112(i)(1)), is that these sources are being newly constructed and hence can immediately install the best pollution controls without incurring the time or the expense of retrofitting. Put another way, new sources know from the beginning of the construction effort what controls will be required, and do not have to incur the higher costs and the time-consuming disruptions normally associated with control retrofits. If we were to require "new sources" that commenced construction prior to December 2, 2005, to retroactively install controls because we have changed rule requirements, then these particular sources would have to bear retrofit costs that we do not believe were intended by the CAA. Immediate compliance would also be an impossibility.¹⁶

The commenter states that the statute mandates this result because a new source is defined as a source constructed or reconstructed after the Administrator "first proposes" regulations "establishing an emission standard" applicable to the source. The commenter thus concludes that the new source trigger date must be March 24, 1998, the proposal date of the 1999 rule. This reading makes no sense in the

¹⁶ As it happens, under this rule, the compliance date for sources which [0] commenced construction after December 2, 2005, and before promulgation of this final rule is 3 years because the standards adopted are more stringent than those proposed on December 2, 2005. See CAA section 112(i)(2). However, the same issue will arise should EPA adopt revised standards as a result of the periodic review mandated by section 112(d)(6). There is no indication that Congress intended the draconian result of sources constructed at the time of the initial MACT rule (which could be decades in the past for a section 112 (d)(6) revised standard) to be considered new sources.

context of a court action which essentially required EPA to reexamine the entire issue, and re-determine what the standard should be. Under such circumstances, the only reasonable date for determining new source applicability for a resulting standard would be the date EPA proposes it. Moreover, even under the commenter's (strained) reading, EPA did not propose standards for mercury, hydrocarbons, or HCl for these sources in the 1998 proposal until December 2, 2005; this is why the rule was remanded by the D.C. Circuit.¹⁷ Hence, for the HAP covered by this rule, the new source trigger date would be December 2, 2005, even under the commenter's reading. However, we repeat that we disagree with the commenter's interpretation because it results in situations antithetical to the underlying premise of a new source standard: namely that amendments to new source standards will result in existing sources having to comply immediately with both new source standards and immediate compliance dates. This would be both unfair and impossible. Congress simply cannot have intended this result.

Comments: Regarding the proposed work practice standards for existing kilns (operate at normal operating conditions and operate a particulate control device), one commenter states that there is not enough information to require "normal operating conditions" for kilns and air pollution control device. According to the commenter, "normal" kiln conditions may not be best for HCl removal. This commenter also states that existing operating & maintenance (O&M) and start up, shut down, and malfunction (SSM) plans already ensure normal operation. Other commenters state that this proposed work practice is arbitrary as there is no "normal operating condition" for all kilns in the U.S. The commenters state that a multitude of factors—combustion parameters, kiln design, raw material inputs, fuel characteristics, etc—make this requirement unworkable.

One commenter notes that 40 CFR 63.6(e) already requires plants to minimize emissions during an SSM event to the extent consistent with good air pollution practices and with safety considerations. The commenter states EPA should clarify that the proposed requirement to continuously operate kilns under normal conditions and operate a particulate control device is subject to the SSM provisions elsewhere

¹⁷ Greenfield cement kilns, for which EPA adopted a new source standard for THC in 1999, are a separate type of new source for purposes of this analysis.

in the NESHAP (section 63.6(e)). The same commenter later submitted another comment restating their position on HCl that standards for existing and new kilns are not necessary and do not represent the MACT floor.

Response: This comment is also moot given EPA's decision not to set a section 112(d) standard for HCl based on the authority of section 112(d)(4) of the CAA.

Comment: One commenter states that EPA has not demonstrated that it has examined the costs associated with alkaline scrubbers in establishing a MACT floor for new sources. The commenter states that EPA's scrubber costs are not representative of a wet scrubber that can meet limits of up to 90 percent control of SO₂. According to the commenter, EPA's cost are for dry or wet lime spray systems incapable of 90 percent reduction on preheater/precalciner kilns. The commenter provides capital and annualized costs for a 1 million tpy kiln of \$18 to \$25 million and \$4.5 to \$7 million, respectively. The commenter states that using EPA's range of 12 to 200 tpy of HCl removal, this translates to a cost of between \$35,000 and \$375,000 per ton of HCl removed. The commenter states that this range is higher than the range EPA considered unreasonable for existing kiln beyond-the-floor controls (\$8,500 to \$28,000 per ton removed). The commenter concludes that wet scrubbers are not a reasonable option. The commenter adds that dry or wet lime spray systems can remove SO₂ prior to the raw mill but essentially perform the same function as the raw mill, and therefore achieve an incremental removal efficiency far below 90 percent. The commenter states that this would be less cost effective than EPA described for existing kiln beyond-the-floor technology.

Response: This comment is also moot in relation to HCl given EPA's decision not to set a section 112(d) standard for HCl based on the authority of section 112(d)(4) of the CAA. However, it now has relevance in regards to the costs of controlling mercury emissions because we evaluated wet scrubbers for mercury control from existing sources as a beyond-the-floor option and new sources as a floor option. We did further investigation of the potential costs of alkaline (wet) scrubbers and revised our cost estimates after proposal based on data developed as part of the Industrial Boiler NESHAP. The scrubber costs are based on alkaline scrubbers specifically designed to remove HCl and/or SO₂ from a coal-fired boiler and we have made the required adjustments in cost to account for differences in the flue gas

characteristics of a cement kiln versus a coal-fired boiler.

Comment: One commenter states that EPA's proposed risk-based exemptions from HCl standards are unlawful, arbitrary and capricious. On the proposal to develop a single national risk-based HCl standard based on the RfC for HCl the commenter states no national risk-based HCl standard exists making it impossible to comment effectively on any provisions in the cement rule that might rely on a hypothetical future rulemaking. The commenter continues stating that any attempt to set risk-based standards on a national rule that does not exist and is not currently available for review, would contravene the CAA notice and comment requirements. The commenter states further that 112(d)(4) allows EPA to set health-based emission standards only for those pollutants for which a health threshold has been established, and that no cancer threshold has been set for HCl (nor is there any classification of HCl with respect to carcinogenicity and none exists). Also, the commenter states that no non-cancer threshold has been set for HCl and that the integrated risk information system (IRIS) RfC, on which EPA attempts to rely, does not purport to be an established threshold. According to the commenter, disclaimers in IRIS negate any notion that it provides an established threshold for HCl.

Response: We largely disagree with these comments. Section 112 of the CAA includes exceptions to the general statutory requirement to establish emission standards based on MACT. Of relevance here, section 112(d)(4) effectively allows us to consider risk-based standards for HAP "for which a health threshold has been established" provided emissions of the HAP are at levels that provide an "ample margin of safety." Therefore, we believe we have the discretion under section 112(d)(4) to develop standards which may be less stringent than the corresponding technology-based MACT standards for some categories emitting threshold pollutants, or not to set a standard if it is apparent that emissions from the source category (i.e. from any source in the category, or any potential new source) would remain protective of human health and the environment with an ample margin of safety and protective of the environment.

The data are inadequate to make a determination as to whether HCl is carcinogenic in either humans or animals, so EPA has not developed an assessment for carcinogenicity of HCl.

The IRIS noncancer assessment for HCl provides a RfC for inhalation. An

RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily inhalation exposure of the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

The existence of a threshold for noncancer effects of HCl is established by general toxicological principles, i.e., that organisms are able to repair some amount of corrosive tissue damage of the type caused by HCl. If the damage does not exceed an organisms' ability to repair it, then no adverse effects will occur. Although the underlying data for HCl did not identify subthreshold exposures for chronic effects, this was due to experimental design issues rather than the absence of a threshold. EPA is unaware of any studies, theory, or experts that suggest HCl does not have a threshold for adverse effects.

Comment: Two commenters submitted comments on the need for HCl standards. According to the commenters, based on a risk analysis using 14 preheat/precalciner kilns at 13 cement plants using a range of in-stack HCl concentrations as well as a sensitivity analysis using higher hazardous waste kiln HCl concentrations, risks are well below the short-term and long-term thresholds. Based on this minimal risk, the commenters state that there is no need for an HCl standard for new kilns or the proposed operational standard for existing kilns. The commenters state that additional data will be submitted to demonstrate that there is minimal risk and no need for HCl standards.

As stated in its comments on the original proposal, one commenter states that a standard for HCl is not warranted for either existing or new sources. Since the close of the previous comment period, the commenter conducted a study to evaluate the long term and short term health risks of HCl emissions from 112 kilns at 67 plants. According to the commenter, risks were assessed using EPA modeling guidance and conservative modeling assumptions. The commenter states that based on their analysis, both chronic and acute risks are below acceptable levels and that none of the kilns studied have the potential to generate HCl emissions that result in air concentrations exceeding EPA's RfC threshold for chronic health effects or Cal EPA's reference exposure level threshold for acute effects. Based on these results, the commenter states that there is no justification for an HCl standard for new or existing cement kilns. The commenter included a copy of the health risk analysis with their comments. Another commenter refers to

the above information submitted by another commenter that risks to health from HCl are well below levels acceptable for both chronic and acute impacts.

Response: As discussed in section IV.B above, we have reviewed the risk analysis provided by the commenter and agree that additional control of HCl is not required.

Comment: Regarding emission standards for THC, one commenter states that although EPA has proposed limits, they have not set standards for the main kiln stack at existing sources and new sources at existing plants. The commenter states that EPA's position on THC standards is unlawful, contemptuous of court, and arbitrary for the same reasons given by the commenter above regarding EPA position on mercury standards (see above). The same commenter in a later submission, states that the preamble to the proposed rule appears to indicate that EPA did not set emission standards for THC emissions from the kiln's main stack, although the regulatory text does specify emission limits for the kiln's main stack.

Response: Since EPA is setting standards for THC (as a surrogate for non-dioxin organic HAP), and also proposed to do so, this comment is not factually accurate (and, as noted in earlier responses, mischaracterizes the court's mandate in any case). In addition, as previously discussed, we do not agree with the commenter that the court's mandate required us to set standards regardless of the facts. The court noted that we had inappropriately limited our analysis to add-on back end control technologies. As is the case with mercury and HCl, setting some type of emission limits based on test data would mean that many facilities would have to apply a beyond-the-floor add-on control technology to meet the floor level of control without consideration of the costs, energy, and non-air health and environmental impacts.

Comments: One commenter states that EPA has improperly borrowed standards from its 1999 regulations for hazardous waste combustors, which were found unlawful and vacated¹⁸ rather than setting standards that reflect the THC or CO emission levels actually achievable by the best performing sources (12 percent of cement kilns for existing and best performing cement kiln for new). The commenter states further that although maintaining good combustion

¹⁸This is incorrect; the THC rules for hazardous waste incinerators/cement kilns/lightweight aggregate kilns were not challenged and were therefore not vacated by the D.C. Circuit. See *CKRC*, 255 F.3d at 872.

conditions affects THC emissions, it is not the only factor that does so and cites the plants' selection of raw materials as affecting THC emissions. The commenter states that EPA's new greenfield source standard reflects that use of low organic feed materials affects THC emissions and also cites statements by Florida DEP and Holcim that selection of feed materials can affect THC emissions. The commenter states that EPA admits that add-on controls, e.g., ACI and scrubber/RTO (in use on two kilns), as well as precalciner/no preheater technology reduce THC emissions. According to the commenter, because these other factors can affect THC emissions, EPA has incorrectly set the floor based on good combustion control only. The commenter states that EPA concedes that cement kilns may be able to achieve better THC emission levels than through the use of good combustion alone when it discusses in the proposed rule that nonhazardous waste cement kilns should be "less challenged" than hazardous waste kilns in meeting the proposed limits and that the "lack of any hazardous waste feed for a non-hazardous waste (NHW) cement kiln should make it easier to control the combustion process." The commenter states that EPA did not account for the fact that nonhazardous waste burning kilns can control their combustion conditions and thus THC emission more easily than hazardous waste burning kilns, instead just borrowing the standard for hazardous waste burning kilns without attempting to show that the proposed limits reflect what is actually achievable by the relevant best performers. According to the commenter, EPA's arguments that it does not have to consider factors other than good combustion were rejected by the court as irrelevant and EPA must set the THC limits reflecting the average emission level that the best sources actually achieve.

Response: In the original NESHAP, we noted that THC emissions were primarily a function of the organic materials in the kiln feed. As we have previously discussed, a facility has a starkly limited ability to change their raw materials to reduce their organic content. The fact that individual facilities have successfully reduced organic contents of their feed materials to reduce THC emissions does not indicate that this option is available to all facilities. Therefore, we cannot use this option as the basis of a national standard for existing facilities.¹⁹

¹⁹EPA could subcategorize each source based on its raw material organic content (each source being a different "type"), but rejects this alternative as

For new greenfield facilities we established in the 1999 rule that a facility would have the option to site the quarry at a location with low enough organic content that they could meet a 50 ppmv THC emissions limit. We determined that this was feasible because two facilities had already done so at the time we promulgated the original NESHAP. This limit was not remanded by the court and is currently in effect.

As we have previously discussed, we do not agree that the court decision compels us to set a THC standard that will require some sources to install a beyond-the-floor control technology under the guise of a floor standard. These facts have not changed from the original NESHAP.

However, at proposal we noted that facilities could control THC resulting from combustion of fuel.²⁰ We explained that the basis of the MACT floor for cement kilns firing hazardous waste was also good combustion, and these kilns had established limits for THC as a quantitative measure of good combustion conditions. Given the fact that both classes of kilns were using the same method of control, we proposed to apply the same limits to kilns that did not burn hazardous waste. We have no data, and none were supplied by the commenter, to make any judgments about whether or not kilns that do not burn hazardous waste could actually meet a more stringent standard. Because the standards are based on complete combustion of the fuel, and because of the extremely high temperatures in the end of the kiln where the fuels are introduced (both those that burn hazardous waste and those that do not), we believe that both types of kilns should achieve comparable complete destruction of organic materials present in the fuels under normal operating conditions reflecting good combustion. Simply because we state that controlling THC emissions from kilns that do not burn hazardous waste should be less difficult than controlling emissions from kilns that do burn hazardous waste does not imply that one type of kiln can achieve a measurably lower THC emission level than another.

Comments: Several commenters state that it is inappropriate to set THC floor limits based on a different source category, i.e., HWC. According to the

being a paper exercise not producing environmental benefit.

²⁰Fuel organics can be controlled because they are fed into the hot end of the kiln. Feed materials are fed into the other end of the kiln and therefore have the opportunity to vaporize and leave with the exhaust gas before they reach the portions of the kiln which are hot enough to combust them.

commenters, at issue is the control of products of incomplete combustion (PIC) vs. control of hydrocarbons from feed materials. They state that HWC have the option ceasing to burn hazardous waste when exceeding the limit (and can do so easily using automatic waste feed cutoff systems) and that the HWC THC standard only applies when hazardous waste is being burned.

Three commenters state that the HWC MACT standards were based on EPA's RCRA Boiler and Industrial Furnace rules, which in turn were based on the need to safely manage hazardous waste, a need that is irrelevant to the facilities covered under the current proposal.

Response: We agree with this comment and have removed the proposed quantified limits for existing sources. We have not removed the limit for new sources because the basis of the new source floor (and standard) is performance of a RTO (preceded by a scrubber to enable the RTO to function). Application of an RTO (in series with a scrubber) would allow new cement kilns to meet a 20 ppmv standard, or to remove 98 percent of incoming organic HAP measured as THC.

Comment: Three commenters state that EPA has no empirical data demonstrating that any NHW kiln can achieve the proposed limits on a continuous basis. One commenter states that bench scale studies estimated that for varying organic levels, 47 percent of samples would have resulted in emissions that exceed the 20 ppmv limit.

Response: We agree with this comment and have removed the proposed limits for existing sources. We have not removed the limit of new sources because the basis for the new source floor is now the performance of a RTO. Application of an RTO would allow the facilities noted in the comment to meet a 20 ppmv standard.

Comment: Three commenters state that the contribution to THC/CO from raw materials outweighs the measure of THC/CO for good combustion of hazardous waste fuels. Thus, THC and CO are not useful indicators of good combustion. One commenter notes that available information shows that it is difficult to correlate HC and HAP emissions. The commenter further states that several studies show that neither THC nor CO is a reliable surrogate for good combustion or PIC or HAP emissions. According to the commenter, HC emissions are a function of: (1) Raw material organic content; (2) source of fuel and firing location; (3) temperature profile; (4) oxygen concentration; and (5) type of manufacturing process. One

commenter states that the high temperatures required for the formation of cement clinker (>2700F) ensure as complete combustion of fuels as is possible.

Response: We agree with the comment that because organic contributions from processing raw materials is the chief contributor to measured THC levels (since such emissions are not combusted and hence are not largely destroyed), having a quantified limit for THC as a measure of good combustion is not appropriate for existing cement kilns that do not burn hazardous waste. We disagree with the more general statements regarding the appropriateness of a THC indicator for organic HAP, and indeed are continuing to utilize THC as an indicator for new sources. As noted in the proposal of the original NESHAP, the organic HAP component of THC emissions varies widely (63 FR 14196). However, THC emissions do contain organic HAP. Applying MACT to THC emissions will also control organic HAP, but will be less costly than attempting to set individual limits for each individual organic HAP (64 FR 31918).

We also agree with the comment that combustion conditions in the hot end of the kiln where fuels are fired should assure destruction of organics (including organic HAP) in the fuel. For this reason, we adhere to our position at proposal that good combustion conditions in the cement kiln should assure destruction of organic HAP in fuel and represents the measure of best performance for reducing emissions of organic HAP from existing cement kilns. As explained in section I.C above, we have chosen a different means of expressing good combustion conditions than the quantified THC limit which we proposed.

Comment: Three commenters state that it is inappropriate to apply limits for non-dioxin organic HAP when feed materials have varying levels of organics, which EPA acknowledges by setting THC limits only for new greenfield sources (EPA also applied variability of feed/fuel materials in justifying rules or lack of rules for mercury, HCl and non-mercury metals). Two commenters add that a Reaction Engineering study shows that organics emitted from kiln feed is extremely variable across the country with levels varying by over four orders of magnitude.

Response: We agree with these comments and have made appropriate changes in the final rule to the proposed floor for existing cement kilns' non-dioxin organic HAP emissions to account for the essentially

uncontrollable variability in organic HAP levels in raw materials.

Comment: A commenter states that EPA failed to consider the reduction in THC as part of the beyond-the-floor analysis of ACI. According to the commenter, organic HAP potentially controlled by ACI include polychlorinated biphenyls, polycyclic organic matter, and polyaromatic hydrocarbons. According to the commenter, to determine the maximum degree of reduction in THC emissions that is achievable for cement kilns, the CAA requires that EPA evaluate the reductions achievable through the use of ACI.

One commenter states that: (1) EPA did not determine, as required by the CAA for beyond-the-floor standards, the maximum degree of reduction in THC emissions achievable through GCP; (2) EPA did not show that its standards reflect the maximum degree of reduction achievable through combustion controls in light of its findings that NHW burning kilns should be able to achieve the THC standards more easily than hazardous waste burning kilns; (3) EPA did not determine the maximum degree of reduction achievable through the judicious selection of raw materials although they acknowledge that such methods will control THC emissions and that kilns are already using it and can control THC emissions through the use of other materials such as fly ash and kilns can and do import raw materials from sources that are not co-located or immediately nearby; (4) EPA did not determine the degree of reduction achievable through the use of end-of-stack controls already in use in the cement industry, including ACI, which EPA only considered for mercury and dioxin control and which would reduce THC emissions significantly and also reduce mercury and dioxin emissions;²¹ (5) EPA failed to determine the maximum degree of reduction achievable through the use of limestone scrubber/RTO even though the agency is aware that such devices can significantly reduce emissions of THC (as well as HCl) and are already in use in the industry and does not contend that they are too expensive; and (6) EPA failed to consider or determine the maximum degree of reduction achievable through the use of a carbon coke filter system such as the Polvitec system in use at Holcim's Zurich plant. For the reasons (1–7) listed above, the commenter states that EPA's beyond-

the-floor analysis for THC contravenes CAA 112(d)(2) which requires that EPA's final standards reflect the maximum degree of reduction achievable through any and all reduction measures, and any claim that EPA's THC standard reflects the maximum achievable degree of reduction would be arbitrary and capricious in light of EPA's failure to consider these technologies or explain its decision not to base beyond-the-floor standards on any or all of them.

Response: We have no actual test data to establish the impact of ACI on THC emissions, but are using a figure of 50 percent, which reflects the best estimates of the one facility using ACI for organics control. As explained in section IV.C above, the facility in question is extremely unusual in that the uncontrolled THC emission levels are much higher than any other facility in the source category, so the 50 percent reduction figure is probably more efficient than would be achieved industry-wide. As explained in section IV.A.2 above, however, even assuming this degree of reduction, we did not find a beyond-the-floor option based on performance of ACI to be achievable within the meaning of section 112(d)(2).

The commenter also stated that we did not assess the maximum degree of THC reduction achievable by optimized combustion practices. There are no data available to perform this type of analysis and none were provided by the commenter. Moreover, THC levels significantly below those associated with good combustion conditions are not necessarily indicative of further organic HAP reductions. See discussion at 70 FR 59462–59463 (October 12, 2005).

We also did not evaluate the degree to which "judicious selection" of raw materials can be used to reduce THC emissions, except that we have previously established that a greenfield facility can limit THC emission to 50 ppmv by selection of limestone with sufficiently low organic materials contents. We are aware that cement production facilities can import some raw materials from sources other than those nearby. However, the fact that in some cases materials can be imported from a farther distance does not change the fact that each individual cement facility has specific raw materials needs based on their particular limestone and other raw materials. We do not have data, nor are data available, to develop a national rule that would cover every possible raw material substitution to reduce THC emissions.

The commenter also stated we did not assess the maximum degree of emission

²¹ Since the rule already contains a standard for dioxin, incremental reductions attributable to use of ACI are quite small; see section IV.a.2 above.

reduction achievable through the use of end-of-stack controls. However, as previously discussed, there are no data available for us to perform this analysis for any controls other than an RTO. In the case of an RTO, we have evaluated its performance as a beyond-the-floor control for existing sources. In that case, we determined requiring a facility to apply an RTO as a beyond-the-floor option was not achievable, within the meaning of section 112(d)(2), due to the high costs and adverse energy utilization impacts. The new source standard for THC is based on performance of an RTO (in tandem with a scrubber), as discussed previously. We do not believe any further control is technically feasible.

The commenter also stated we had not considered the use of a carbon coke system. The source for this comment notes that there was one facility in Europe. We note the plant in question was designed to burn pelletized sewage sludge. The source of the comment does not indicate the performance or costs of this system. We assume it would perform similarly to a carbon adsorption system, which achieves emission reductions similar to those of an RTO. We believe that the wet scrubber/RTO system, which is demonstrated on a cement kiln in the United States, is a viable beyond-the-floor option. Given the lack of demonstration of a carbon coke filter in this country, the fact that we have a viable alternative as a beyond-the-floor option (an RTO), and the fact that the carbon coke filter is unlikely to perform any better than an RTO, we do not believe consideration of a carbon coke filter is warranted.

Comment: Several commenters oppose EPA's proposed regulation of area sources for THC. Three commenters state that there is no legal basis for regulating area sources. The commenters note that there is no "statement of basis and purpose" as required by CAA 307(d)(3).

One commenter recommends that EPA exempt area sources, which would experience the same cost as major sources with fewer benefits; or consider less stringent options, e.g., periodic stack test rather than CEM.

Response: As previously noted, in the original 1999 NESHAP for this source category we regulated THC emissions from area sources because the THC emissions from a cement kiln are likely to contain polycyclic organic matter. This pollutant is listed in section 112(c)(6) of the CAA as a pollutant. The commenter provided no data that would lead us to change this determination (63 FR 14193-94).

We also considered requiring periodic stack tests rather than THC CEM. However, the current rule already requires kilns at greenfield area sources to install a THC CEM. We could see no justification for allowing a more lenient THC monitoring option for new kilns at non-greenfield facilities.

Comment: One commenter states that the requirement for THC CEM will impose additional cost for no benefit. The commenter recommends that EPA eliminate numerical limits or require less costly monitoring options, e.g., periodic stack testing. The commenter recommends that if EPA does require CEM, extend the compliance date to at least 2 years because the State certification process requires more than 1 year.

Response: We have not adopted a requirement that existing sources install a THC monitor. For new sources, the compliance date is ordinarily the effective date of the rule or startup, whichever is later. See section 112(i)(1). However, in this case, because the new source standard is more stringent than proposed (see discussion in section IV.C.3 above), sources which commenced construction or reconstruction after December 2, 2005, but before December 20, 2006, will have until December 21, 2009 to comply. See section 112(i)(2).

Comment: Two commenters favor including all crushers in the Portland cement NESHAP and establishing emission limits for crushers based on the requirements in 40 CFR, subpart OOO, if they satisfy the requirements of the CAA. One commenter cites State requirements for primary crushers of 10 percent opacity, work practices, and a baghouse with outlet concentration of 0.01 grams per dry standard cubic feet; secondary crushers are subject to a 20 percent opacity limit. The commenter provided a copy of their State requirements for crushers at cement manufacturing facilities.

One commenter states that applicability based on location relevant to other sources is confusing and recommended that EPA put all appropriate requirements for the sources in one requirement and remove 63.1340(c) altogether.

Response: We agree that applicability based on location relevant to other sources is confusing. However, in our final determination on this issue we decided that crushers should not be covered under this NESHAP. The reasons are first, we have no definitive information that there are any facilities that currently have crushers after raw materials storage. Second, we have no data to set a floor for existing crushers

that might potentially be covered. We considered using the current Nonmetallic Mineral NSPS, which established standards of performance for new crushers. But we have no data to determine if the NSPS for this source category would be an appropriate MACT floor. Finally, we believe we can resolve the issue by simply stating that crushers are not covered by this regulation. It was never our intent that this rule regulate equipment typically associated with another source category.

Comment: One commenter states that all of the raw material handling and storage, except crushing, should be covered by the Portland cement NESHAP. They state that the only non-metallic mining activities subject to the NSPS subpart OOO are at the quarry and at the crusher. The commenter states that under the alternative interpretation offered by EPA, several steps characteristic of cement manufacturing would not be included in subpart LLL, for example the "on-line" measurement devices such as cross-belt neutron analyzers that are used in the preblending and proportioning steps. The commenter states further that the raw mix fed to the raw mill is the product of the very careful instrumentally-aided proportioning and blending operation that is one of the most important series of steps in the cement manufacturing process.

Response: We agree with this comment.

VII. Summary of Environmental, Energy, and Economic Impacts

A. What facilities are affected by the final amendments?

We estimate that there are approximately 94 cement plants currently in operation. These 94 plants have a total of 158 NHW cement kilns. We estimate that 20 new kilns with a capacity of 20,900,000 tpy of clinker capacity will be subject to the final amendments by the end of the fifth year after promulgation of the amendments. Note that national impacts are based on the estimated capacity increase, not on a specific number of model kilns.

B. What are the air quality impacts?

For existing kilns, we estimate that the impacts of the amendments will essentially be zero because we believe that all existing kilns are already performing the work practices prescribed in the amendments. For the 20 new kilns the variation in mercury and hydrocarbon emissions from kilns makes it difficult to quantify impacts on a national basis with any accuracy.

For mercury emissions we estimate a new kiln with a capacity of 650,000 tpy of clinker will have an emission reduction ranging from zero to 280 lb/yr. We estimate the national mercury emissions reduction to be 1300 to 3000 lb/yr in the fifth year after promulgation.

Reported hydrocarbon emission test results range from less than 1 ppmv dry basis (at 7 percent oxygen) to over 140 ppmv dry basis (Docket A-92-53) measured at the main kiln stack. For 52 kilns tested for hydrocarbon emissions (Docket A-92-53), approximately 25 percent had emissions of hydrocarbons that exceeded the 20 ppmv THC limit at the main stack. The average hydrocarbon emissions for the kilns exceeding 20 ppmv was 62.5 ppmv. Assuming that most new kilns will be sited at existing locations this would imply that 15 out of 20 new kilns will have no THC emissions reduction as a result of the THC Standard. For a new kiln that, in the absence of the standard, would emit near the average hydrocarbon level of 62.5 ppmv, the application of new source MACT consisting of an RTO would result in a reduction of about 196 tpy for a 650,000 tpy kiln. We also estimate that for 15 percent of the new kiln capacity will have uncontrolled emissions that exceed the 20 ppmv limit, but will use alternatives to application of an RTO (such as ACI) to meet the THC emissions limit. These kilns will achieve an emissions reduction of approximately 103 tpy for a new 650,000 tpy new kiln. The total national reduction will be 1100 tpy in the fifth year after promulgation of the standard.

The THC and mercury standards for new sources will also result in concurrent control of SO₂ emissions. For kilns that elect to use an RTO to comply with the THC emissions limit it is necessary to install an alkaline scrubber upstream of the RTO to control acid gas and to provide additional control of PM. We estimate that approximately 25 percent of the additional capacity built in the next five years will have to install wet scrubbers for mercury control, and 10 percent will install a wet scrubber/RTO system for THC control. The SO₂ emissions reductions for a new 650,000 tpy kiln will be approximately 320 tpy, and is estimated as 3640 nationally.

Note that we have determined that reducing SO₂ emissions also results in a reduction in secondary formation of fine PM because some SO₂ is converted to sulfates in the atmosphere. Therefore, the THC standards will also result in a reduction in emissions of fine PM.

In addition to the direct air emissions impacts, there will be secondary air impacts that result in the increased electrical demand generated by new sources' control equipment. These emissions will be an increase in emissions of pollutants from utility boilers that supply electricity to the Portland cement facilities. Assuming two new kilns will install a scrubber followed by an RTO, three will install an ACI system, and five will install wet scrubbers, we estimate these increases to be 105 tpy of NO_x, 47 tpy of CO, 157 tpy of SO₂, and 5 tpy of PM at the end of the fifth year after promulgation.

C. What are the water quality impacts?

There should be no water quality impacts for the proposed amendments. The requirement for new sources to use alkaline scrubbers upstream of the RTO will produce a scrubber slurry liquid waste stream. However, we are assuming the scrubber slurry produced will be dewatered and disposed of as solid waste. Water from the dewatering process will be recycled back to the sc in the form of aqueous discharges, addition of a scrubber will increase water usage by about 41 million gallons per year (gy) for each new 650,000 tpy kiln that installs a scrubber, or a national total of 460 million gy.

D. What are the solid waste impacts?

The solid waste impact will be the generation of scrubber slurry that is assumed to be dewatered and disposed of as solid waste, and solid waste from the ACI systems. The amount of solid waste produced is estimated as 519,300 tpy in the fifth year after promulgation of the amendments.

E. What are the energy impacts?

Requiring new kilns to install and operate alkaline scrubbers and RTO will result in increased energy use due to the electrical requirements for the scrubber and increased fan pressure drops, and natural gas to fuel the RTO. We estimate the additional electrical demand to be 41 million kWhr per year and the natural gas use to be 271 billion cubic feet by the end of the fifth year.

F. What are the cost impacts?

The final rule amendments should impose minimal costs on existing sources. These costs will be recordkeeping costs to document CKD wastage. The costs for new sources include the THC monitor and recordkeeping costs for CKD wastage on all new kilns, a wet scrubber for mercury control on five new kilns, and a wet scrubber/RTO on two of the new kilns. The estimated capital cost for a

new 650,000 tpy kiln to install a THC monitor is \$140,000, to install a wet scrubber is \$2.7 million, and to install a wet scrubber/RTO is \$10.7 million. For kilns where the uncontrolled THC emissions are below 40 ppmv, we are assuming they will opt for a lower cost THC control, such as ACI. The estimated capital cost for ACI applied to a new 650,000 tpy kiln is \$1.0 to \$1.6 million. The total estimated national capital cost at the end of the fifth year after promulgation is \$64 to \$67 million.

The estimated annualized cost per new 650,000 tpy kiln is an estimated as \$34,000 to \$37,000 for kilns a THC monitor, \$470,000 to \$597,000 for ACI, \$1.4 to \$1.5 million for a wet scrubber, and \$3.6 to \$3.9 million for a wet scrubber/RTO. National annualized costs by the end of the fifth year will be an estimated \$26 to \$28 million.

G. What are the economic impacts?

EPA conducted an economic analysis of the amendments to the NESHAP which have cost implications. For existing sources the only requirement with any cost implication is the requirement to keep records of CKD wastage. These costs are very small. We assessed earlier Portland cement regulations with greater per source costs, and those costs did not have a significant effect on the cost of goods produced. Since the conditions that produced those conclusions still exist today, EPA believes these new regulations will not have a discernible impact on the Portland cement market for existing sources.

For new sources, both the magnitude of control costs needed to comply with the final amendments and the distribution of these costs among affected facilities have a role in determining how the market will change. The final amendments will require all new kilns constructed on or after December 2, 2005, to install THC monitors. As with existing sources, the cost on a THC monitor is not significant compared to the costs assessed in the earlier regulations. However, the cost for ACI or for the wet scrubbers/RTO systems are significant. We estimate that 3 of the 20 new kilns will have to install ACI, 2 of 20 new kilns will be required to install a wet scrubber/RTO system to meet the limits for THC, and five kilns will install a wet scrubber to meet the new source mercury limits.

Because of the high cost of transportation compared to the value of Portland cement, the market for Portland cement is localized and characterized by imperfect competition. The possible outcomes of the final amendments are either a deferral in

bringing the new kiln into production or a price increase in the immediate region around the two new kilns that face control costs. For perfect competition, control costs at a new facility will be completely passed on in the long run to the purchaser of the good. With imperfect competition the outcome is harder to predict. Less than full cost pass through is a likely possibility.

The model new kilns used in this analysis have a clinker capacity of 650,000 tons/yr. The annual control cost would be up to \$597,000 for kilns that apply ACI, \$1.5 million for a kiln that applies a wet scrubber, and \$3.9 million for a kiln that applies an scrubber/RTO, in 2002 dollars. Clinker is an intermediate good in the production of Portland cement and corresponds to a Portland cement capacity of 720,000 tons/yr. To compare the costs to the value of the Portland cement in 2004 of \$85 for a national average mill value we use the Chemical Engineering Plant Cost Index for 2004 and 2002 to get a 2004 annual cost of \$640,000 for kilns that require ACI, \$1.7 million for kiln that apply wet scrubbers, and \$4.4 million for those that apply an scrubber/RTO. The value of the Portland cement produced in a year at the \$85 price would be \$61 million. If the cost were to be fully passed on to the purchaser in a higher price the price would

increase by 1.0 to 7.2 percent, to values of \$86 to \$91, respectively.

With the increasing demand for Portland cement and the high capacity utilization of existing plants and the nature of the regional markets, it is unlikely that the new kilns would be delayed. Because of the imperfect competition, it is likely in the regions around the two new kilns facing control, the price of the Portland cement would increase but by less than the 1.0 to 7.2 percent that would be required to fully cover the control costs.

VIII. Statutory and Executive Order Reviews

A. Executive Order 12866, Regulatory Planning and Review

Under Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), this action is a “significant regulatory action” because it raised novel legal and policy issues. Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under EO 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action.

B. Paperwork Reduction Act

The information collection requirements in this final rule have been

submitted for approval to the OMB under the *Paperwork Reduction Act*, 44 U.S.C. 3501 *et seq.* The information collection requirements are not enforceable until OMB approves them.

The information requirements are based on notification, recordkeeping, and reporting requirements in the NESHAP General Provisions (40 CFR part 63, subpart A), which are mandatory for all operators subject to national emission standards. These recordkeeping and reporting requirements are specifically authorized by section 114 of the CAA (42 U.S.C. 7414). All information submitted to EPA pursuant to the recordkeeping and reporting requirements for which a claim of confidentiality is made is safeguarded according to Agency policies set forth in 40 CFR part 2, subpart B.

These requirements include records of CKD removal from the kiln system at all existing and new sources, and requirements for new kilns constructed after December 2, 2005, to install and test a continuous monitor to measure THC. We expect these additional requirements to affect 94 facilities over the first 3 years. The estimated annual average burden is outlined below.

Affected entity	Total hours	Labor costs	Total annual O&M costs	Total costs
Industry	4,159	\$679,105	\$161,672	\$840,777
Implementing Agency	213	16,100	NA	16,100

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA’s regulations in 40

CFR are listed in 40 CFR part 9. When this information collection request is approved by OMB, the Agency will publish a technical amendment to 40 CFR part 9 in the **Federal Register** to display the OMB control number for the approved information collection requirements contained in this final rule.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impact of today’s proposed rule amendments

on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administration’s (SBA) regulations at 13 CFR 121.201; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of this final rule amendments on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. The small entities directly regulated by the final rule amendments are small businesses. We determined there are 6 or 7 small businesses in this industry out of a total of 44. Each small business operates a single plant with one or more kilns. The total annualized cost of the standards in the amendments for an existing kiln is

nominal. The revenue for the entire small business sector is estimated to be around \$260 million (2003 dollars). New sources, will incur higher costs because new kilns must install a THC monitor, and approximately three of the 20 new kilns will have to install ACI, two will have to install wet scrubbers, and two will have to install a wet scrubber/RTO system for THC control. For new sources that must install controls, the cost of control is estimated to be one to seven percent of the expected revenue from a new kiln. We currently do not have any information on plans for small businesses to build new kilns.

Although the final rule amendments will not have a significant economic impact on a substantial number of small entities, EPA nonetheless has tried to reduce the impact of the final amendments on small entities. The emission standards are representative of the floor level of emissions control, which is the minimum level of control allowed under CAA. Further, the costs of required performance testing and monitoring for non-dioxin organic HAP emissions from new sources have been minimized by specifying emissions limits and monitoring parameters in terms a surrogate for organic HAP emissions, which surrogate (THC) is less costly to measure.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104-4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of \$100 million or more in any 1 year. Before promulgating a rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative

was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that the final rule amendments do not contain a Federal mandate that may result in expenditures of \$100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any 1 year, nor do the amendments significantly or uniquely impact small governments, because they contain no requirements that apply to such governments or impose obligations upon them. Thus, these final rule amendments are not subject to the requirements of sections 202 and 205 of the UMRA.

E. Executive Order 13132, Federalism

Executive Order 13132 (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure "meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications." "Policies that have federalism implications" is defined in the Executive Order to include regulations that have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government."

The final rule amendments do not have federalism implications. The final rule amendments will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132, because State and local governments do not own or operate any sources that would be subject to the proposed rule amendments. Thus, Executive Order 13132 does not apply to the final rule amendments.

F. Executive Order 13175, Consultation and Coordination With Indian Tribal Governments

Executive Order 13175 entitled "Consultation and Coordination with Indian Tribal Governments" (65 FR 67249, November 9, 2000), requires EPA to develop an accountable process to ensure "meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications." The final rule amendments do not have tribal implications, as specified in Executive Order 13175, because tribal governments do not own or operate any sources subject to today's action. Thus, Executive Order 13175 does not apply to the proposed rule amendments.

G. Executive Order 13045, Protection of Children From Environmental Health Risks and Safety Risks

Executive Order 13045 (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be "economically significant" as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

EPA interprets Executive Order 13045 as applying only to those regulatory actions that are based on health or safety risks, such that the analysis required under section 5-501 of the Executive Order has the potential to influence the rule. The final rule amendments are not subject to Executive Order 13045 because they are based on technology performance and not on health or safety risks.

H. Executive Order 13211, Actions That Significantly Affect Energy, Supply, Distribution, or Use

This rule is not a "significant energy action" as defined in Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use" (66 FR 28355 (May 22, 2001)) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. These rule requirements will have energy effects due to the energy requirements for the control devices required for new sources. We estimate the additional electrical demand to be 15 million kWhr per year and the

natural gas use to be 270 billion cubic feet by the end of the fifth year. We do not consider these energy impacts to be significant.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) of 1995 (Pub. L. 104–113, Section 12(d), 15 U.S.C. 272 note) directs EPA to use voluntary consensus standards (VCS) in its regulatory activities, unless to do so would be inconsistent with applicable law or otherwise impractical. The VCS are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by VCS bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency does not use available and applicable VCS.

This final rule involves technical standards. EPA cites EPA Method 29 of 40 CFR part 60 for measurement of mercury emissions in stack gases for new cement kilns.

Consistent with the NTTAA, EPA conducted searches to identify voluntary consensus standards in addition to these EPA methods. The search and review results are in the docket for this rule.

One voluntary consensus standard was identified as an acceptable alternative to an EPA test method for the purposes of the final rule. The voluntary consensus standard ASTM D6784–02, “Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method),” is an acceptable alternative to EPA Method 29 (portion for mercury only) as a method for measuring mercury.

The search for emissions measurement procedures identified two other voluntary consensus standards. EPA determined that these two standards identified for measuring emissions of the HAP or surrogates subject to emission standards in this rule were impractical alternatives to EPA test methods for the purposes of this rule. Therefore, EPA does not intend to adopt these standards for this purpose. The reasons for the two determinations for the two methods are discussed below.

The voluntary consensus standard EN 13211:2001, “Air Quality—Stationary Source Emissions—Determination of the Concentration of Total Mercury,” is not acceptable as an alternative to the mercury portion of EPA Method 29 primarily because it is not validated for

use with impingers, as in EPA method, although the standard describes procedures for the use of impingers. This European standard is validated for the use of fritted bubblers only and requires the use of a side (split) stream arrangement for isokinetic sampling because of the low sampling rate of the bubblers (up to 3 liters per minute, maximum). Also, only two bubblers (or impingers) are required by EN 13211, whereas EPA method requires the use of six impingers. In addition, EN 13211 does not include many of the quality control procedures of EPA methods, especially for the use and calibration of temperature sensors and controllers, sampling train assembly and disassembly, and filter weighing.

The voluntary consensus standard CAN/CSA Z223.26–M1987, “Measurement of Total Mercury in Air Cold Vapour Atomic Absorption Spectrophotometric Method,” is not acceptable as an alternative to EPA Method 29 (for mercury). This standard is not acceptable because of the lack of detail in quality control. Specifically, CAN/CSA Z223.26 does not include specifications for the number of calibration samples to be analyzed, procedures to prevent carryover from one sample to the next, and procedures for subtraction of the instrument response to calibration blank as in EPA method. Also, CAN/CSA Z223.26 does not require that the calibration curve be forced through or close to zero (or a point no further than ± 2 percent of the recorder full scale) as in EPA method. Also, CAN/CSA Z223.26 does not include a procedure to assure that two consecutive peak heights agree within 3 percent of their average value and that the peak maximum is greater than 10 percent of the recorder full scale, as in EPA methods. CAN/CSA Z223.26 does not include instructions for a blank and a standard to be run at least every five samples, and specifications for the peak height of the blank and the standard as in EPA method.

Section 63.1349 to subpart LLL of this rule lists the testing methods included in the regulation. Under § 63.7(f) and § 63.8(f) of Subpart A of the General Provisions, a source may apply to EPA for permission to use alternative test methods or alternative monitoring requirements in place of any required testing methods, performance specifications, or procedures.

J. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the

agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a “major rule” as defined by 5 U.S.C. 804(2). This rule will be effective on December 20, 2006.

List of Subjects in 40 CFR Part 63

Environmental protection, Administrative practice and procedure, Air pollution control, Hazardous substances, and Reporting and recordkeeping requirements.

Dated: December 8, 2006.

Stephen L. Johnson,
Administrator.

■ For the reasons stated in the preamble, title 40, chapter I, part 63 of the Code of Federal Regulations is amended as follows:

PART 63—[Amended]

■ 1. The authority citation for part 63 continues to read as follows:

Authority: 42 U.S.C. 7401, *et seq.*

Subpart LLL—[Amended]

■ 2. § 63.1342 is revised to read as follows:

§ 63.1342 Standards: General.

Table 1 to this subpart provides cross references to the 40 CFR part 63, subpart A, general provisions, indicating the applicability of the general provisions requirements to subpart LLL.

■ 3. Section 63.1343 is revised to read as follows:

§ 63.1343 Standards for kilns and in-line kiln/raw mills.

(a) *General.* The provisions in this section apply to each kiln, each in-line kiln/raw mill, and any alkali bypass associated with that kiln or in-line kiln/raw mill. All gaseous, mercury and D/F emission limits are on a dry basis, corrected to 7 percent oxygen. All total hydrocarbon (THC) emission limits are measured as propane. The block averaging periods to demonstrate compliance are hourly for 20 ppmv total hydrocarbon (THC) limits and monthly for the 50 ppmv THC limit.

(b) *Existing kilns located at major sources.* No owner or operator of an existing kiln or an existing kiln/raw mill

located at a facility that is a major source subject to the provisions of this subpart shall cause to be discharged into the atmosphere from these affected sources, any gases which:

(1) Contain particulate matter (PM) in excess of 0.15 kg per Mg (0.30 lb per ton) of feed (dry basis) to the kiln. When there is an alkali bypass associated with a kiln or in-line kiln/raw mill, the combined particulate matter emissions from the kiln or in-line kiln/raw mill and the alkali bypass are subject to this emission limit.

(2) Exhibit opacity greater than 20 percent.

(3) Contain D/F in excess of:

(i) 0.20 ng per dscm (8.7×10^{-11} gr per dscf) (TEQ); or

(ii) 0.40 ng per dscm (1.7×10^{-10} gr per dscf) (TEQ) when the average of the performance test run average temperatures at the inlet to the particulate matter control device is 204 °C (400 °F) or less.

(c) *Reconstructed or new kilns located at major sources.* No owner or operator of a reconstructed or new kiln or reconstructed or new inline kiln/raw mill located at a facility which is a major source subject to the provisions of this subpart shall cause to be discharged into the atmosphere from these affected sources any gases which:

(1) Contain particulate matter in excess of 0.15 kg per Mg (0.30 lb per ton) of feed (dry basis) to the kiln. When there is an alkali bypass associated with a kiln or in-line kiln/raw mill, the combined particulate matter emissions from the kiln or in-line kiln/raw mill and the bypass stack are subject to this emission limit.

(2) Exhibit opacity greater than 20 percent.

(3) Contain D/F in excess of:

(i) 0.20 ng per dscm (8.7×10^{-11} gr per dscf) (TEQ); or

(ii) 0.40 ng per dscm (1.7×10^{-10} gr per dscf) (TEQ) when the average of the performance test run average temperatures at the inlet to the particulate matter control device is 204 °C (400 °F) or less.

(4) Contain total hydrocarbons (THC), from the main exhaust of the kiln, or main exhaust of the in-line kiln/raw mill, in excess of 20 ppmv if the source is a new or reconstructed source that commenced construction after December 2, 2005. As an alternative to meeting the 20 ppmv standard you may demonstrate a 98 percent reduction of THC emissions from the exit of the kiln to discharge to the atmosphere. If the source is a greenfield kiln that commenced construction on or prior to December 2, 2005, then the THC limit is 50 ppmv.

(5) Contain mercury from the main exhaust of the kiln, or main exhaust of the in-line kiln/raw mill, or the alkali bypass in excess of 41 µg/dscm if the source is a new or reconstructed source that commenced construction after December 2, 2005. As an alternative to meeting the 41 µg/dscm standard you may route the emissions through a packed bed or spray tower wet scrubber with a liquid-to-gas (l/g) ratio of 30 gallons per 1000 actual cubic feet per minute (acfm) or more and meet a site-specific emissions limit based on the measured performance of the wet scrubber.

(d) *Existing kilns located at area sources.* No owner or operator of an existing kiln or an existing in-line kiln/raw mill located at a facility that is an area source subject to the provisions of this subpart shall cause to be discharged into the atmosphere from these affected sources any gases which:

(1) Contain D/F in excess of 0.20 ng per dscm (8.7×10^{-11} gr per dscf) (TEQ); or

(2) Contain D/F in excess of 0.40 ng per dscm (1.7×10^{-10} gr per dscf) (TEQ) when the average of the performance test run average temperatures at the inlet to the particulate matter control device is 204 °C (400 °F) or less.

(e) *New or reconstructed kilns located at area sources.* No owner or operator of a new or reconstructed kiln or new or reconstructed in-line kiln/raw mill located at a facility that is an area source subject to the provisions of this subpart shall cause to be discharged into the atmosphere from these affected sources any gases which:

(1) Contain D/F in excess of:

(i) 0.20 ng per dscm (8.7×10^{-11} gr per dscf) (TEQ); or

(ii) 0.40 ng per dscm (1.7×10^{-10} gr per dscf) (TEQ) when the average of the performance test run average temperatures at the inlet to the particulate matter control device is 204 °C (400 °F) or less.

(2) Contain total hydrocarbons (THC), from the main exhaust of the kiln, or main exhaust of the in-line kiln/raw mill, in excess of 20 ppmv if the source is a new or reconstructed source that commenced construction after December 2, 2005. As an alternative to meeting the 20 ppmv standard you may demonstrate a 98 percent reduction of THC emissions from the exit of the kiln to discharge to the atmosphere. If the source is a greenfield kiln that commenced construction on or prior to December 2, 2005, then the THC limit is 50 ppmv.

(3) Contain mercury from the main exhaust of the kiln, or main exhaust of the in-line kiln/raw mill, or the alkali

bypass in excess of 41 µg/dscm if the source is a new or reconstructed source that commenced construction after December 2, 2005. As an alternative to meeting the 41 µg/dscm standard you may route the emissions through a packed bed or spray tower wet scrubber with a liquid-to-gas (l/g) ratio of 30 gallons per 1000 actual cubic feet per minute (acfm) or more and meet a site-specific emissions limit based on the measured performance of the wet scrubber.

■ 4. Section 63.1344 is amended as follows:

■ a. Revising paragraphs (c) through (e);

■ b. Adding paragraphs (f) through (i).

§ 63.1344 Operating limits for kilns and in-line kiln/raw mills.

* * * * *

(c) The owner or operator of an affected source subject to a mercury, THC or D/F emission limitation under § 63.1343 that employs carbon injection as an emission control technique must operate the carbon injection system in accordance with paragraphs (c)(1) and (c)(2) of this section.

(1) The three-hour rolling average activated carbon injection rate shall be equal to or greater than the activated carbon injection rate determined in accordance with § 63.1349(b)(3)(vi).

(2) The owner or operator shall either:

(i) Maintain the minimum activated carbon injection carrier gas flow rate, as a three-hour rolling average, based on the manufacturer's specifications. These specifications must be documented in the test plan developed in accordance with § 63.7(c), or

(ii) Maintain the minimum activated carbon injection carrier gas pressure drop, as a three-hour rolling average, based on the manufacturer's specifications. These specifications must be documented in the test plan developed in accordance with § 63.7(c).

(d) Except as provided in paragraph (e) of this section, the owner or operator of an affected source subject to a mercury, THC or D/F emission limitation under § 63.1343 that employs carbon injection as an emission control technique must specify and use the brand and type of activated carbon used during the performance test until a subsequent performance test is conducted, unless the site-specific performance test plan contains documentation of key parameters that affect adsorption and the owner or operator establishes limits based on those parameters, and the limits on these parameters are maintained.

(e) The owner or operator of an affected source subject to a D/F, THC, or mercury emission limitation under

§ 63.1343 that employs carbon injection as an emission control technique may substitute, at any time, a different brand or type of activated carbon provided that the replacement has equivalent or improved properties compared to the activated carbon specified in the site-specific performance test plan and used in the performance test. The owner or operator must maintain documentation that the substitute activated carbon will provide the same or better level of control as the original activated carbon.

(f) Existing kilns and in-line kilns/raw mills must implement good combustion practices (GCP) designed to minimize THC from fuel combustion. GCP include training all operators and supervisors to operate and maintain the kiln and calciner, and the pollution control systems in accordance with good engineering practices. The training shall include methods for minimizing excess emissions.

(g) No kiln and in-line kiln/raw mill may use as a raw material or fuel any fly ash where the mercury content of the fly ash has been increased through the use of activated carbon, or any other sorbent unless the facility can demonstrate that the use of that fly ash will not result in an increase in mercury emissions over baseline emissions (i.e. emissions not using the fly ash). The facility has the burden of proving there has been no emissions increase over baseline.

(h) All kilns and in-line kilns/raw mills must remove (i.e. not recycle to the kiln) from the kiln system sufficient cement kiln dust to maintain the desired product quality.

(i) New and reconstructed kilns and in-line kilns/raw mills must not exceed the average hourly CKD recycle rate measured during mercury performance testing. Any exceedance of this average hourly rate is considered a violation of the standard.

■ 5. Section 63.1346 is revised to read as follows:

§ 63.1346 Standards for new or reconstructed raw material dryers.

(a) New or reconstructed raw material dryers located at facilities that are major sources can not discharge to the atmosphere any gases which:

(1) Exhibit opacity greater than ten percent, or

(2) Contain THC in excess of 20 ppmv, on a dry basis as propane corrected to 7 percent oxygen if the source commenced construction after December 2, 2005. As an alternative to the 20 ppmv standard, you may demonstrate a 98 percent reduction in THC emissions from the exit of the raw materials dryer to discharge to the

atmosphere. If the source is a greenfield dryer constructed on or prior to December 2, 2005, then the THC limit is 50 ppmv, on a dry basis corrected to 7 percent oxygen.

(b) New or reconstructed raw materials dryers located at a facility that is an area source cannot discharge to the atmosphere any gases which contain THC in excess of 20 ppmv, on a dry basis as propane corrected to 7 percent oxygen if the source commenced construction after December 2, 2005. As an alternative to the 20 ppmv standard, you may demonstrate a 98 percent reduction in THC emissions from the exit of the raw materials dryer to discharge to the atmosphere. If the source is a greenfield dryer constructed on or prior to December 2, 2005, then the THC limit is 50 ppmv, on a dry basis corrected to 7 percent oxygen.

■ 6. Section 63.1349 is amended as follows:

- a. By revising paragraph (b)(4);
- b. By adding paragraph (b)(5);
- c. By removing paragraph (f).

§ 63.1349 Performance Testing Requirements.

* * * * *

(b) * * *

(4)(i) The owner or operator of an affected source subject to limitations on emissions of THC shall demonstrate initial compliance with the THC limit by operating a continuous emission monitor in accordance with Performance Specification 8A of appendix B to part 60 of this chapter. The duration of the performance test shall be three hours, and the average THC concentration (as calculated from the one-minute averages) during the three-hour performance test shall be calculated. The owner or operator of an in-line kiln/raw mill shall demonstrate initial compliance by conducting separate performance tests while the raw mill of the in-line kiln/raw mill is under normal operating conditions and while the raw mill of the in-line kiln/raw mill is not operating.

(ii) The owner or operator of an affected source subject to limitations on emissions of THC who elects to demonstrate compliance with the alternative THC emission limit of 98 percent weight reduction must demonstrate compliance by also operating a continuous emission monitor in accordance with Performance Specification 8A of appendix B to part 60 at the inlet to the THC control device of the kiln, inline kiln raw mill, or raw materials dryer in the same manner as prescribed in paragraph (i) above. Alternately, you may elect to demonstrate a 98 weight

percent reduction in THC across the control device using the performance test requirements in 40 CFR part 63, subpart SS.

(5) The owner or operator of a kiln or in-line kiln/raw mill subject to the 41 µg/dscm mercury standard shall demonstrate compliance using EPA Method 29 of 40 CFR part 60. ASTM D6784-02, Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), is an acceptable alternative to EPA Method 29 (portion for mercury only). If the kiln has an in-line raw mill, you must demonstrate compliance with both raw mill off and raw mill on. You must record the hourly recycle rate of CKD during both test conditions and calculate an average hourly rate for the three test runs for each test condition.

* * * * *

■ 7. Section 63.1350 is amended as follows:

- a. Revising paragraphs (g), (h) and (n); and
- b. Adding paragraphs (o) and (p).

§ 63.1350 Monitoring requirements.

* * * * *

(g) The owner or operator of an affected source subject to an emissions limitation on D/F, THC or mercury emissions that employs carbon injection as an emission control technique shall comply with the monitoring requirements of paragraphs (f)(1) through (f)(6) and (g)(1) through (g)(6) of this section to demonstrate continuous compliance with the D/F, THC or mercury emissions standard.

(1) Install, operate, calibrate and maintain a continuous monitor to record the rate of activated carbon injection. The accuracy of the rate measurement device must be ±1 percent of the rate being measured.

(2) Verify the calibration of the device at least once every three months.

(3) The three-hour rolling average activated carbon injection rate shall be calculated as the average of 180 successive one-minute average activated carbon injection rates.

(4) Periods of time when one-minute averages are not available shall be ignored when calculating three-hour rolling averages. When one-minute averages become available, the first one-minute average is added to the previous 179 values to calculate the three-hour rolling average.

(5) When the operating status of the raw mill of the in-line kiln/raw mill is changed from off to on, or from on to off, the calculation of the three-hour

rolling average activated carbon injection rate must begin anew, without considering previous recordings.

(6) The owner or operator must install, operate, calibrate and maintain a continuous monitor to record the activated carbon injection system carrier gas parameter (either the carrier gas flow rate or the carrier gas pressure drop) established during the mercury, THC or D/F performance test in accordance with paragraphs (g)(6)(i) through (g)(6)(iii) of this section.

(i) The owner or operator shall install, calibrate, operate and maintain a device to continuously monitor and record the parameter value.

(ii) The owner or operator must calculate and record three-hour rolling averages of the parameter value.

(iii) Periods of time when one-minute averages are not available shall be ignored when calculating three-hour rolling averages. When one-minute averages become available, the first one-minute average shall be added to the previous 179 values to calculate the three-hour rolling average.

(h) The owner or operator of an affected source subject to a limitation on THC emissions under this subpart shall comply with the monitoring requirements of paragraphs (h)(1) through (h)(3) of this section to demonstrate continuous compliance with the THC emission standard:

(1) The owner or operator shall install, operate and maintain a THC continuous emission monitoring system in accordance with Performance Specification 8A, of appendix B to part 60 of this chapter and comply with all of the requirements for continuous monitoring systems found in the general provisions, subpart A of this part.

(2) The owner or operator is not required to calculate hourly rolling averages in accordance with section 4.9 of Performance Specification 8A if they are only complying with the 50 ppmv THC emissions limit.

(3) For facilities complying with the 50 ppmv THC emissions limit, any thirty-day block average THC concentration in any gas discharged from a greenfield raw material dryer, the main exhaust of a greenfield kiln, or the main exhaust of a greenfield in-line kiln/raw mill, exceeding 50 ppmvd, reported as propane, corrected to seven percent oxygen, is a violation of the standard.

(4) For new facilities complying with the 20 ppmv THC emissions limit, any hourly average THC concentration in any gas discharged from a raw material dryer, the main exhaust of a greenfield kiln, or the main exhaust of a kiln or in-line kiln/raw mill, exceeding 20 ppmvd, reported as propane, corrected to seven percent oxygen, is a violation of the standard.

* * * * *

(n) Any kiln or kiln/in-line raw mill using a control device (other than ACI) to comply with a mercury emissions limit or equipment standard will monitor the control device parameters as specified in 40 CFR part 63 subpart SS.

(o) For kilns and in-line kilns/raw mills complying with the requirements in Section 63.1344(g), each owner or operator must obtain a certification from the supplier for each shipment of fly ash received to demonstrate that the fly ash was not derived from a source in which the use of activated carbon, or any other sorbent, is used as a method of mercury emissions control. The certification shall include the name of the supplier and a signed statement from the supplier confirming that the fly ash was not derived from a source in which the use of activated carbon, or any other sorbent, is used as a method of emission control.

(p) If the facility opts to use a fly ash derived from a source in which the use of activated carbon, or any other sorbent, is used as a method of mercury emissions control and demonstrate that the use of this fly ash does not increase mercury emissions, they must obtain daily fly ash samples, composites monthly, and analyze the samples for mercury.

■ 8. Section 63.1351 is revised to read as follows:

§ 63.1351 Compliance dates.

(a) Except as noted in paragraph (c) below, the compliance date for an owner or operator of an existing affected source subject to the provisions of this subpart is June 14, 2002.

(b) Except as noted in paragraph (d) below, the compliance date for an owner or operator of an affected source subject to the provisions of this subpart that commences new construction or reconstruction after March 24, 1998, is

June 14, 1999, or upon startup of operations, whichever is later.

(c) The compliance date for an existing source to meet the requirements of GCP for THC is December 20, 2007.

(d) The compliance date for a new source which commenced construction after December 2, 2005, and before December 20, 2006 to meet the THC emission limit of 20 ppmv/98 percent reduction or the mercury standard of 41 µg/dscm or a site-specific standard based on application of a wet scrubber will be December 21, 2009.

■ 9. Section 63.1355 is amended by adding paragraphs (d), (e) and (f) to read as follows:

§ 63.1355 Recordkeeping requirements.

* * * * *

(d) You must keep annual records of the amount of CKD which is removed from the kiln system and either disposed of as solid waste or otherwise recycled for a beneficial use outside of the kiln system.

(e) You must keep records of the amount of CKD recycled on an hourly basis.

(f) You must keep records of all fly ash supplier certifications as required by § 63.1350(o).

■ 10. Section 63.1356 is amended by revising paragraph (a) to read as follows:

§ 63.1356 Exemption from new source performance standards.

(a) Except as provided in paragraphs (a)(1) and (2) of this section, any affected source subject to the provisions of this subpart is exempt from any otherwise applicable new source performance standard contained in subpart F or subpart OOO of part 60 of this chapter.

(1) Kilns and in-line kiln/raw mills, as applicable, under 40 CFR 60.60(b), located at area sources are subject to PM and opacity limits and associated reporting and recordkeeping, under 40 CFR part 60, subpart F.

(2) Greenfield raw material dryers, as applicable under 40 CFR 60.60(b), located at area sources, are subject to opacity limits and associated reporting and recordkeeping under 40 CFR part 60, subpart F.

* * * * *

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