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40 CFR Parts 9, 63, 260 et al.
**National Emission Standards for
Hazardous Air Pollutants: Final Standards
for Hazardous Air Pollutants for
Hazardous Waste Combustors (Phase I
Final Replacement Standards and Phase
II); Final Rule**

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 9, 63, 260, 264, 265, 266, 270 and 271

[FRL-7971-8]

RIN 2050-AE01

National Emission Standards for Hazardous Air Pollutants: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors (Phase I Final Replacement Standards and Phase II)

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This action finalizes national emission standards (NESHAP) for hazardous air pollutants for hazardous waste combustors (HWCs): hazardous waste burning incinerators, cement kilns, lightweight aggregate kilns, industrial/commercial/institutional boilers and process heaters, and hydrochloric acid production furnaces. EPA has identified HWCs as major sources of hazardous air pollutant (HAP) emissions. These standards implement section 112(d) of the Clean Air Act (CAA) by requiring hazardous waste combustors to meet HAP emission standards reflecting the performance of the maximum achievable control technology (MACT).

The HAP emitted by HWCs include arsenic, beryllium, cadmium,

chromium, dioxins and furans, hydrogen chloride and chlorine gas, lead, manganese, and mercury. Exposure to these substances has been demonstrated to cause adverse health effects such as irritation to the lung, skin, and mucus membranes, effects on the central nervous system, kidney damage, and cancer. The adverse health effects associated with exposure to these specific HAP are further described in the preamble. For many HAP, these findings have only been shown with concentrations higher than those typically in the ambient air.

This action also presents our decision regarding the February 28, 2002 petition for rulemaking submitted by the Cement Kiln Recycling Coalition, relating to EPA's implementation of the so-called omnibus permitting authority under section 3005(c) of the Resource Conservation and Recovery Act (RCRA). That section requires that each permit issued under RCRA contain such terms and conditions as permit writers determine to be necessary to protect human health and the environment. In that petition, the Cement Kiln Recycling Coalition requested that we repeal the existing site-specific risk assessment policy and technical guidance for hazardous waste combustors and that we promulgate the policy and guidance as rules in accordance with the Administrative Procedure Act if we continue to believe that site-specific risk assessments may be necessary.

DATES: The final rule is effective December 12, 2005. The incorporation by reference of Method 0023A into § 63.14 is approved by the Director of the Federal Register as of December 12, 2005.

ADDRESSES: The official public docket is the collection of materials that is available for public viewing at the Office of Air and Radiation Docket and Information Center (Air Docket) in the EPA Docket Center, Room B-102, 1301 Constitution Ave., NW., Washington, DC.

FOR FURTHER INFORMATION CONTACT: For more information concerning applicability and rule determinations, contact your State or local representative or appropriate EPA Regional Office representative. For information concerning rule development, contact Michael Galbraith, Waste Treatment Branch, Hazardous Waste Minimization and Management Division, (5302W), U.S. EPA, 1200 Pennsylvania Avenue, NW., Washington DC 20460, telephone number (703) 605-0567, fax number (703) 308-8433, electronic mail address galbraith.michael@epa.gov.

SUPPLEMENTARY INFORMATION:

Regulated Entities

The promulgation of the final rule would affect the following North American Industrial Classification System (NAICS) and Standard Industrial Classification (SIC) codes:

Category	NAICS code	SIC code	Examples of potentially regulated entities
Any industry that combusts hazardous waste as defined in the final rule.	562211	4953	Incinerator, hazardous waste
	327310	3241	Cement manufacturing, clinker production
	327992	3295	Ground or treated mineral and earth manufacturing
	325	28	Chemical Manufacturers
	324	29	Petroleum Refiners
	331	33	Primary Aluminum
	333	38	Photographic equipment and supplies
	488, 561, 562	49	Sanitary Services, N.E.C.
	421	50	Scrap and waste materials
	422	51	Chemical and Allied Products, N.E.C
	512, 541, 561, 812	73	Business Services, N.E.C.
	512, 514, 541, 711	89	Services, N.E.C.
	924	95	Air, Water and Solid Waste Management

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 examples of the types of entities EPA is now aware could potentially be regulated by this action. Other types of entities not listed could also be affected. To determine whether your facility,

company, business, organization, etc., is regulated by this action, you should examine the applicability criteria in Part II of this preamble. If you have any questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

Abbreviations and Acronyms Used in This Document

- acfm actual cubic feet per minute
- Btu British thermal units
- CAA Clean Air Act
- CFR Code of Federal Regulations
- DRE destruction and removal efficiency
- dscf dry standard cubic foot
- dscm dry standard cubic meter

EPA Environmental Protection Agency
 FR Federal Register
 gr/dscf grains per dry standard cubic foot
 HAP hazardous air pollutant(s)
 ICR Information Collection Request
 kg/hr kilograms per hour
 kW-hour kilo Watt hour
 MACT Maximum Achievable Control Technology
 mg/dscm milligrams per dry standard cubic meter
 MMBtu million British thermal unit
 ng/dscm nanograms per dry standard cubic meter
 NESHAP national emission standards for HAP
 ng nanograms
 POHC principal organic hazardous constituent
 ppmv parts per million by volume
 ppmw parts per million by weight
 Pub. L. Public Law
 RCRA Resource Conservation and Recovery Act
 SRE system removal efficiency
 TEQ toxicity equivalence
 µg/dscm micrograms per dry standard cubic meter
 U.S.C. United States Code

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Part One: Background and Summary

I. What Is the Statutory Authority for This Standard?

Section 112 of the Clean Air Act requires that the EPA promulgate regulations requiring the control of HAP emissions from major and certain area sources. The control of HAP is achieved through promulgation of emission standards under sections 112(d) and (in a second round of standard setting) (f).

EPA's initial list of categories of major and area sources of HAP selected for regulation in accordance with section 112(c) of the Act was published in the **Federal Register** on July 16, 1992 (57 FR 31576). Hazardous waste incinerators, Portland cement plants, clay products manufacturing (including lightweight aggregate kilns), industrial/commercial/institutional boilers and process heaters, and hydrochloric acid production furnaces are among the listed 174 categories of sources. The listing was based on the Administrator's determination that these sources may reasonably be anticipated to emit one or more of the 186 listed HAP in quantities sufficient to designate them as major sources.

II. What Is the Regulatory Development Background of the Source Categories in the Final Rule?

Today's notice finalizes standards for controlling emissions of HAP from hazardous waste combustors: incinerators, cement kilns, lightweight aggregate kilns, boilers, process heaters¹, and hydrochloric acid production furnaces that burn hazardous waste. We call incinerators, cement kilns, and lightweight aggregate kilns Phase I sources because we have already promulgated standards for those source categories. We call boilers and hydrochloric acid production furnaces Phase II sources because we intended to promulgate MACT standards for those source categories after promulgating MACT standards for Phase I sources. The regulatory background of Phase I and Phase II source categories is discussed below.

A. Phase I Source Categories

Phase I combustor sources are regulated under the Resource Conservation and Recovery Act (RCRA), which establishes a "cradle-to-grave"

¹ A process heater meets the RCRA definition of a boiler. Therefore, process heaters that burn hazardous wastes are covered under subpart EEE as boilers, and are discussed as such in subsequent parts of the preamble.

regulatory structure overseeing the safe treatment, storage, and disposal of hazardous waste. We issued RCRA rules to control air emissions from hazardous waste burning incinerators in 1981, 40 CFR Parts 264 and 265, Subpart O, and from cement kilns and lightweight aggregate kilns that burn hazardous waste in 1991, 40 CFR Part 266, Subpart H. These rules rely generally on risk-based standards to assure control necessary to protect human health and the environment, the applicable RCRA standard. See RCRA section 3004 (a) and (q).

The Phase I source categories also are subject to standards under the Clean Air Act. We promulgated standards for Phase I sources on September 30, 1999 (64 FR 52828). This final rule is referred to in this preamble as the Phase I rule or 1999 final rule. These emission standards created a technology-based national cap for hazardous air pollutant emissions from the combustion of hazardous waste in these devices. The rule regulates emissions of numerous hazardous air pollutants: dioxin/furans, other toxic organics (through surrogates), mercury, other toxic metals (both directly and through a surrogate), and hydrogen chloride and chlorine gas. Where necessary, Section 3005(c)(3) of RCRA provides the authority to impose additional conditions on a source-by-source basis in a RCRA permit if necessary to protect human health and the environment.

A number of parties, representing interests of both industrial sources and of the environmental community, sought judicial review of the Phase I rule. On July 24, 2001, the United States Court of Appeals for the District of Columbia Circuit granted portions of the Sierra Club's petition for review and vacated the challenged portions of the standards. *Cement Kiln Recycling Coalition v. EPA*, 255 F. 3d 855 (D.C. Cir. 2001). The court held that EPA had not demonstrated that its calculation of MACT floors met the statutory requirement of being no less stringent than (1) the average emission limitation achieved by the best performing 12 percent of existing sources and, for new sources, (2) the emission control achieved in practice by the best controlled similar source for new sources. 255 F.3d at 861, 865–66. As a remedy, the court, after declining to rule on most of the issues presented in the industry petitions for review, vacated the "challenged regulations," stating that: "[W]e have chosen not to reach the bulk of industry petitioners' claims, and leaving the regulations in place during remand would ignore petitioners' potentially meritorious challenges." Id.

at 872. Examples of the specific challenges the Court indicated might have merit were provisions relating to compliance during start up/shut down and malfunction events, including emergency safety vent openings, the dioxin/furan standard for lightweight aggregate kilns, and the semivolatiles metal standard for cement kilns. *Id.* However, the Court stated, “[b]ecause this decision leaves EPA without standards regulating [hazardous waste combustor] emissions, EPA (or any of the parties to this proceeding) may file a motion to delay issuance of the mandate to request either that the current standards remain in place or that EPA be allowed reasonable time to develop interim standards.” *Id.*

Acting on this invitation, all parties moved the Court jointly to stay the issuance of its mandate for four months to allow EPA time to develop interim standards, which would replace the vacated standards temporarily, until final standards consistent with the Court’s mandate are promulgated. The interim standards were published on February 13, 2002 (67 FR 6792). EPA did not justify or characterize these standards as conforming to MACT, but rather as an interim measure to prevent adverse consequences that would result from the regulatory gap resulting from no standards being in place. *Id.* at 6793, 6795–96; see also 69 FR at 21217 (April 20, 2004). EPA also entered into a settlement agreement, enforceable by the Court of Appeals, to issue final standard conforming to the Court’s mandate by June 14, 2005. That date has since been extended to September 14, 2005.

B. Phase II Source Categories

Phase II combustors—boilers and hydrochloric acid production furnaces—are also regulated under the Resource Conservation and Recovery Act (RCRA) pursuant to 40 CFR Part 266, Subpart H, and (for reasons discussed below) are also subject to the MACT standard setting process in section 112(d) of the CAA. We delayed promulgating MACT standards for these source categories pending reevaluation of the MACT standard-setting methodology following the Court’s decision to vacate the standards for the Phase I source categories. We also have entered into a judicially enforceable consent decree with Sierra Club that requires EPA to promulgate MACT standards for the Phase II sources by June 14, 2005, since extended to September 14, 2005—the same date that (for independent reasons) is required for the replacement standards for Phase I sources.

III. How Was the Final Rule Developed?

We proposed standards for HWCs on April 20, 2004 (69 FR 21197). The public comment period closed on July 6, 2004. In addition, on February 4, 2005, we requested certain key commenters to comment by email on a limited number of issues arising from public comments on the proposed rule. The comment period for those issues closed on March 7, 2005.

We received approximately 100 public comment letters on the proposed rule and the subsequent direct request for comments. Comments were submitted by owner/operators of HWCs, trade associations, state regulatory agencies and their representatives, and environmental groups. Today’s final rule reflects our consideration of all of the comments and additional information we received. Major public comments on the proposed rule along with our responses, are summarized in this preamble.

IV. What Is the Relationship Between the Final Rule and Other MACT Combustion Rules?

The amendments to the Subpart EEE, Part 63, standards for hazardous waste combustors apply to the source categories that are currently subject to that subpart—incinerators, cement kilns, and lightweight aggregate kilns that burn hazardous waste. Today’s final rule, however, also amends Subpart EEE to establish MACT standards for the Phase II source categories—those boilers and hydrochloric acid production furnaces that burn hazardous waste.

Generally speaking, you are an affected source pursuant to Subpart EEE if you combust, or have previously combusted, hazardous waste in an incinerator, cement kiln, lightweight aggregate kiln, boiler, or hydrochloric acid production furnace. You continue to be an affected source until you cease burning hazardous waste and initiate closure requirements pursuant to RCRA. Affected sources do not include: (1) Sources exempt from regulation under 40 CFR part 266, subpart H, because the only hazardous waste they burn is listed under 40 CFR 266.100(c); (2) research, development, and demonstration sources exempt under § 63.1200(b); and (3) boilers exempt from regulation under 40 CFR part 266, subpart H, because they meet the definition of small quantity burner under 40 CFR 266.108. See § 63.1200(b).

If you never previously combusted hazardous waste, or have ceased burning hazardous waste and initiated RCRA closure requirements, you are not subject to Subpart EEE. Rather, EPA has

promulgated separate MACT standards for sources that do not burn hazardous waste within the following source categories: commercial and industrial solid waste incinerators (40 CFR Part 60, Subparts CCCC and DDDD); Portland cement manufacturing facilities (40 CFR Part 63, Subpart LLL); industrial/commercial/institutional boilers and process heaters (40 CFR Part 63, Subpart DDDDD); and hydrochloric acid production facilities (40 CFR Part 63, Subpart NNNNN). In addition, EPA considered whether to establish MACT standards for lightweight aggregate manufacturing facilities that do not burn hazardous waste, and determined that they are not major sources of HAP emissions. Thus, EPA has not established MACT standards for lightweight aggregate manufacturing facilities that do not burn hazardous waste.

Note that non-stack emissions points are not regulated under Subpart EEE.² Emissions attributable to storage and handling of hazardous waste prior to combustion (i.e., emissions from tanks, containers, equipment, and process vents) would continue to be regulated pursuant to either RCRA Subpart AA, BB, and CC and/or an applicable MACT that applies to the before-mentioned material handling devices. Emissions unrelated to the hazardous waste operations may be regulated pursuant to other MACT rulemakings. For example, Portland cement manufacturing facilities that combust hazardous waste are subject to both Subpart EEE and Subpart LLL, and hydrochloric acid production facilities that combust hazardous waste may be subject to both Subpart EEE and Subpart NNNNN.³ In these instances Subpart EEE controls HAP emissions from the cement kiln and hydrochloric acid production furnace stack, while Subparts LLL and NNNNN would control HAP emissions from other operations that are not directly related to the combustion of hazardous waste (e.g., clinker cooler emissions for cement production facilities, and hydrochloric acid product transportation and storage for hydrochloric acid production facilities).

Note that if you temporarily cease burning hazardous waste for any reason, you remain an affected source and are still subject to the applicable Subpart

² Note, however, that fugitive emissions attributable to the combustion of hazardous waste from the combustion device are regulated pursuant to Subpart EEE.

³ Hydrochloric acid production furnaces that combust hazardous waste are also affected sources subject to Subpart NNNNN if they produce a liquid acid product that contains greater than 30% hydrochloric acid.

EEE requirements. However, even as an affected source, the emission standards or operating limits do not apply if: (1) Hazardous waste is not in the combustion chamber and you elect to comply with other MACT (or CAA section 129) standards that otherwise would be applicable if you were not burning hazardous waste, e.g., the nonhazardous waste burning Portland Cement Kiln MACT (Subpart LLL); or (2) you are in a startup, shutdown, or malfunction mode of operation.

V. What Are the Health Effects Associated With Pollutants Emitted by Hazardous Waste Combustors?

Today's final rule protects air quality and promotes the public health by reducing the emissions of some of the HAP listed in Section 112(b)(1) of the CAA. Emissions data collected in the development of this final rule show that metals, hydrogen chloride and chlorine gas, dioxins and furans, and other organic compounds are emitted from hazardous waste combustors. The HAP that would be controlled with this rule are associated with a variety of adverse health effects. These adverse health effects include chronic health disorders (e.g., irritation of the lung, skin, and mucous membranes and effects on the blood, digestive tract, kidneys, and central nervous system), and acute health disorders (e.g., lung irritation and congestion, alimentary effects such as nausea and vomiting, and effects on the central nervous system). Provided below are brief descriptions of risks associated with HAP that are emitted from hazardous waste combustors.

Antimony

Antimony occurs at very low levels in the environment, both in the soils and foods. Higher concentrations, however, are found at antimony processing sites, and in their hazardous wastes. The most common industrial use of antimony is as a fire retardant in the form of antimony trioxide. Chronic occupational exposure to antimony (generally antimony trioxide) is most commonly associated with "antimony pneumoconiosis," a condition involving fibrosis and scarring of the lung tissues. Studies have shown that antimony accumulates in the lung and is retained for long periods of time. Effects are not limited to the lungs, however, and myocardial effects (effects on the heart muscle) and related effects (e.g., increased blood pressure, altered EKG readings) are among the best-characterized human health effects associated with antimony exposure. Reproductive effects (increased incidence of spontaneous abortions and

higher rates of premature deliveries) have been observed in female workers exposed in an antimony processing facilities. Similar effects on the heart, lungs, and reproductive system have been observed in laboratory animals.

EPA assessed the carcinogenicity of antimony and found the evidence for carcinogenicity to be weak, with conflicting evidence from inhalation studies with laboratory animals, equivocal data from the occupational studies, negative results from studies of oral exposures in laboratory animals, and little evidence of mutagenicity or genotoxicity.⁴ As a consequence, EPA concluded that insufficient data are available to adequately characterize the carcinogenicity of antimony and, accordingly, the carcinogenicity of antimony cannot be determined based on available information. However, the International Agency for Research on Cancer in an earlier evaluation, concluded that antimony trioxide is "possibly carcinogenic to humans" (Group 2B).

Arsenic

Chronic (long-term) inhalation exposure to inorganic arsenic in humans is associated with irritation of the skin and mucous membranes. Human data suggest a relationship between inhalation exposure of women working at or living near metal smelters and an increased risk of reproductive effects, such as spontaneous abortions. Inorganic arsenic exposure in humans by the inhalation route has been shown to be strongly associated with lung cancer, while ingestion or inorganic arsenic in humans has been linked to a form of skin cancer and also to bladder, liver, and lung cancer. EPA has classified inorganic arsenic as a Group A, human carcinogen.

Beryllium

Chronic inhalation exposure of humans to high levels of beryllium has been reported to cause chronic beryllium disease (berylliosis), in which granulomatous (noncancerous) lesions develop in the lung. Inhalation exposure to high levels of beryllium has been demonstrated to cause lung cancer in rats and monkeys. Human studies are limited, but suggest a causal relationship between beryllium exposure and an increased risk of lung cancer. We have classified beryllium as a Group B1, probable human carcinogen, when inhaled; data are

inadequate to determine whether beryllium is carcinogenic when ingested.

Cadmium

Chronic inhalation or oral exposure to cadmium leads to a build-up of cadmium in the kidneys that can cause kidney disease. Cadmium has been shown to be a developmental toxicant in animals, resulting in fetal malformations and other effects, but no conclusive evidence exists in humans. An association between cadmium exposure and an increased risk of lung cancer has been reported from human studies, but these studies are inconclusive due to confounding factors. Animal studies have demonstrated an increase in lung cancer from long-term inhalation exposure to cadmium. EPA has classified cadmium as a Group B1, probable carcinogen.

Chlorine gas

Chlorine is an irritant to the eyes, the upper respiratory tract, and lungs. Chronic exposure to chlorine gas in workers has resulted in respiratory effects including eye and throat irritation and airflow obstruction. No information is available on the carcinogenic effects of chlorine in humans from inhalation exposure. A National Toxicology Program (NTP) study showed no evidence of carcinogenic activity in male rats or male and female mice, and equivocal evidence in female rats, from ingestion of chlorinated water. The EPA has not classified chlorine for potential carcinogenicity. In the absence of specific scientific evidence to the contrary, it is the Agency's policy to classify noncarcinogenic effects as threshold effects. RfC development is the default approach for threshold (or nonlinear) effects.

Chromium

Chromium may be emitted in two forms, trivalent chromium (chromium III) or hexavalent chromium (chromium VI). The respiratory tract is the major target organ for chromium VI toxicity for inhalation exposures. Bronchitis, decreases pulmonary function, pneumonia, and other respiratory effects have been noted from chronic high dose exposure in occupational settings due to chromium VI. Limited human studies suggest that chromium VI inhalation exposure may be associated with complications during pregnancy and childbirth, while animal studies have not reported reproductive effects from inhalation exposure to chromium VI. Human and animal studies have clearly established that inhaled chromium VI is

⁴ See "Evaluating The Carcinogenicity of Antimony," Risk Assessment Issue Paper (98-030/07-26-99), Superfund Technical Support Center, National Center for Environmental Assessment, July 26, 1999.

a carcinogen, resulting in an increased risk of lung cancer. EPA has classified chromium VI as a Group A, human carcinogen.

Chromium III is less toxic than chromium VI. The respiratory tract is also the major target organ for chromium III toxicity, similar to chromium VI. Chromium III is an essential element in humans, with a daily intake of 50 to 200 micrograms per day recommended for an adult. The body can detoxify some amount of chromium VI to chromium III. EPA has not classified chromium III with respect to carcinogenicity.

Cobalt

Cobalt is a relatively rare metal that is produced primarily as a by-product during refining of other metals, especially copper. Cobalt has been widely reported to cause respiratory effects in humans exposed by inhalation, including respiratory irritation, wheezing, asthma, and pneumonia. Cardiomyopathy (damage to the heart muscle) has also been reported, although this effect is better known from oral exposure. Other effects of oral exposure in humans are polycythemia (an abnormally high number of red blood cells) and the blocking of uptake of iodine by the thyroid. In addition, cobalt is a sensitizer in humans by any route of exposure. Sensitized individuals may react to inhalation of cobalt by developing asthma or to ingestion or dermal contact with cobalt by developing dermatitis. Cobalt is a vital component of vitamin B₁₂, though there is no evidence that intake of cobalt is ever limiting in the human diet.

A number of epidemiological studies have found that exposures to cobalt are associated with an increased incidence of lung cancer in occupational settings. The International Agency for Research on Cancer (part of the World Health Organization) classifies cobalt and cobalt compounds as "possibly carcinogenic to humans" (Group 2B). The American Conference of Governmental Industrial Hygienists has classified cobalt as a confirmed animal carcinogen with unknown relevance to humans (category A3). An EPA assessment concludes that under EPA's cancer guidelines, cobalt would be considered likely to be carcinogenic to humans.⁵

⁵ See "Derivation of a Provisional Carcinogenicity Assessment for Cobalt and Compounds," Risk Assessment Issue Paper (00-122/1-15-02), Superfund Technical Support Center, National Center for Environmental Assessment, January 15, 2002. This is a provisional EPA assessment that has

Dioxins and Furans

Exposures to 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and related compounds at levels 10 times or less above those modeled to approximate average background exposure have resulted in adverse non-cancer health effects in animals. This statement is based on assumptions about the toxic equivalent for these compounds, for which there is acknowledged uncertainty. These effects include changes in hormone systems, alterations in fetal development, reduced reproductive capacity, and immunosuppression. Effects that may be linked to dioxin and furan exposures at low dose in humans include changes in markers of early development and hormone levels. Dioxin and furan exposures are associated with altered liver function and lipid metabolism changes in activity of various liver enzymes, depression of the immune system, and endocrine and nervous system effects. EPA in its 1985 dioxin assessment classified 2,3,7,8-TCDD as a probable human carcinogen. The International Agency for Research on Cancer (IARC) concluded in 1997 that the overall weight of the evidence was sufficient to characterize 2,3,7,8-TCDD as a known human carcinogen.⁶ In 2001 the U.S. Department of Health and Human Services National Toxicology Program in their 9th Report on Carcinogens classified 2,3,7,8-TCDD as a known human carcinogen.⁷

The chemical and environmental stability of dioxins and their tendency to accumulate in fat have resulted in their detection within many ecosystems. In the United States and elsewhere, accidental contamination of the environment by 2,3,7,8-TCDD has resulted in deaths in many species of wildlife and domestic animals.⁸ High residues of this compound in fish have resulted in closing rivers to fishing. Laboratory studies with birds, mammals, aquatic organisms, and other species have demonstrated that exposure to 2,3,7,8-TCDD can result in acute and delayed mortality as well as carcinogenic, teratogenic, mutagenic, histopathologic, immunotoxic, and

been externally peer reviewed but has not yet been incorporated in IRIS.

⁶ IARC (International Agency for Research on Cancer). (1997) IARC monographs on the evaluation of carcinogenic risks to humans. Vol. 69. Polychlorinated dibenzo-para-dioxins and polychlorinated dibenzofurans. Lyon, France.

⁷ The U.S. Department of Health and Human Services, National Toxicology Program 9th Report on Carcinogens, Revised January 2001.

⁸ This does not necessarily apply in regard to laboratory testing, which tend to use 2,3,7,8 TCDD as the test compound.

reproductive effects, depending on dose received, which varied widely in the experiments.⁹

Hydrogen chloride/hydrochloric acid

Hydrogen chloride, also called hydrochloric acid, is corrosive to the eyes, skin, and mucous membranes. Chronic (long-term) occupational exposure to hydrochloric acid has been reported to cause gastritis, bronchitis, and dermatitis in workers. Prolonged exposure to low concentrations may also cause dental discoloration and erosion. No information is available on the reproductive or developmental effects of hydrochloric acid in humans. In rats exposed to hydrochloric acid by inhalation, altered estrus cycles have been reported in females and increased fetal mortality and decreased fetal weight have been reported in offspring. EPA has not classified hydrochloric acid for carcinogenicity. In the absence of specific scientific evidence to the contrary, it is the Agency's policy to classify noncarcinogenic effects as threshold effects. RfC development is the default approach for threshold (or nonlinear) effects.

Lead

Lead can cause a variety of effects at low dose levels. Chronic exposure to high levels of lead in humans results in effects on the blood, central nervous system, blood pressure, and kidneys. Children are particularly sensitive to the chronic effects of lead, with slowed cognitive development, reduced growth and other effects reported. Reproductive effects, such as decreased sperm count in men and spontaneous abortions in women, have been associated with lead exposure. The developing fetus is at particular risk from maternal lead exposure, with low birth weight and slowed postnatal neurobehavioral development noted. Human studies are inconclusive regarding lead exposure and cancer, while animal studies have reported an increase in kidney cancer from lead exposure by the oral route. EPA has classified lead as a Group B2, probable human carcinogen.

Manganese

Health effects in humans have been associated with both deficiencies and excess intakes of manganese. Chronic exposure to low levels of manganese in the diet is considered to be nutritionally essential in humans, with a recommended daily allowance of 2 to 5 milligrams per day (mg/d). Chronic

⁹ Eisler, R. 1986. Dioxin hazards to fish, wildlife, and invertebrates: a synoptic review. U.S. Fish and Wildlife Service Biological Report. 85(1.8).

exposure to high levels of manganese by inhalation in humans results primarily in central nervous system effects. Visual reaction time, hand steadiness, and eye-hand coordination were affected in chronically-exposed workers. Impotence and loss of libido have been noted in male workers afflicted with manganese attributed to inhalation exposures. EPA has classified manganese in Group D, not classifiable as to carcinogenicity in humans.

Mercury

Mercury exists in three forms: elemental mercury, inorganic mercury compounds (primarily mercuric chloride), and organic mercury compounds (primarily methyl mercury). Each form exhibits different health effects. Various sources may release elemental or inorganic mercury; environmental methyl mercury is typically formed by biological processes after mercury has precipitated from the air.

Chronic exposure to elemental mercury in humans also affects the central nervous system, with effects such as increased excitability, irritability, excessive shyness, and tremors. The EPA has not classified elemental mercury with respect to cancer.

The major effect from chronic exposure to inorganic mercury is kidney damage. Reproductive and developmental animal studies have reported effects such as alterations in testicular tissue, increased embryo resorption rates, and abnormalities of development. Mercuric chloride (an inorganic mercury compound) exposure has been shown to result in forestomach, thyroid, and renal tumors in experimental animals. EPA has classified mercuric chloride as a Group C, possible human carcinogen.

Nickel

Nickel is an essential element in some animal species, and it has been suggested it may be essential for human nutrition. Nickel dermatitis, consisting of itching of the fingers, hand and forearms, is the most common effect in humans from chronic exposure to nickel. Respiratory effects have also been reported in humans from inhalation exposure to nickel. No information is available regarding the reproductive or developmental effects of nickel in humans, but animal studies have reported such effects, although a consistent dose-response relationship has not been seen. Nickel forms released from industrial boilers include soluble nickel compounds, nickel subsulfide, and nickel carbonyl. Human and animal

studies have reported an increased risk of lung and nasal cancers from exposure to nickel refinery dusts and nickel subsulfide. Animal studies of soluble nickel compounds i.e., nickel carbonyl have reported lung tumors. The EPA has classified nickel refinery subsulfide as a Group A, human carcinogen and nickel carbonyl as a Group B2, probable human carcinogen.

Organic HAP

Organic HAPs include halogenated and nonhalogenated organic classes of compounds such as polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). Both PAHs and PCBs are classified as potential human carcinogens, and are considered toxic, persistent and bioaccumulative. Organic HAP also include compounds such as benzene, methane, propane, chlorinated alkanes and alkenes, phenols and chlorinated aromatics. Adverse health effects of HAPs include damage to the immune system, as well as neurological, reproductive, developmental, respiratory and other health problems.

Particulate Matter

Atmospheric particulate matter (PM) is composed of sulfate, nitrate, ammonium, and other ions, elemental carbon, particle-bound water, a wide variety of organic compounds, and a large number of elements contained in various compounds, some of which originate from crustal materials and others from combustion sources. Combustion sources are the primary origin of trace metals found in fine particles in the atmosphere. Ambient PM can be of primary or secondary origin.

Exposure to particles can lead to a variety of serious health effects. The largest particles do not get very far into the lungs, so they tend to cause fewer harmful health effects. Fine particles pose the greatest problems because they can get deep into the lungs. Scientific studies show links between these small particles and numerous adverse health effects. Epidemiological studies have shown a significant correlation between elevated PM levels and premature mortality. Other important effects associated with PM exposure include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days), lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems. Individuals particularly sensitive to PM exposure

include older adults and people with heart and lung disease.

This is only a partial summary of adverse health and environmental effects associated with exposure to PM. Further information is found in the 2004 Criteria Document for PM ("Air Quality Criteria for Particulate Matter," EPA/600/P-99/002bF) and the 2005 Staff Paper for PM (EPA, "Review of the National Ambient Air Quality Standards for Particulate Matter, Policy Assessment of Scientific and Technical Information: OAQPS Staff Paper," (June 2005)).

Selenium

Selenium is a naturally occurring substance that is toxic at high concentrations but is also a nutritionally essential element. Studies of humans chronically exposed to high levels of selenium in food and water have reported discoloration of the skin, pathological deformation and loss of nails, loss of hair, excessive tooth decay and discoloration, lack of mental alertness, and listlessness. The consumption of high levels of selenium by pigs, sheep, and cattle has been shown to interfere with normal fetal development and to produce birth defects. Results of human and animal studies suggest that supplementation with some forms of selenium may result in a reduced incidence of several tumor types. One selenium compound, selenium sulfide, is carcinogenic in animals exposed orally. We have classified elemental selenium as a Group D, not classifiable as to human carcinogenicity, and selenium sulfide as a Group B2, probable human carcinogen.

Part Two: Summary of the Final Rule

I. What Source Categories and Subcategories Are Affected by the Final Rule?

Today's rule promulgates standards for controlling emissions of HAP from hazardous waste combustors: incinerators, cement kilns, lightweight aggregate kilns, boilers, and hydrochloric acid production furnaces that burn hazardous waste. A description of each source category can be found in the proposed rule (see 69 FR at 21207-08).

Hazardous waste burning incinerators, cement kilns, and lightweight aggregate kilns are currently subject to 40 CFR part 63, subpart EEE, National Emission Standards for Hazardous Air Pollutants (NESHAP). Today's rule revises the emissions limits and certain compliance and monitoring provisions of subpart EEE for these

source categories. The definitions of hazardous waste incinerator, hazardous waste cement kiln, and hazardous waste lightweight aggregate kiln appear at 40 CFR 63.1201(a).

Boilers that burn hazardous waste are also affected sources under today's rule. The rule uses the RCRA definition of a boiler under 40 CFR 260.10 and includes industrial, commercial, and institutional boilers as well as thermal units known as process heaters. Hazardous waste burning boilers will continue to comply with the emission standards found under 40 CFR part 266, subpart H (i.e., the existing RCRA rules) until they demonstrate compliance with the requirements of 40 CFR part 63, subpart EEE, and, for permitted sources, subsequently remove these requirements from their RCRA permit.

Finally, hydrochloric acid production furnaces that burn hazardous waste are affected sources under today's rule. These furnaces are a type of halogen acid furnace included in the definition of "industrial furnace" defined at § 260.10. Hydrochloric acid production furnaces that burn hazardous waste will continue to comply with the emission standards found under 40 CFR part 266, subpart H, until they demonstrate compliance with 40 CFR part 63, subpart EEE, and, for permitted sources, subsequently remove these requirements from their RCRA permit.

II. What Are the Affected Sources and Emission Points?

Today's rule apply to each major and area source incinerator, cement kiln, lightweight aggregate kiln, boiler, and hydrochloric acid production furnace that burns hazardous waste.¹⁰ We note that only major source boilers and hydrochloric acid production furnaces are subject to the full suite of subpart EEE emission standards.¹¹ The emissions limits apply to each emission point (e.g., stack) where gases from the combustion of hazardous waste are discharged or otherwise emitted into the atmosphere. For facilities that have multiple combustion gas discharge points, the emission limits generally apply to each emission point. A cement kiln, for example, could be configured to have dual stacks where the majority of combustion gases are discharged though the main stack and other combustion gases emitted through a

separate stack, such as an alkali bypass stack. In that case, the emission standards would apply separately to each of these stacks.¹²

III. What Pollutants Are Emitted and Controlled?

Hazardous waste combustors emit dioxin/furans, sometimes at high levels depending on the design and operation of the emission control equipment, and, for incinerators, depending on whether a waste heat recovery boiler is used. All hazardous waste combustors can also emit high levels of other organic HAP if they are not designed, operated, and maintained to operate under good combustion conditions.

Hazardous waste combustors can also emit high levels of metal HAP, depending on the level of metals in the waste feed and the design and operation of air emissions control equipment. Hazardous waste burning hydrochloric acid production furnaces, however, generally feed and emit low levels of metal HAP.

All of these HAP metals (except for the volatile metal mercury) are emitted as a portion of the particulate matter emitted by these sources. Hazardous waste combustors can also emit high levels of particulate matter, except that hydrochloric acid production furnaces generally feed hazardous wastes with low ash content and consequently emit low levels of particulate matter. A majority of particulate matter emissions from hazardous waste combustors are in the form of fine particulate. Particulate emissions from incinerators and liquid fuel-fired boilers depend on the ash content of the hazardous waste feed and the design and operation of air emission control equipment. Particulate emissions from cement kilns and lightweight aggregate kilns are not significantly affected by the ash content of the hazardous waste fuel because uncontrolled particulate emissions are attributable primarily to fine raw material entrained in the combustion gas. Thus, particulate emissions from kilns depends on operating conditions that effect entrainment of raw material, and the design and operation of the emission control equipment.

IV. Does the Final Rule Apply to Me?

The final rule applies to you if you own or operate a hazardous waste combustor—an incinerator, cement kiln, lightweight aggregate kiln, boiler, or hydrochloric acid production facility

that burns hazardous waste. The final rule does not apply to a source that meets the applicability requirements of § 63.1200(b) for reasons explained at 69 FR at 21212–13.

V. What Are the Emission Limitations?

You must meet the emission limits in Tables 1 and 2 of this preamble for your applicable source category and subcategory. Standards are corrected to 7 percent oxygen. As noted at proposal, we previously promulgated requirements for carbon monoxide, total hydrocarbon, and destruction and removal efficiency standards under subpart EEE for incinerators, cement kilns, and lightweight aggregate kilns. We view these standards as unaffected by the Court's vacature of the challenged regulations in its decision of July 24, 2001. We are therefore not repromulgating and reopening consideration of these standards in today's final rule, but are summarizing these standards in Tables 1 and 2 for reader's convenience.¹³ See 69 FR at 21221, 21248, 21261 and 21274.

Liquid fuel boilers equipped with dry air pollution control devices are subject to different dioxin/furan emission standards than liquid fuel boilers that are not equipped with dry air pollution control devices.¹⁴ Liquid fuel boilers processing hazardous waste with a heating value less than 10,000 BTU/lb must comply with the emission concentration-based standards (expressed as mass of total HAP emissions per volume of stack gas emitted) for mercury, semivolatile metals, low volatile metals, and total chlorine. Liquid fuel boilers processing hazardous waste with heating values greater than 10,000 BTU/lb must comply with thermal emissions-based standards (expressed as mass of HAP emissions attributable to the hazardous waste per million BTU input from the hazardous waste) for those same pollutants. Low volatile metal standards for liquid fuel boilers apply only to emissions of chromium, whereas the low volatile metal standard for the other source categories applies to the combined emissions of chromium, arsenic, and beryllium. Semivolatile metal standards apply to the combined emissions of lead and cadmium.

For any of the source categories except hydrochloric acid production

¹⁰ A major source emits or has the potential to emit 10 tons per year of any single hazardous air pollutant or 25 tons per year or greater of hazardous air pollutants in the aggregate. An area source is a source that is not a major source.

¹¹ See Part Four, Section II.A for a discussion of the standards that are applicable to area source boilers and hydrochloric acid production furnaces.

¹² We note that there is a provision that allows cement kilns with dual stacks to average emissions on a flow-weighted basis to demonstrate compliance with the metal and chlorine emission standards. See §§ 63.1204(e) and 63.1220(3).

¹³ We are also republishing these standards, for reader's convenience only, in the new replacement standard section for these source categories. See § 63.1219, § 63.1220 and § 673.1219.

¹⁴ Liquid fuel boilers equipped with a wet air pollution control device followed by a dry air pollution control device do not meet the definition of a dry air pollution device.

furnaces, you may elect to comply with an alternative to the total chlorine standard under which you would establish site-specific, health-based emission limits for hydrogen chloride and chlorine based on national exposure standards. This alternative chlorine standard is discussed in part two, section IX and part four, section VII.

Incinerators and liquid and solid fuel boilers may elect to comply with an alternative to the particulate matter standard that would limit emissions of all the semivolatile metal HAPs and low volatile metal HAPs. Under this alternative, the numerical emission limits for semivolatile metal and low volatile metal emission HAP are identical to the limitations included in

Tables 1 and 2. However, for semivolatile metals, the alternative standard applies to the combined emissions of lead, cadmium, and selenium; for low volatile metals, the standard applies to the combined emissions of chromium, arsenic, beryllium, antimony, cobalt, manganese, and nickel. See § 63.1219(e).

TABLE 1.—SUMMARY OF EMISSION LIMITS FOR EXISTING SOURCES

	Incinerators	Cement kilns	Lightweight aggregate kilns	Solid fuel-fired boilers ¹	Liquid fuel-fired boilers ¹	Hydrochloric acid production furnaces ¹
Dioxin/Furans (ng TEQ/dscm).	0.20 or 0.40 and temperature control < 400°F at APCD inlet ⁶ .	0.20 or 0.40 and temperature control < 400°F at APCD inlet.	0.20 or rapid quench below 400°F at kiln exit.	CO or HC and DRE standard as a surrogate.	0.40 for dry APCD sources; CO or HC and DRE standard as surrogate for others.	CO or HC and DRE standard as surrogate.
Mercury	130 µg/dscm	Hazardous waste feed restriction of 3.0 ppmw and 120 µg/dscm MTEC ¹¹ ; or 120 µg/dscm total emissions.	120 hazardous waste MTEC ¹¹ feed restriction or 120 µg/dscm total emissions.	11 µg/dscm ...	4.2E-5lb/MMBtu ^{2, 5} or 19 µg/dscm ² ; depending on BTU content of hazardous waste ¹³ .	Total chlorine standard as surrogate.
Particulate Matter ...	0.013 gr/dscf ⁸	0.028 gr/dscf and 20% opacity ¹² .	0.025 gr/dscf	0.030 gr/dscf ⁸	0.035 gr/dscf ⁸	Total chlorine standard as surrogate.
Semivolatile Metals (lead + cadmium).	230 µg/dscm	7.6 E-4 lbs/MMBtu ⁵ and 330 µg/dscm ³ .	3.0E-4 lb/MMBtu ⁵ and 250 µg/dscm ³ .	180 µg/dscm	8.2 E-5 lb/MMBtu ^{2, 5} or 150 µg/dscm ² ; depending on BTU content of hazardous waste ¹³ .	Total chlorine standard as surrogate.
Low Volatile Metals (arsenic + beryllium + chromium).	92 µg/dscm	2.1 E-5 lbs/MMBtu ⁵ and 56 µg/dscm ³ .	9.5E-5 lb/MMBtu ⁵ and 110 µg/dscm ³ .	380 µg/dscm	1.26E-4 lb/MMBtu ^{4, 5} or 370 µg/dscm ⁴ ; depending on BTU content of hazardous waste ¹³ .	Total chlorine standard as surrogate.
Total Chlorine (hydrogen chloride + chlorine gas).	32 ppmv ⁷	120 ppmv ⁷	600 ppmv ⁷	440 ppmv ⁷	5.08E-2 lb/MMBtu ^{5, 7} or 31 ppmv ⁷ ; depending on BTU content of hazardous waste ¹³ .	150 ppmv or 99.923% system removal efficiency.
Carbon Monoxide (CO) or Hydrocarbons (HC).	100 ppmv CO ⁹ or 10 ppmv HC.	See Note # 10 below.	100 ppmv CO ⁹ or 20 ppmv HC.	(2) 100 ppmv CO ⁹ or 10 ppmv HC		
Destruction and Removal Efficiency.	99.99% for each principal organic hazardous pollutant. For sources burning hazardous wastes F020, F021, F022, F023, F026, or F027, however, 99.9999% for each principal organic hazardous pollutant.					

Notes:

¹ Particulate matter, semivolatile metal, low volatile metal, and total chlorine standards for solid and liquid fuel boilers apply only to major sources. Particulate matter, semivolatile and low volatile metal standards for hydrochloric acid production furnaces apply only to major sources, although area sources must still comply with the surrogate total chlorine standard to control mercury emissions.

² Standard is based on normal emissions data, and is therefore expressed as an annual average emission limitation.

³ Sources must comply with both the thermal emissions and emission concentration standards.

⁴ Low volatile metal standard for liquid fuel-fired boilers is for chromium only.

⁵ Standards expressed as mass of pollutant contributed by hazardous waste per million BTU contributed by the hazardous waste.

⁶ APCD means "air pollution control device".

⁷ Sources may elect to comply with site-specific risk-based emission limits for hydrogen chloride and chlorine gas

⁸ Sources may elect to comply with an alternative to the particulate matter standard.

⁹ Sources that elect to comply with the CO standard must demonstrate compliance with the HC standard during the comprehensive performance test that demonstrates compliance with the destruction and removal efficiency requirement.

¹⁰ Kilns without a bypass: 20 ppmv HC or 100 ppmv CO⁹. Kilns with a bypass/mid-kiln sampling system: 10 ppmv HC or 100 ppmv CO⁹ in the bypass duct, mid-kiln sampling system or bypass stack.

¹¹ MTEC means "maximum theoretical emission concentration", and is equivalent to the feed rate divided by gas flow rate

¹² The opacity standard does not apply to a source equipped with a bag leak detection system under 63.1206(c)(8) or a particulate matter detection system under 63.1206(c)(9).

¹³ Emission concentration-based standards apply to sources processing hazardous waste with energy content less than 10,000 BTU/lb; thermal emission standards apply to sources processing hazardous waste with energy content greater than 10,000 btu/lb.

TABLE 2.—SUMMARY OF EMISSION LIMITS FOR NEW OR RECONSTRUCTED SOURCES

	Incinerators	Cement kilns	Lightweight aggregate kilns	Solid fuel boilers ¹	Liquid fuel boilers ¹	Hydrochloric acid production furnaces ¹
Dioxin/Furans (ng TEQ/dscm).	0.11 for dry APCD and/or WHB ⁵ sources; 0.20 for other sources.	0.20 or 0.40 and temperature control <400 °F at APCD inlet.	0.20 or rapid quench <400 °F at kiln exit.	CO or HC and DRE standard as a surrogate.	0.40 for sources with dry APCD; CO or HC and DRE standard as a surrogate for other sources.	CO or THC and DRE standard as a surrogate.
Mercury	8.1 µg/dscm	Hazardous waste feed restriction of 1.9 ppmw and 120 µg/dscm MTEC ¹⁰ ; or 120 µg/dscm total emissions.	120 hazardous waste MTEC ¹⁰ feed restriction or 120 µg/dscm total emissions.	11 µg/dscm ...	1.2E–6 lb/MMBtu ^{2,4} or 6.8 µg/dscm ² ; depending on BTU content of hazardous waste ¹² .	TCl as surrogate.
Particulate matter (gr/dscf).	0.0015 ⁷	0.0023 and 20% opacity ¹¹ .	0.0098	0.015 ⁷	0.0087 ⁷	TCl as surrogate.
Semivolatile Metals (lead + cadmium).	10 µg/dscm	6.2E–5 lb/MMBtu ⁴ and 180 µg/dscm.	3.7 E–5 lb/MMBtu ⁴ and 43 µg/dscm.	180 µg/dscm	6.2 E–6 lb/MMBtu ^{2,4} or 78 µg/dscm ² ; depending on BTU content of hazardous waste ¹² .	TCl as surrogate.
Low Volatile Metals (arsenic + beryllium + chromium).	23 µg/dscm	1.5E–5 lb/MMBtu ⁴ and 54 µg/dscm.	3.3E–5 lb/MMBtu ⁴ and 110 µg/dscm.	190 µg/dscm	1.41E–5 lb/MMBtu ^{3,4} or 12 µg/dscm ³ ; depending on BTU content of hazardous waste ¹² .	TCl as surrogate.
Total Chlorine (Hydrogen chloride + chlorine gas).	21 ppmv ⁶	86 ppmv ⁶	600 ppmv ⁶	73 ppmv ⁶	5.08E–2 lb/MMBtu ^{4,6} or 31 ppmv ⁶ ; depending on BTU content of hazardous waste ¹² .	25 ppmv or 99.987% SRE.
Carbon monoxide (CO) or Hydrocarbons (HC).	100 ppmv CO ⁸ or 10 ppmv HC.	See note #9 below.	100 ppmv CO ⁸ or 20 ppmv HC.		100 ppmv CO ⁸ or 10 ppmv HC	
Destruction and Removal Efficiency.	99.99% for each principal organic hazardous pollutant. For sources burning hazardous wastes F020, F021, F022, F023, F026, or F027, however, 99.9999% for each principal organic hazardous pollutant.					

Notes:

¹ Particulate matter, semivolatile metal, low volatile metal, and total chlorine standards for solid and liquid fuel boilers apply only to major sources. Particulate matter, semivolatile and low volatile metal standards for hydrochloric acid production furnaces apply only to major sources, although area sources must still comply with the surrogate total chlorine standard to control mercury emissions.

² Standard is based on normal emissions data, and is therefore expressed as an annual average emission limitation.

³ Low volatile metal standard for liquid fuel-fired boilers is for chromium only. Arsenic and beryllium are not included in the low volatile metal total for liquid fuel-fired boilers.

⁴ Standards expressed as mass of pollutant contributed by hazardous waste per million BTU contributed by the hazardous waste.

⁵ APCD means “air pollution control device”, WHB means “waste heat boiler”.

⁶ Sources may elect to comply with risk-based emission limits for hydrogen chloride and chlorine gas.

⁷ Sources may elect to comply with an alternative to the particulate matter standard.

⁸ Sources that elect to comply with the CO standard must demonstrate compliance with the THC standard during the comprehensive performance test that demonstrates compliance with the destruction and removal efficiency requirement.

⁹ Greenfield kilns without a bypass: 20 ppmv HC or 100 ppmv CO⁸ and 50 ppmv HC. Greenfield kilns with a bypass/mid kiln sampling system: Main stack standard of 50 ppmv HC and 10 ppmv HC or 100 ppmv CO⁸ in the bypass duct, mid-kiln sampling system or bypass stack. Greenfield kilns with a bypass/mid-kiln sampling system: 10 ppmv HC or 100 ppmv CO⁸ in the bypass duct, mid-kiln sampling system or bypass stack; Non-greenfield kilns without a bypass: 20 ppmv HC or 100 ppmv CO⁸. A greenfield kiln is a kiln whose construction commenced after April 19, 1996 at a plant site where a cement kiln (whether burning hazardous waste or not) did not previously exist.

¹⁰ MTEC means “maximum theoretical emission concentration”, and is equivalent to the feed rate divided by gas flow rate.

¹¹ The opacity standard does not apply to a source equipped with a bag leak detection system under 63.1206(c)(8) or a particulate matter detection system under 63.1206(c)(9).

¹² Emission concentration-based standards apply to sources processing hazardous waste with energy content less than 10,000 BTU/lb; thermal emission standards apply to sources processing hazardous waste with energy content greater than 10,000 btu/lb.

VI. What Are the Testing and Initial Compliance Requirements?

The testing and initial compliance requirements we promulgate today for solid fuel boilers, liquid fuel boilers, and hydrochloric acid production furnaces are identical to those that are applicable to incinerators, cement kilns, and lightweight aggregate kilns at §§ 63.1206, 63.1207, and 63.1208. We

note, however, that today’s final rule revises some of these requirements as they apply to all or specific HWCs (e.g., one-time dioxin/furan test for sources not subject to a numerical dioxin/furan standard; dioxin/furan stack test method; hydrogen chloride and chlorine stack test methods)

We also discuss compliance and testing dates for incinerators, cement

kilns, and lightweight aggregate kilns as well. Even though we are not repromulgating the compliance and testing requirements for those source categories, those sources must demonstrate compliance with the replacement emission standards promulgated today.

A. Compliance Dates

The time-line for testing and initial compliance requirements is as follows:

1. The compliance date is October 14, 2008;¹⁵
2. You must submit a comprehensive performance test plan to the permitting authority for review and approval 12 months prior to commencing the test.
3. You must submit an eligibility demonstration for the health-based compliance alternative to the total chlorine emission standard 12 months before the compliance date if you elect to comply with § 63.1215;
4. You must place in the operating record a Documentation of Compliance by the compliance date identifying the operating parameter limits that, using available information, you have determined will ensure compliance with the emission standards;
5. For boilers and hydrochloric acid production furnaces, you must commence the initial comprehensive performance test within 6 months after the compliance date;
6. For incinerators, cement kilns, and lightweight aggregate kilns, you must commence the initial comprehensive performance test within 12 months after the compliance date;
7. You must complete the initial comprehensive performance test within 60 days of commencing the test; and
8. You must submit a Notification of Compliance within 90 days of completing the test documenting compliance with emission standards and continuous monitoring system requirements.

B. Testing Requirements

All hazardous waste combustors must commence the initial comprehensive performance test under the time lines discussed above. The purpose of the comprehensive performance test is to document compliance with the emission standards of the final rule and establish operating parameter limits to maintain compliance with those standards. You must also conduct periodic comprehensive performance testing every five years.

If your source is subject to a numerical dioxin/furan emission standard (i.e., incinerators, cement kilns, lightweight aggregate kilns that comply with the 0.2 ng TEQ/dscm standard, and liquid fuel boilers equipped with a dry air pollution control device), you must conduct a dioxin/furan confirmatory performance test no later than 2.5 years after each comprehensive performance test (i.e.,

midway between comprehensive performance tests). If your source is not subject to a numerical dioxin/furan emission standard (e.g., solid fuel boilers, lightweight aggregate kilns that comply with the 400 °F temperature limit at the kiln exit, liquid fuel boilers equipped with wet or no air pollution control system, and hydrochloric acid production furnaces), you must conduct a one-time dioxin/furan test to enable the Agency to evaluate the effectiveness of the carbon monoxide/hydrocarbon standard and the destruction and removal efficiency standard in controlling dioxin/furan emissions for those sources. Previous dioxin/furan emission tests may be used to meet this requirement if the combustor operated under the conditions required by the rule and if design and operation of the combustor has not changed since the test in a manner that could increase dioxin/furan emissions. The Agency will use those emissions data when reevaluating the MACT standards under CAA section 112(d)(6), when determining whether to develop residual risk standards for these sources pursuant to section 112(f)(2), and when determining whether the source's RCRA Permit is protective of human health and the environment.

You must use the following stack test methods to document compliance with the emission standards: (1) Method 29 for mercury, semivolatile metals, and low volatile metals; and (2) Method 26/26A, Methods 320 or 321, or ASTM D 6735-01 for hydrogen chloride and chlorine;¹⁶ (3) either Method 0023A or Method 23 for dioxin/furans; and (4) either Method 5 or 5i for particulate matter.

C. Initial Compliance Requirements

The initial compliance requirements for solid fuel boilers, liquid fuel boilers, and hydrochloric acid production furnaces include:¹⁷

1. You must place in the operating record a Documentation of Compliance by the compliance date identifying the operating parameter limits that, using available information, you have determined will ensure compliance with the emission standards;
2. You must develop and comply with a startup, shutdown, and malfunction plan;

¹⁶Note that you may be required to use other test methods to document emissions of hydrogen chloride and chlorine if you elect to comply with the alternative, health-based emission limits for total chlorine under § 63.1215. See § 63.1208(b)(5).

¹⁷These same requirements currently apply to incinerators, cement kilns, and lightweight aggregate kilns.

3. You must install an automatic waste feed cutoff system that links the operating parameter limits to the waste feed cutoff system;

4. You must control combustion system leaks;

5. You must establish and comply with an operator training and certification program;

6. You must establish and comply with an operation and maintenance plan;

7. If your source is equipped with a baghouse, you must install either a bag leak detection system or a particulate matter detection system;¹⁸ and

8. If your source is equipped with an electrostatic precipitator or ionizing wet scrubber, you must either establish site-specific control device operating parameter limits which limits are linked to the automatic waste feed cutoff system, or install a particulate matter detection system and take corrective measures when the alarm level is exceeded.

VII. What Are the Continuous Compliance Requirements?

The continuous compliance requirements for solid fuel boilers, liquid fuel boilers, and hydrochloric acid production furnaces are identical to those applicable to incinerators, cement kilns, and lightweight aggregate kilns. See § 63.1209. We note, however, that today's final rule revises some of these requirements as they apply to all or specific HWCs (e.g., bag leak detection system requirements; optional particulate matter detection system requirements; compliance assurance for thermal emissions-based standards).

You must use carbon monoxide or hydrocarbon continuous emissions monitors (as well as an oxygen continuous emissions monitor to correct the carbon monoxide or hydrocarbon values to 7% oxygen) to ensure compliance with the carbon monoxide or hydrocarbon emission standards.

You must also establish limits (as applicable) on the feedrate of metals, chlorine, and ash, key combustor operating parameters, and key operating

¹⁸A major difference between a bag leak detection system and a particulate matter detection system is the way the alarm level is established. The alarm level for a bag leak detection system is established using concepts in the Agency's bag leak detection system guidance document while the alarm level for a particulate matter detection system is established based on the detector response during the comprehensive performance test. The ash feedrate limit for incinerators and boilers is waived if you use a particulate matter detection system but not if you use a bag leak detection system because the bag leak detection system alarm level may not provide reasonable assurance of continuous compliance with the particulate matter emission standard.

¹⁵See 69 FR at 21313 for rationale. We received no adverse comments at proposal.

parameters of the air pollution control device based on operations during the comprehensive performance test. You must continuously monitor these parameters with a continuous monitoring system.

VIII. What Are the Notification, Recordkeeping, and Reporting Requirements?

The notification, recordkeeping, and reporting requirements that we promulgate today for solid fuel boilers, liquid fuel boilers, and hydrochloric acid production furnaces are identical to those that are applicable to incinerators, cement kilns, and lightweight aggregate kilns. See §§ 63.1210 and 63.1211. We note, however, that today's final rule revises some of these requirements as they apply to all or specific HWCs.

You must submit notifications including the following to the permitting authority in addition to those required by the NESHAP General Provisions, subpart A of 40 CFR part 63:

1. Notification of changes in design, operation, or maintenance (§ 63.1206(b)(5)(i));
2. Notification of performance test and continuous monitoring system evaluation, including the performance test plan and continuous monitoring system performance evaluation plan (§ 63.1207(e));
3. Notification of compliance, including results of performance tests and continuous monitoring system evaluations (§§ 63.1210(b), 63.1207(j); 63.1207(k), and 63.1207(l)); and
4. Various notifications if you request or elect to comply with alternative requirements at § 63.1210(a)(2).

You must submit the following reports to the permitting authority in addition to those required by the NESHAP General Provisions, subpart A of 40 CFR part 63:

1. Startup, shutdown, and malfunction plan, if you elect to comply with § 63.1206(c)(2)(ii)(B));
2. Excessive exceedances report (§ 63.1206(c)(3)(vi)); and
3. Emergency safety vent opening reports (§ 63.1206(c)(4)(iv)).

Finally, you must keep records documenting compliance with the requirements of Subpart EEE. Recordkeeping requirements are prescribed in § 63.1211(b), and include requirements under the NESHAP General Provisions, subpart A of 40 CFR

IX. What Is the Health-Based Compliance Alternative for Total Chlorine, and How Do I Demonstrate Eligibility?

A. Overview

The rule allows you to establish and comply with health-based compliance alternatives for total chlorine for hazardous waste combustors other than hydrochloric acid production furnaces in lieu of the MACT technology-based emission standards established under §§ 63.1216, 63.1217, 63.1219, 63.1220, and 63.1221. See § 63.1215. To identify and comply with the limits, you must:

(1) Identify a total chlorine emission rate for each on-site hazardous waste combustor. You may select total chlorine emission rates as you choose to demonstrate eligibility for the health-based limits, except the total chlorine emission rate limits for incinerators, cement kilns, and lightweight aggregate kilns cannot result in total chlorine emission concentrations exceeding the Interim Standards provided by §§ 63.1203, 63.1204, and 63.1205;¹⁹

(2) Calculate the HCl-equivalent emission rate for the total chlorine emission rates you select, considering long-term exposure and using Reference Concentrations (RfCs) as the health threshold metric. This emission rate is called the annual average HCl-equivalent emission rate;

(3) Perform an eligibility demonstration to determine if your annual average HCl-equivalent emission rate meets the national exposure standard (i.e., Hazard Index not exceeding 1.0 considering the maximum annual average ambient concentration of hydrogen chloride and chlorine at an off-site receptor location which concentrations are attributable to all on-site hazardous waste combustors) and thus is below the annual average HCl-equivalent emission rate limit;

(4) Calculate the HCl-equivalent emission rate for the total chlorine emission rates you select, considering short-term exposure and using acute Reference Exposure Levels (aRELs) as the health threshold metric. This emission rate is called the 1-hour average HCl-equivalent emission rate.

(5) Determine whether your 1-hour HCl-equivalent emission rate may exceed the national exposure standard (i.e., Hazard Index not exceeding 1.0 considering the maximum 1-hour average ambient concentration of hydrogen chloride and chlorine at an

¹⁹Note that the final rule sunsets the Interim Standards on the compliance date of today's rule but codifies the Interim Standards for total chlorine under § 63.1215(b)(7).

off-site receptor location which concentrations are attributable to all on-site hazardous waste combustors) and thus may exceed the 1-hour average HCl-equivalent emission rate limit when complying with the annual average HCl-equivalent emission rate limit, absent an hourly rolling average limit on the feedrate of total chlorine and chloride.

(6) Submit your eligibility demonstration, including your determination of whether the 1-hour average HCl-equivalent emission rate limit may be exceeded absent an hourly rolling average limit on the feedrate of total chlorine and chloride, for review and approval;

(7) Document during the comprehensive performance test the total chlorine system removal efficiency for each combustor and use this system removal efficiency to calculate chlorine feedrate limits. Also, document that total chlorine emissions during the test do not exceed the 1-hour average HCl-equivalent emission rate limit during any run of the test. In addition, establish operating limits on the emission control device based on operations during the comprehensive performance test; and

(8) Comply with the requirements for changes in the design, operation, or maintenance of the facility which could affect the HCl-equivalent emission rate limits or system removal efficiency for total chlorine, and changes in the vicinity of your facility over which you do not have control (e.g., new receptors locating proximate to the facility).

B. HCl-Equivalent Emission Rates

You must express total chlorine emission rates (lb/hr) from each on-site hazardous waste combustor, including hydrochloric acid production furnaces²⁰, as an annual average HCl-equivalent emission rate and a 1-hour average HCl-equivalent emission rate. See § 63.1215(b). The annual average HCl-equivalent emission rate equates chlorine emission rates to hydrogen chloride (HCl) emission rates using Reference Concentrations (RfCs) as the health risk metric for long-term exposure. The 1-hour average HCl-equivalent emission rate equates chlorine emission rates to HCl emission rates using 1-hour Reference Exposure

²⁰Although hydrochloric acid production furnaces are not eligible for the health-based total chlorine emission limits (because control of total chlorine is a surrogate for control of metal HAP), you must consider total chlorine emissions from hydrochloric acid production furnaces when demonstrating that total chlorine emissions from all on-site hazardous waste combustors will not exceed the Hazard Index limit of 1.0 at an off-site receptor location.

Levels (aRELs) as the health risk metric for acute exposure.

To calculate HCl-equivalent emission rates, you must apportion total chlorine emissions (ppmv) between chlorine and HCl using the volumetric ratio of chlorine to hydrogen chloride (Cl_2/HCl).

- To calculate the annual average HCl-equivalent emission rate (lb/hr) and the emission rate limit, you must use the historical average Cl_2/HCl volumetric ratio from all regulatory compliance tests and the gas flowrate (and other relevant parameters) from the most recent RCRA compliance test or MACT performance test.

- To calculate the 1-hour average HCl-equivalent emission rate (lb/hr) and emission rate limit, you must use the highest Cl_2/HCl volumetric ratio from all regulatory compliance tests and the gas flowrate from the most recent RCRA compliance test or MACT performance test.

- If you believe that the Cl_2/HCl volumetric ratio for one or more historical compliance tests is not representative of the current ratio, you may request that the permitting authority allow you to screen those ratios from the analysis of historical ratios.

- If the permitting authority believes that too few historical Cl_2/HCl ratios are available to establish a representative average ratio and a representative maximum ratio, the permitting authority may require you to conduct periodic testing to establish representative ratios.

- You must include the Cl_2/HCl volumetric ratio demonstrated during each performance test in your data base of historical Cl_2/HCl ratios to update the ratios for subsequent calculations of the annual average and 1-hour average HCl-equivalent emission rates (and emission rate limits).

C. Eligibility Demonstration

You must perform an eligibility demonstration to determine whether the total chlorine emission rates you select for each on-site hazardous waste combustor meet the national exposure standard (i.e., the Hazard Index of 1.0 cannot be exceeded at an off-site receptor location considering maximum annual average ambient concentrations attributable to all on-site hazardous waste combustors and the RfCs for HCl and chlorine) using either a look-up table analysis or a site-specific compliance demonstration.²¹ Eligibility

²¹ The total chlorine emission rates (lb/hr) for incinerators, cement kilns, and lightweight aggregate kilns cannot result in total chlorine emission concentrations (ppmv) exceeding the Interim Standards provided by §§ 63.1203, 63.1204, and 63.1205. The final rule sunsets the Interim

for the health-based total chlorine standard is determined by comparing the annual average HCl-equivalent emission rate for the total chlorine emission rate you select for each combustor to the annual average HCl-equivalent emission rate limit.

The annual average HCl-equivalent emission rate limit is the HCl-equivalent emission rate, determined by equating the toxicity of chlorine to HCl using RfCs as the health risk metric for long-term exposure, which ensures that maximum annual average ambient concentrations of HCl equivalents do not exceed a Hazard Index of 1.0, rounded to the nearest tenths decimal place (0.1) and considering all on-site hazardous waste combustors. See § 63.1215(b)(2).

Your facility is eligible for the health-based compliance alternatives for total chlorine if either: (1) The annual average HCl-equivalent emission rate for each on-site hazardous waste combustor is below the HCl-equivalent emission rate limit determined from the appropriate value for the emission rate limit in the applicable look-up table and the proration procedure for multiple combustors discussed below; or (2) the annual average HCl-equivalent emission rate for each on-site hazardous waste combustor is below the annual average HCl-equivalent emission rate limit you calculate based on a site-specific compliance demonstration.

1. Look-Up Table Analysis

Look-up tables for the eligibility demonstration are provided as Tables 1 and 2 to § 63.1215. Table 1 presents annual average HCl-equivalent emission rate limits for sources located in flat terrain. For purposes of this analysis, flat terrain is terrain that rises to a level not exceeding one half the stack height within a distance of 50 stack heights.

Table 2 presents annual average HCl-equivalent emission rate limits for sources located in simple elevated terrain. For purposes of this analysis, simple elevated terrain is terrain that rises to a level exceeding one half the stack height, but that does not exceed the stack height within a distance of 50 stack heights.

If your facility is not located in either flat or simple elevated terrain, you must conduct a site-specific compliance demonstration.

To determine the annual average HCl-equivalent emission rate limit for a source from the look-up table, you must use the stack height and stack diameter

Standards on the compliance date of today's rule but codifies the Interim Standards for total chlorine under § 63.1215(b)(7).

for your hazardous waste combustors and the distance between the stack and the property boundary. If any of these values for stack height, stack diameter, and distance to nearest property boundary do not match the exact values in the look-up table, you must use the next lowest table value. If you have more than one hazardous waste combustor on site, you must adjust the emission rate limits provided by the tables such that the sum of the ratios for all combustors of the adjusted emission rate limit to the emission rate limit provided by the table cannot exceed 1.0. See § 63.1215 (c)(3)(v).

2. Site-Specific Compliance Demonstration

You may use any scientifically-accepted peer-reviewed risk assessment methodology for your site-specific compliance demonstration to calculate an annual average HCl-equivalent emission rate limit for each on-site hazardous waste combustor. An example of one approach for performing the demonstration for air toxics can be found in the EPA's "Air Toxics Risk Assessment Reference Library, Volume 2, Site-Specific Risk Assessment Technical Resource Document," which may be obtained through the EPA's Air Toxics Web site at <http://www.epa.gov/ttn/atw>.

To determine the annual average HCl-equivalent emission rate limit for each on-site hazardous waste combustor, your site-specific compliance demonstration must, at a minimum: (1) estimate long-term inhalation exposures through the estimation of annual or multi-year average ambient concentrations; (2) estimate the inhalation exposure for the actual individual most exposed to the facility's emissions from hazardous waste combustors, considering locations where people reside and where people congregate for work, school, or recreation; (3) use site-specific, quality-assured data wherever possible; (4) use health-protective default assumptions wherever site-specific data are not available, and; (5) contain adequate documentation of the data and methods used for the assessment so that it is transparent and can be reproduced by an experienced risk assessor and emissions measurement expert.

To establish the annual average HCl-equivalent emission rate limit for each combustor, you may apportion as you elect among the combustors the annual average HCl-equivalent emission rate limit for the facility, which limit ensures that the RfC-based Hazard Index of 1.0 is not exceeded.

D. Assurance That the 1-Hour HCl-Equivalent Emission Rate Will Not Be Exceeded

The long-term, RfC-based Hazard Index will always be higher than the short-term, aREL-based Hazard Index for a constant HCl-equivalent emission rate because the health threshold levels for short-term exposure are orders of magnitude higher than the health threshold levels for long-term exposure.²² Even though maximum 1-hour average ambient concentrations are substantially higher than maximum annual average concentrations, the higher short-term ambient concentrations do not offset the much higher health threshold levels for short-term exposures. Thus, the long-term, RfC-based Hazard Index will always govern regarding whether a source can make an eligibility demonstration. Accordingly, eligibility for the health-based emission limits is based solely on whether a source can comply with the annual average HCl-equivalent emission rate limit.

Nonetheless, some sources may have highly variably chlorine feedrates (and corresponding highly variable HCl-equivalent emission rates) such that they may feed chlorine at very high levels for short periods of time and still remain in compliance with the chlorine feedrate limit established to ensure compliance with the annual average HCl-equivalent emission rate limit.²³ To ensure that the 1-hour HCl-equivalent emission rate limit will not be exceeded during these periods of peak emissions, you must establish a 1-hour average HCl-equivalent emission rate and 1-hour average HCl-equivalent emission rate limit for each combustor and consider site-specific factors including prescribed criteria to determine if the 1-hour average HCl-equivalent emission rate limit may be exceeded absent an hourly rolling average limit on chlorine feedrate. If the 1-hour average HCl-equivalent emission rate limit may be exceeded, you must establish an hourly rolling average feedrate limit on chlorine.

You must calculate the 1-hour average HCl-equivalent emission rate from the total chlorine emission rate you select for each source.

You must establish the 1-hour average HCl-equivalent emission rate limit for each affected source using either a look-up table analysis or site-specific analysis. Look-up tables are provided

for 1-hour average HCl-equivalent emission rate limits as Table 3 and Table 4 to this section. Table 3 provides limits for facilities located in flat terrain. Table 4 provides limits for facilities located in simple elevated terrain. You must use the Tables to establish emission rate limits in the same manner as you use Tables 1 and 2 to establish annual average HCl-equivalent emission rate limits.

If you conduct a site-specific analysis to establish a 1-hour average HCl-equivalent emission rate limit, you must follow the risk assessment procedures you used to establish an annual average HCl-equivalent emission rate limit. The 1-hour HCl-equivalent emission rate limit, however, is the emission rate than ensures that the Hazard Index associated with maximum 1-hour average exposures is not greater than 1.0.

You must consider criteria including the following to determine if a source may exceed the 1-hour HCl-equivalent emission rate limit absent an hourly rolling average chlorine feedrate limit: (1) The ratio of the 1-hour average HCl-equivalent emission rate based on the total chlorine emission rate you select for each hazardous waste combustor to the 1-hour average HCl-equivalent emission rate limit for the combustor; and (2) the potential for the source to vary total chlorine and chloride feedrates substantially over the averaging period for the feedrate limit you establish to ensure compliance with the annual average HCl-equivalent emission rate limit.

If you determine that a source may exceed the 1-hour average HCl-equivalent emission rate limit, you must establish an hourly rolling average chlorine feedrate limit as discussed below in Section G.

You must include the following information in your eligibility demonstration to document your determination whether an hourly rolling average feedrate limit is needed to maintain compliance with the 1-hour HCl-equivalent emission rate limit: (1) Determination of the Cl₂/HCl volumetric ratio established for 1-hour average HCl-equivalent emission rate determinations as provided by § 63.1215(b)(6)(ii); (2) determination of the 1-hour average HCl-equivalent emission rate calculated from the total chlorine emission rate you select for the combustor; (3) determination of the 1-hour average HCl-equivalent emission rate limit; (4) determination of the ratio of the 1-hour average HCl-equivalent emission rate to the 1-hour HCl-equivalent emission rate limit for the combustor; and (5) determination of the

potential for the source to vary chlorine feedrates substantially over the averaging period for the long-term feedrate limit (*i.e.*, 12-hours, or up to annually) established to maintain compliance with the annual average HCl-equivalent emission rate limit.

E. Review and Approval of Eligibility Demonstrations

The permitting authority will review and approve your eligibility demonstration. Your eligibility demonstration must contain, at a minimum, the information listed in § 63.1215(d)(1).

1. Review and Approval for Existing Sources

If you operate an existing source, you must submit the eligibility demonstration to your permitting authority for review and approval not later than 12 months prior to the compliance date. You must also submit a separate copy of the eligibility demonstration to: U.S. EPA, Risk and Exposure Assessment Group, Emission Standards Division (C404-01), Attn: Group Leader, Research Triangle Park, North Carolina 27711, electronic mail address REAG@epa.gov.

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

If your permitting authority has not approved your eligibility demonstration by the compliance date, and has not issued a notice of intent to disapprove your demonstration, you may nonetheless begin complying, on the compliance date, with the annual average HCl-equivalent emission rate limits you present in your eligibility demonstration.

If your permitting authority issues a notice of intent to disapprove your eligibility demonstration after the

²² USEPA, "Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 24.2.

²³ See discussion below in Section F regarding the requirement to establish chlorine feedrate limits.

compliance date, the authority will identify the basis for that notice and specify how much time you will have to submit additional information or to comply with the MACT total chlorine standards. The permitting authority may extend the compliance date of the total chlorine standard to allow you to make changes to the design or operation of the combustor or related systems as quickly as practicable to enable you to achieve compliance with the MACT standard for total chlorine.

2. Review and Approval for New and Reconstructed Sources

The procedures for review and approval of eligibility demonstrations applicable to existing sources discussed above also apply to new or reconstructed sources, except that the date you must submit the eligibility demonstration is as discussed below.

If you operate a new or reconstructed source that starts up by April 12, 2007, or a solid fuel-fired boiler or liquid fuel-fired boiler that is an area source that increases its emissions or its potential to emit such that it becomes a major source of HAP before April 12, 2007, you must either: (1) Submit an eligibility demonstration for review and approval by April 12, 2006 and comply with the HCl-equivalent emission rate limits and operating requirements you establish in the eligibility demonstration; or (2) comply with the final total chlorine emission standards under §§ 63.1216, 63.1217, 63.1219, 63.1220, and 63.1221, by October 12, 2005, or upon startup, whichever is later, except for a standard that is more stringent than the standard proposed on April 20, 2004 for your source. If a final standard is more stringent than the proposed standard, you may comply with the proposed standard until October 14, 2008, after which you must comply with the final standard.

If you operate a new or reconstructed source that starts up on or after April 12, 2007, or a solid fuel-fired boiler or liquid fuel-fired boiler that is an area source that increases its emissions or its potential to emit such that it becomes a major source of HAP on or after April 12, 2007, you must comply with either of the following. You may submit an eligibility demonstration for review and approval 12 months prior to startup. Alternatively, you may comply with the final total chlorine emission standards under §§ 63.1216, 63.1217, 63.1219, 63.1220, and 63.1221 upon startup. If the final standard is more stringent than the standard proposed for your source on April 20, 2004, however, and if you start operations before October 14, 2008, you may comply with the proposed

standard until October 14, 2008, after which you must comply with the final standard.

F. Testing Requirements

You must comply with the requirements for comprehensive performance testing under § 63.1207.

1. Test Methods for Stack Gas Containing Alkaline Particulate

If you operate a cement kiln or a combustor equipped with a dry acid gas scrubber, you must use EPA Method 320/321 or ASTM D 6735-01, or an equivalent method, to measure hydrogen chloride, and the back-half (caustic impingers) of Method 26/26A, or an equivalent method, to measure chlorine.

2. Test Methods for Stack Gas Containing High Levels of Bromine or Sulfur

If you operate an incinerator, boiler, or lightweight aggregate kiln and your feedstreams contain bromine or sulfur during the comprehensive performance test at the levels indicated below, you must use EPA Method 320/321 or ASTM D 6735'01, or an equivalent method, to measure hydrogen chloride, and Method 26/26A, or an equivalent method, to measure chlorine and hydrogen chloride combined. You must determine your chlorine emissions to be the higher of: (1) The value measured by Method 26/26A, or an equivalent method; or (2) the value calculated by the difference between the combined hydrogen chloride and chlorine levels measured by Method 26/26A, or an equivalent method, and the hydrogen chloride measurement from EPA Method 320/321 or ASTM D 6735-01, or an equivalent method.

These procedures apply if you feed during the comprehensive performance test bromine at a bromine/chlorine ratio in feedstreams greater than 5 percent by mass, or sulfur at a sulfur/chlorine ratio in feedstreams greater than 50 percent by mass.²⁴

Finally, you should precondition the M26/26A filter for one hour prior to beginning the performance test to minimize the potential for a low bias caused by adsorption/absorption of hydrogen chloride on the filter.

G. Monitoring Requirements

You must establish and comply with limits on the same operating parameters that apply to sources complying with the MACT standard for total chlorine

under § 63.1209(o), except that feedrate limits on total chlorine and chloride must be established as described below.

1. Feedrate Limit to Ensure Compliance with the Annual Average HCl-Equivalent Emission Rate Limit

For sources subject to the feedrate limit for total chlorine and chloride under § 63.1209(n)(4) to ensure compliance with the semivolatile metals standard, the feedrate limit (and averaging period) for total chlorine and chloride to ensure compliance with the annual average HCl-equivalent emission rate limit is the same as required by that paragraph. Thus, the chlorine feedrate limit is the average of the run averages during the comprehensive performance test, and is established as a 12-hour rolling average.

That chlorine feedrate limit cannot exceed the numerical value (i.e., not considering the averaging period) of the feedrate limit that ensures compliance with the annual average HCl-equivalent emission rate limit, however. Therefore, the numerical value of the total chlorine and chloride feedrate limit must not exceed the value you calculate as the annual average HCl-equivalent emission rate limit (lb/hr) divided by [1 - system removal efficiency]. You must calculate a total chlorine system removal efficiency for each test run of the comprehensive performance test as [1 - total chlorine emission rate (g/s)/chlorine feedrate (g/s)], and calculate the average system removal efficiency of the test run averages. If your source does not control total chlorine, you must assume zero system removal efficiency. If emissions during the comprehensive performance test exceed the annual average HCl-equivalent emission rate limit, eligibility for the health-based emission limits is not affected. This is because the emission rate limit is an annual average limit. Compliance is based on a 12-hour rolling average chlorine feedrate limit (rather than an (up to) an annual averaging period) for sources subject to the 12-hour rolling average feedrate limit for total chlorine and chloride under § 63.1209(n)(4) to ensure compliance with the semivolatile metals standard given that the more stringent feedrate limit (i.e., the feedrate limit with the shorter averaging period) would apply.

For sources exempt from the feedrate limit for total chlorine and chloride under § 63.1209(n)(4) because they comply with § 63.1207(m)(2) (which allows compliance with the semivolatile metals emission standard absent emissions testing by assuming all metals fed are emitted), the feedrate limit for total chlorine and chloride to ensure

²⁴ USEPA, "Technical Support Document for HWC MACT Standards, Volume IV: Compliance with the HWC MACT Standards," September 2005, Chapter 15.1.2.

compliance with the annual average HCl-equivalent emission rate must be established as follows:

- You must establish an average period for the feedrate limit that does not exceed an annual rolling average;
- You must calculate a total chlorine system removal efficiency for each test run of the comprehensive performance test as $[1 - \text{total chlorine emission rate (g/s)/chlorine feedrate (g/s)}]$, and calculate the average system removal efficiency of the test run averages. If your source is not equipped with a control system that consistently and reproducibly controls total emissions (e.g., wet or dry scrubber), you must assume zero system removal efficiency. If emissions during the comprehensive performance test exceed the annual average HCl-equivalent emission rate limit, eligibility for emission limits under this section is not affected. The emission rate limit is an annual average limit and compliance is based on an annual average feedrate limit on total chlorine and chloride (or a shorter averaging period if you so elect under paragraph (g)(2)(ii)(A) of this section); and
- You must calculate the feedrate limit for total chlorine and chloride as the annual average HCl-equivalent emission rate limit (lb/hr) divided by $[1 - \text{system removal efficiency}]$ and comply with the feedrate limit on the averaging period you establish.

2. Feedrate Limit To Ensure Compliance With the 1-Hour Average HCl-Equivalent Emission Rate Limit

You must establish an hourly rolling average feedrate limit on total chlorine and chloride to ensure compliance with the 1-hour average HCl-equivalent emission rate limit unless you determine that the hourly rolling average feedrate limit is waived as discussed under Section D above. If required, you must calculate the hourly rolling average feedrate limit for total chlorine and chloride as the 1-hour average HCl-equivalent emission rate limit (lb/hr) divided by $[1 - \text{system removal efficiency}]$ using the system removal efficiency demonstrated during the comprehensive performance test.

H. Relationship Among Emission Rates, Emission Rate Limits, and Feedrate Limits

We summarize here the relationship among: (1) the total chlorine emission rate you select in your eligibility demonstration; (2) the annual average and 1-hour average HCl-equivalent emission rates you present in your eligibility demonstration; (3) the annual average and 1-hour average emission

rate limits you present in your eligibility demonstration; (4) performance test emission rates for total chlorine and HCl-equivalent emissions; and (5) long-term and hourly rolling average chlorine feedrate limits.

1. Total Chlorine Emission Rate, Annual Average HCl-Equivalent Emission Rate, and Annual Average HCl-Equivalent Emission Rate Limit

For the eligibility demonstration, you must select a total chlorine emission concentration (ppmv) for each combustor, determine the Cl_2/HCl volumetric ratio, calculate the annual average HCl-equivalent emission rate (lb/hr), and document that the emission rate does not exceed the annual average HCl-equivalent emission rate limit.

You select a total chlorine (i.e., HCl and chlorine combined) emission concentration (ppmv) for each hazardous waste combustor expressed as chloride (Cl^-) equivalent. For incinerators, cement kilns, and lightweight aggregate kilns, this emission concentration cannot exceed the Interim Standards for total chlorine. You then determine the average Cl_2/HCl volumetric ratio considering all historical regulatory emissions tests and apportion total chlorine emissions between Cl_2 and HCl accordingly. You use these apportioned volumetric emissions to calculate the Cl_2 and HCl emission rates (lb/hr) using the average gas flowrate (and other relevant parameters) for the most recent RCRA compliance test or MACT performance test for total chlorine. Finally, you use these Cl_2 and HCl emission rates to calculate an annual average HCl-equivalent emission rate, which cannot exceed the annual average HCl-equivalent emission rate limit that you establish as discussed below.

To establish the annual average HCl-equivalent emission rate limit, you may either use Tables 1 or 2 in § 63.1215 to look-up the limit, or conduct a site-specific risk analysis. Under the site-specific risk analysis option, the annual average HCl-equivalent emission rate limit would be the highest emission rate that the risk assessment estimates would result in a Hazard Index not exceeding 1.0 for the actual individual most exposed to the facility's emissions considering off-site locations where people reside and where people congregate for work, school, or recreation.

If you have more than one on-site hazardous waste combustor, and if you use the look-up tables to establish the annual average HCl-equivalent emission rate limits, the sum of the ratios for all combustors of the annual average HCl-

equivalent emission rate to the annual average HCl-equivalent emission rate limit cannot not exceed 1.0. This will ensure that the RfC-based Hazard Index of 1.0 is not exceeded, a principle criterion of the eligibility demonstration.

If you use site-specific risk analysis to demonstrate that a Hazard Index of 1.0 is not exceeded, you would generally identify for each combustor the maximum annual average HCl-equivalent emission rate that the risk assessment estimates would result in an RfC-based Hazard Index of 1.0 at any off-site receptor location (i.e., considering locations where people reside and where people congregate for work, school, or recreation).²⁵ This emission rate would be the annual average HCl-equivalent emission rate limit for each combustor.

2. 1-Hour Average HCl-Equivalent Emission Rate and Emission Rate Limit

As discussed in Section D above, you must determine in your eligibility demonstration whether the 1-hour HCl-equivalent emission rate limit may be exceeded absent an hourly rolling average chlorine feedrate limit. To make this determination, you must establish a 1-hour average HCl-equivalent emission rate and a 1-hour average HCl-equivalent emission rate limit.

You calculate the 1-hour average HCl-equivalent emission rate from the total chlorine emission rate, established as discussed above, using the equation in § 63.1215(b)(3).

You establish the 1-hour average HCl-equivalent emission rate limit by either using Tables 3 or 4 in § 63.1215 to look-up the limit, or conducting a site-specific risk analysis. Under the site-specific risk analysis option, the 1-hour average HCl-equivalent emission rate limit would be the highest emission rate that the risk assessment estimates would result in an aREL-based Hazard Index not exceeding 1.0 at any off-site receptor location (i.e., considering locations where people reside and where people congregate for work, school, or recreation).

3. Performance Test Emissions

During the comprehensive performance test, you must demonstrate a system removal efficiency for total chlorine as $[1 - \text{TCl emitted (lb/hr)/chlorine fed (lb/hr)}]$. During the test, however, the total chlorine emission rate you select for each combustor and the annual average HCl-equivalent

²⁵ Note again, however, that the total chlorine emission concentration (ppmv) is capped by the Interim Standards for incinerators, cement kilns, and lightweight aggregate kilns.

emission rate limit can exceed the levels you present in the eligibility demonstration. This is because those emission rates are annual average rates and need not be complied with over the duration of three runs of the performance test, which may be nominally only 3 hours.

The 1-hour average HCl-equivalent emission rate limit cannot be exceeded during any run of the comprehensive performance test, however. This limit is based on an aREL Hazard Index of 1.0; an exceedance of the limit over a test run with a nominal 1-hour duration would result in a Hazard Index of greater than 1.0.

4. Chlorine Feedrate Limits

To maintain compliance with the annual average HCl-equivalent emission rate limit, you must establish a long-term average chlorine feedrate limit. In addition, if you determine under § 63.1205(d)(3) that the 1-hour average HCl-equivalent emission rate may be exceeded (i.e., because your chlorine feedrate may vary substantially over the averaging period for the long-term chlorine feedrate limit), you must establish an hourly rolling average chlorine feedrate limit.

Long-Term Chlorine Feedrate Limit. The chlorine feedrate limit to maintain compliance with the annual average HCl-equivalent emission rate is either: (1) The chlorine feedrate during the comprehensive performance test if you demonstrate compliance with the semivolatile metals emission standard during the test (see § 63.1209(o)); or (2) if you comply with the semivolatile metals emission standard under § 63.1207(m)(2) by assuming all metals in the feed to the combustor are emitted, the HCl-equivalent emission rate limit divided by [1 – system removal efficiency] where you demonstrate the system removal efficiency during the comprehensive performance test.

If you establish the chlorine feedrate limit based on the feedrate during the performance test to demonstrate compliance with the semivolatile metals emission standard, the averaging period for the feedrate limit is a 12-hour rolling average. If you establish the chlorine feedrate limit based on the system removal efficiency during the performance test, the averaging period is up to an annual rolling average. See discussion in Part Four, Section VII.B of this preamble.

If you comply with the semivolatile metals emission standard under § 63.1207(m)(2), however, the long-term chlorine feedrate limit is based on the system removal efficiency during the comprehensive performance test rather

than the feedrate during the performance test. This is because the averaging period for this chlorine feedrate limit (that ensures compliance with the annual average HCl-equivalent emission rate limit) is up to an annual rolling average. See § 63.1215(g)(2). Thus, the chlorine feedrate, and total chlorine emissions, can be higher than the limit during the relatively short duration of the comprehensive performance tests.

Hourly Rolling Average Chlorine Feedrate Limit. If you determine under § 63.1205(d)(3) that the 1-hour average HCl-equivalent emission rate limit may be exceeded, you must establish an hourly rolling average chlorine feedrate limit. That feedrate limit is established as the 1-hour HCl-equivalent emission rate limit divided by [1 – system removal efficiency]. The hourly rolling average chlorine feedrate limit is not established based on feedrates during the performance test because performance test feedrates may be substantially lower than the feedrate needed to ensure compliance with the 1-hour average HCl-equivalent emission rate. Note, however, that the hourly rolling average feedrate limit cannot be exceeded during any run of the comprehensive performance test. This chlorine feedrate limit is based on the 1-hour average HCl-equivalent emission rate limit, which is based on an aREL Hazard Index of 1.0. Thus, an exceedance of the hourly rolling average feedrate limit (and the 1-hour HCl-equivalent emission rate limit) over a test run with a nominal 1-hour duration would result in a Hazard Index of greater than 1.0.

I. Changes

Your requirements will change in response to changes that affect the HCl-equivalent emission rate or HCl-equivalent emission rate limit for a source.

1. Changes Over Which You Have Control

Changes That Affect HCl-Equivalent Emission Rate Limits. If you plan to change the design, operation, or maintenance of the facility in a manner that would decrease the annual average or 1-hour average HCl-equivalent emission rate limit (e.g., reduce the distance to the property line; reduce stack gas temperature; reduce stack height), prior to the change you must submit to the permitting authority a revised eligibility demonstration documenting the lower emission rate limits and calculations of reduced total chlorine and chloride feedrate limits.

If you plan to change the design, operation, or maintenance of the facility in a manner that would increase the annual average or 1-hour average HCl-equivalent emission rate limit, and you elect to increase your total chlorine and chloride feedrate limits, prior to the change you must submit to the permitting authority a revised eligibility demonstration documenting the increased emission rate limits and calculations of the increased feedrate limits prior to the change.

Changes That Affect System Removal Efficiency. If you plan to change the design, operation, or maintenance of the combustor in a manner that could decrease the system removal efficiency, you are subject to the requirements of § 63.1206(b)(5) for conducting a performance test to reestablish the combustor's system removal efficiency. You also must submit a revised eligibility demonstration documenting the lower system removal efficiency and the reduced feedrate limits on total chlorine and chloride.

If you plan to change the design, operation, or maintenance of the combustor in a manner that could increase the system removal efficiency, and you elect to document the increased system removal efficiency to establish higher feedrate limits on total chlorine and chloride, you are subject to the requirements of § 63.1206(b)(5) for conducting a performance test to reestablish the combustor's system removal efficiency. You must also submit a revised eligibility demonstration documenting the higher system removal efficiency and the increased feedrate limits on total chlorine and chloride.

2. Changes Over Which You Do Not Have Control

If you use site-specific risk assessment in lieu of the look-up tables to establish the HCl-equivalent emission rate limit, you must review the documentation you use in your eligibility demonstration every five years from the date of the comprehensive performance test and submit for review and approval with the comprehensive performance test plan either a certification that the information used in your eligibility demonstration has not changed in a manner that would decrease the annual average HCl-equivalent emission rate limit, or a revised eligibility demonstration. Examples of changes beyond your control that may decrease the annual average HCl-equivalent emission rate limit (or 1-hour average HCl-equivalent emission rate limit) are construction of residences at a location exposed to higher ambient

concentrations than evaluated during your previous risk analysis, or a reduction in the RfCs or aRELs.

If, in the interim between the dates of your comprehensive performance tests, you have reason to know of changes that would decrease the annual average HCl-equivalent emission rate limit, you must submit a revised eligibility demonstration as soon as practicable but not more frequently than annually.

If you determine that you cannot demonstrate compliance with a lower annual average HCl-equivalent emission rate limit (dictated by a change over which you do not have control) during the comprehensive performance test because you need additional time to complete changes to the design or operation of the source or related systems, you may request that the permitting authority grant you additional time to make those changes as quickly as practicable.

X. Overview on Floor Methodologies

The most contentious issue in the rulemaking involved methodologies for determining MACT floors, namely, which sources are best performing, and what is their level of performance. Superficially, these questions have a ready answer: the best performers are the lowest emitters as measured by compliance tests, and those tests fix their level of performance. But compliance tests are snapshots which do not fully capture sources' total operating variability. Since the standards must be met at all times, picking lowest compliance test data to set the standard results in standards best performing sources themselves would be unable to meet at all times.

To avoid this impermissible result, EPA selected approaches that reasonably estimate best performing sources' total variability. Certain types of variability can be quantified statistically, and EPA did so here (using standard statistical approaches) in all of the floor methodologies used in the rule. There are other components of variability, however, which cannot be fully quantified, but nonetheless must be accounted for in reasonably estimating best performing sources' performance over time. EPA selected ranking methodologies which best account for this total variability.

Where control of the feed of HAP is feasible and technically assessable (the case for HAP metals and for total chlorine), EPA used a methodology that ranked sources by their ability to best control both HAP feed and HAP emissions. This methodology thus assesses the efficiency of control of both the HAP inputs to a hazardous waste

combustion unit, and the efficiency of control of the unit's outputs. This methodology reasonably selects the best performing (and for new sources, best controlled) sources, and reasonably assesses their level of performance. When HAP feed control is not feasible, notably where HAP is contributed by raw material and fossil fuel inputs, EPA determined best performers and their level of performance using a methodology that selects the lowest emitters using the best air pollution control technology. This methodology reasonably estimates the best performing sources' level of performance, and better accounts for total variability in emissions levels of the best performing sources.

EPA carefully examined approaches selecting lowest emitters as best performers. Examination of other test conditions from the same best performing sources shows, however, that this approach results in standards not achievable even by the best performers. Indeed, in order to meet such standards, even "best performing" sources (lowest emitting in individual tests) would have to add additional air pollution control technology. EPA views this result as an end run around the section 112(d)(2) beyond-the-floor process, because floor standards would force industry-wide technological changes without consideration of the factors (cost and energy in particular) which Congress mandated for consideration when establishing beyond-the-floor standards.

Part Three: What Are the Major Changes Since Proposal?

I. Database

A. Hazardous Burning Incinerators

Five incinerators have been removed from the database because they have initiated or completed RCRA closure.²⁶ Two incinerators have been added to the list of sources used to calculate the floor levels.²⁷ Emissions data from source 3015 has been excluded for purposes of calculating the particulate matter floor because the source was processing an atypical waste stream from a particulate matter compliance perspective. See part four, section I.F. We have excluded the most recent

²⁶ See "Final Technical Support Document for HWC MACT Standards, Volume II: HWC Database" for a list of the sources that have initiated or completed RCRA closure.

²⁷ We noticed the data from these sources but did not include them in the MACT standard calculations at proposal. Note that inclusion of these sources did not affect any of the calculated MACT standards. See "Final Technical Support Document for HWC MACT Standards, Volume II: HWC Database" for more discussion.

mercury and dioxin/furan emissions data from source 327, and have instead used data from an older test condition to represent this source's emissions because the source encountered problems with its carbon injection system during the most recent test. See part four, section I.F. Emissions data from source 3006 has been excluded for purposes of calculating the semivolatile metal standard because this source did not measure cadmium emissions during its emissions test. See part four, section I.F. We have added mercury emissions data from source 901 (DSSI) to the incinerator mercury database because this source (which is otherwise subject to standards for liquid fuel boilers) is burning a waste which is unlike that burned by any other liquid fuel boiler with respect to mercury concentration and waste provenance, but typical of waste burned by incinerators with respect to those factors. See part four, section VI.D.1. This change correspondingly affects the liquid fuel boiler standard by removing that data from the liquid fuel boiler database.

B. Hazardous Waste Cement Kilns

1. Use of Emissions Data From Ash Grove Cement Company

The emissions data from Ash Grove Cement Company, which operates a recently constructed preheater/precalciner kiln located in Chanute, Kansas, are considered when calculating MACT floors for new hazardous waste burning cement kilns. In the proposal, we did not consider their emissions data in the floor analyses for existing sources because Ash Grove Cement used the data to demonstrate compliance with the new source interim standards, and did not address the data for purposes of new source standards. See 69 FR at 21217 n. 35. Consistent with our position on use of post-1999 emissions data, we are including Ash Grove Cement's emissions data in the floor analyses for new sources. See also Part Four, Section I.B of the preamble.

2. Removal of Holcim's Emissions Data From EPA's HWC Data Base

Following cessation of hazardous waste operations in 2003, we are removing all emissions data from both wet process cement kilns at Holcim's Holly Hill, South Carolina, plant from our hazardous waste combustor data base. This is consistent with our approach in both this rule and the 1999 rule to base the standards only on performance of sources that actually are operating (i.e., burning hazardous waste). See also Part Four, Section I.A and 64 FR at 52844.

3. Use of Mercury Data

As discussed below, we are using a commenter-submitted dataset as the basis of the mercury standards for existing and new cement kilns. This comprehensive dataset documents the day-to-day levels of mercury in hazardous waste fired to all cement kilns for a three year period covering 1999 to 2001. We have determined that the commenter-submitted data are more representative than data used at proposal. See Part Four, Section I.D of the preamble for our rationale.

C. Hazardous Waste Lightweight Aggregate Kilns

We are incorporating mercury data submitted by a commenter into the MACT floor analysis for existing and new lightweight aggregate kilns. These data document the day-to-day levels of mercury in hazardous waste fired to lightweight aggregate kilns located at Solite Corporation's Arvonnia plant between October 2003 and June 2004. We have determined that the commenter-submitted data are more representative than the data used at proposal. See Part Four, Section I.E of the preamble for our rationale.

D. Liquid Fuel Boilers

In the proposed rule, we classified liquid fuel boilers as one category. The final rule classifies them into two for purposes of the mercury, semivolatile metals, chromium, and total chlorine standards: one for liquid fuel boilers burning lower heating value hazardous waste (hazardous waste with a heating value less than 10,000 Btu/lb), and another for liquid fuel boilers burning higher heating value hazardous waste (hazardous waste with a heating value of 10,000 Btu/lb or greater).

We also made other, minor changes to the data base because some sources have initiated closure, were misclassified as other sources in the proposed rule, or were inadvertently not considered in the floor calculations although the sources' test reports were in the docket at proposal.

E. HCl Production Furnaces

Six of the 17 hydrochloric acid production furnaces have ceased burning hazardous waste since proposal. Consequently, we do not use emissions data from these sources to establish the final standards. All six of these sources were equipped with waste heat recovery boilers and had relatively high dioxin/furan emissions. In addition, we reclassified source #2020

as a boiler based on comments received at proposal.

F. Total Chlorine Emissions Data Below 20 ppmv

We corrected all the total chlorine measurements in the data base that were below 20 ppmv to account for potential systemic negative biases in the Method 0050 data in response to comments on the proposed rule. See the discussion in Part Four, Section I.C.1 below.

To account for the bias, we corrected all total chlorine emissions data that were below 20 ppmv to 20 ppmv. We accounted for within-test condition emissions variability for the corrected data by imputing a standard deviation that is based on a regression analysis of run-to-run standard deviation versus emission concentration for all data above 20 ppmv. This approach of using a regression analysis to impute a standard deviation is similar to the approach we used to account for total variability (i.e., test-to-test and within test variability) of PM emissions for sources that use fabric filters.

II. Emission Limits

A. Incinerators

The changes in the incinerator standards for existing sources since proposal are:

Standard	Proposed limit	Final limit
Dioxin/Furans (ng TEQ/dscm)	Sources with dry air pollution control systems or waste heat boilers: 0.28; For others: 0.2 or 0.4 and temperature control at inlet of air pollution control device < 400 °F.	For all sources, 0.20 or 0.40 and temperature control < 400 °F at the air pollution control device inlet.
Particulate Matter (gr/dscf)	0.015	0.013.
Semivolatile Metals (µg/dscm)	59	230.
Low Volatile Metals (µg/dscm)	84	92.
Total Chlorine (ppmv)	1.5	32.
Alternative to the particulate matter standard: Combined emissions of lead, cadmium and selenium (µg/dscm).	59	230.
Alternative to the particulate matter standard: Combined emissions of arsenic, beryllium, chrome, antimony, cobalt, manganese, and nickel (µg/dscm).	84	92.

The changes in the incinerator standards for new sources since proposal are:

Standard	Proposed limit	Final limit
Particulate Matter (gr/dscf)	0.0007	0.0015
Mercury (µg/dscm)	8.0	8.1
Semivolatile Metals (µg/dscm)	6.5	10
Low Volatile Metals (µg/dscm)	8.9	23
Total Chlorine (ppmv)	0.18	21
Alternative to the particulate matter standard: Combined emissions of lead, cadmium and selenium (µg/dscm)	6.5	10
Alternative to the particulate matter standard: Combined emissions of arsenic, beryllium, chrome, antimony, cobalt, manganese, and nickel (µg/dscm)	8.9	23

Hazardous Waste Burning Cement Kilns

The changes in the standards for existing cement kiln since proposal are:

Standard	Proposed limit	Final limit
Mercury (µg/dscm)	64 ¹	Both 3.0 ppmw ² and either 120 µg/dscm (stack emissions) or 120 µg/dscm (expressed as a hazardous waste MTEC) ³ .
Particulate matter	0.028 gr/dscf	0.028 gr/dscf and 20% opacity ⁴ .
Semivolatile metals	4.0E-04 lb/MMBtu ⁵	7.6E-04 lb/MMBtu ⁵ and 330 µg/dscm.
Low volatile metals	1.4E-05 lb/MMBtu ⁵	2.1E-05 lb/MMBtu ⁵ and 56 µg/dscm.
Total chlorine (ppmv) ⁶	110	120.

¹ The proposed mercury standard was an annual limit.
² Feed concentration of mercury in hazardous waste as-fired.
³ HW MTEC means maximum theoretical emissions concentration of the hazardous waste and MTEC is defined at § 63.1201(a).
⁴ The opacity standard does not apply to a source equipped with a bag leak detection system under § 63.1206(c)(8) or a particulate matter detection system under § 63.1206(c)(9).
⁵ Standard is expressed as mass of pollutant stack emissions attributable to the hazardous waste per million British thermal unit heat input of the hazardous waste.
⁶ Combined standard, reported as a chloride (Cl⁻) equivalent.

The changes in the standards for new cement kilns since proposal are:

Standard	Proposed limit	Final limit
Mercury (µg/dscm)	35 ¹	Both 1.9 ppmw ² and either 120 µg/dscm (stack emissions) or 120 µg/dscm (expressed as a hazardous waste MTEC) ³ .
Particulate matter	0.0058 gr/dscf	0.0023 gr/dscf and 20% opacity ⁴ .
Semivolatile metals	6.2E-05 lb/MMBtu ⁵	6.2E-05 lb/MMBtu ⁵ and 180 µg/dscm.
Low volatile metals	1.4E-05 lb/MMBtu ⁵	1.5E-05 lb/MMBtu ⁵ and 54 µg/dscm.
Total chlorine (ppmv) ⁶	78	86.

¹ The proposed mercury standard was an annual limit.
² Feed concentration of mercury in hazardous waste as-fired.
³ HW MTEC means maximum theoretical emissions concentration of the hazardous waste and MTEC is defined at § 63.1201(a).
⁴ The opacity standard does not apply to a source equipped with a bag leak detection system under § 63.1206(c)(8) or a particulate matter detection system under § 63.1206(c)(9).
⁵ Standard is expressed as mass of pollutant stack emissions attributable to the hazardous waste per million British thermal unit heat input of the hazardous waste.
⁶ Combined standard, reported as a chloride (Cl⁻) equivalent.

C. Hazardous Waste Burning Lightweight Aggregate Kilns

The changes in the standards for existing lightweight aggregate kilns since proposal are:

Standard	Proposed limit	Final limit
Dioxins and furans (ng TEQ/dscm)	0.40	0.20 or rapid quench of the flue gas at the exit of the kiln to less than 400 °F.
Mercury (µg/dscm)	67 ¹	120 µg/dscm (stack emissions) or 120 µg/dscm (expressed as a hazardous waste MTEC) ² .
Semivolatile metals	3.1E-04 lb/MMBtu ³ and 250 µg/dscm	3.0E-04 lb/MMBtu ³ and 250 µg/dscm.

¹ The proposed mercury standard was an annual limit.
² HW MTEC means maximum theoretical emissions concentration of the hazardous waste and MTEC is defined at § 63.1201(a).
³ Standard is expressed as mass of pollutant stack emissions attributable to the hazardous waste per million British thermal unit heat input of the hazardous waste.

The changes in the standards for new lightweight aggregate kilns since proposal are:

Standard	Proposed limit	Final limit
Dioxins and furans (ng TEQ/dscm)	0.40	0.20 or rapid quench of the flue gas at the exit of the kiln to less than 400 °F.

Standard	Proposed limit	Final limit
Particulate matter	0.0099 gr/dscf	0.0098 gr/dscf.
Mercury (µg/dscm)	67 ¹	120 µg/dscm (stack emissions) or 120 µg/dscm (expressed as a hazardous waste MTEC) ² .
Semivolatile metals	2.4E-05 lb/MMBtu ³ and 43 µg/dscm	3.7E-05 lb/MMBtu ³ and 43 µg/dscm.

¹ The proposed mercury standard was an annual limit.

² HW MTEC means maximum theoretical emissions concentration of the hazardous waste and MTEC is defined at § 63.1201(a).

³ Standard is expressed as mass of pollutant stack emissions attributable to the hazardous waste per million British thermal unit heat input of the hazardous waste.

D. Solid Fuel Boilers

The changes in the solid fuel boiler standards for existing sources since proposal are:

Standard	Proposed limit	Final limit
Mercury (µg/dscm)	10	11
Semivolatile Metals (µg/dscm)	170	180
Low Volatile metals (µg/dscm)	210	380
Alternative to the particulate matter standard: Combined emissions of lead, cadmium and selenium (µg/dscm)	170	180
Alternative to the particulate matter standard: Combined emissions of arsenic, beryllium, chromium, antimony, cobalt, manganese, and nickel (µg/dscm)	210	380

The changes in the solid fuel boiler standards for new sources since proposal are:

Standard	Proposed limit	Final limit
Mercury (µg/dscm)	10	11
Semivolatile Metals (µg/dscm)	170	180
Low Volatile metals (µg/dscm)	210	380
Alternative to the particulate matter standard: Combined emissions of lead, cadmium and selenium (µg/dscm)	170	180

E. Liquid Fuel Boilers

We redefined the liquid fuel boiler subcategory into two separate boiler subcategories based on the heating value

of the hazardous waste they burn: Those that burn waste below 10,000 Btu/lb, those that burn hazardous waste with a heating value of 10,000 Btu/lb or greater. See Part Four, Section VI.D.2 of

today's preamble for a complete discussion.

The additional changes to the liquid fuel boiler standards for existing sources since proposal are:

Standard	Proposed limit	Final limit	
		HW Fuel < 10,000 Btu/lb	HW Fuel ≥ 10,000 Btu/lb
Mercury (lb/MM Btu)	3.7E-6	19 µg/dscm	4.2E-5
Particulate matter (gr/dscf)	0.032	0.035	
Semivolatile metals (lb/MM Btu)	1.1E-5	150 µg/dscm	8.2E-5
Chromium (lb/MM Btu)	1.1E-4	370 µg/dscm	1.3E-4
Total chlorine (Lb/MM Btu)	2.5E-2	31 ppmv	5.1E-2
Alternative to the particulate matter standard: Combined emissions of lead, cadmium and selenium (lb/MM Btu).	1.1E-5	150 µg/dscm	8.2E-5
Alternative to the particulate matter standard: Combined emissions of arsenic, beryllium, chromium, antimony, cobalt, manganese, and nickel (lb/MM Btu).	1.1E-4	370 µg/dscm	1.3E-4

The changes in the liquid fuel boiler standards for new sources since proposal are:

Standard	Proposed limit	Final limit	
		HW fuel < 10,000 Btu/lb	HW fuel > 10,000 Btu/lb
Dioxin and Furan, dry APCD (ng TEQ/dscm)	0.015 or temp control <400F for dry APCD.	0.40	
Mercury (lb/MM Btu)	3.8E-7	6.8 µg/dscm	1.2E-6
Particulate matter (gr/dscf)	0.0076	0.0087	
Semivolatile metals (lb/MM Btu)	4.3E-6	78 µg/dscm	6.2E-6
Chromium (lb/MM Btu)	3.6E-5	12 µg/dscm	1.4E-5
Total chlorine (lb/MM Btu)	7.2E-4	31 µg/dscm	5.1E-2
Alternative to the particulate matter standard: Combined emissions of lead, cadmium and selenium (lb/MM Btu).	4.3E-6	78 µg/dscm ¹	6.2E-6 ¹
Alternative to the particulate matter standard: Combined emissions of arsenic, beryllium, chromium, antimony, cobalt, manganese, and nickel (lb/MM Btu).	3.6E-5	12 µg/dscm ²	1.4E-5 ²

¹ New or reconstructed liquid fuel boilers that process residual oil or liquid feedstreams that are neither fossil fuel nor hazardous waste and that operate pursuant to the alternative to the particulate matter standard must comply with the alternative emission concentration standard of 4.7 µg/dscm, which is applicable to lead, cadmium and selenium emissions attributable to all feedstreams (hazardous and nonhazardous).

² New or reconstructed liquid fuel boilers that process residual oil or liquid feedstreams that are neither fossil fuel nor hazardous waste that operate pursuant to the alternative to the particulate matter standard must comply with the alternative emission concentration standard of 12 µg/dscm, which is applicable to arsenic, beryllium, chrome, antimony, cobalt, manganese, and nickel emissions attributable to all feedstreams (hazardous and nonhazardous).

F. Hydrochloric Acid Production Furnaces

The changes in the hydrochloric acid production furnace standards for existing sources since proposal are:

Standard	Proposed limit	Final limit
Dioxin and Furans	0.4 ng TEQ/dscm	Carbon Monoxide/Total Hydrocarbons and DRE standards as surrogates.
Total chlorine	14 ppmv or 99.9927% system removal efficiency	150 ppmv or 99.923% system removal efficiency.

The changes in the hydrochloric acid production furnace standards for new sources since proposal are:

Standard	Proposed limit	Final limit
Dioxin and Furans	0.4 ng TEQ/dscm	Carbon Monoxide/Total Hydrocarbons and DRE standards as surrogates
Total chlorine	1.2 ppmv or 99.9994% system removal efficiency	25 ppmv or 99.987% system removal efficiency

G. Dioxin/Furan Testing for Sources Not Subject to a Numerical Standard

Today's final rule requires that all sources not subject to a numerical dioxin and furan standard perform a one time test to determine their dioxin and furan emissions. See the discussion in Part Four, Section VII.L.

In the proposed rule, this requirement was limited to solid fuel boilers and those liquid fuel boilers with a wet or no air pollution control system. The final rule expands this requirement to include hydrochloric acid production furnaces and those lightweight aggregate kilns that elect to comply with the temperature limit at the kiln exit in lieu of the 0.20 ng TEQ/dscm dioxin/furan standard. Those sources are not subject to a numerical dioxin/furan standard under the final rule for reasons

explained in Volume III of the Technical Support Document, Sections 12 and 15.

We note that sources not subject to a numerical dioxin/furan emission standard are subject to the carbon monoxide or hydrocarbon standards and the DRE standard as surrogates.

We are making no changes to the implementation of this requirement. See the proposed rule at 69 FR at 21307 for more information.

III. Statistics and Variability

A. Using Statistical Imputation To Address Variability of Nondetect Values

In the final rule, we use a statistical approach to impute the value of nondetect emissions and feedrate measurements to avoid dampening of the variability of data sets when

nondetect measurements are assumed to be present at the detection limit.

At proposal, we assumed that nondetects (i.e., HAP levels in stack emissions below the level of detection of the applicable analytic method) are invariably present at the detection limit. Commenters on the proposed rule stated, however, that assuming nondetects are present at the detection limit dampens emissions variability—a consideration necessary to reasonably ascertain sources' performance over time. This could have significant practical consequence for those data sets (such as the data base for liquid fuel boilers) dominated by nondetected values. We agree with these commenters, and instead of making the arbitrary assumption that all nondetected values are identical (which

in fact is highly unlikely), we are using a statistical methodology to impute the value of nondetect measurements.

The imputation approach assigns a value for each nondetect measurement in a data set within the possible range of values that results in maximizing the 99th percentile upper prediction limit for the data set. For example, the possible range of values for a measurement that is 100% nondetect is between zero and the detection limit.

On February 4, 2005 we distributed a direct request for comments on the imputation approach to major stakeholders. We respond to the comments we received in Part Four, Section IV.D of today's notice.

B. Degrees of Freedom When Imputing a Standard Deviation Using the Universal Variability Factor for Particulate Matter Controlled by a Fabric Filter

The use of the universal variability factor to impute a standard deviation for particulate emissions from sources controlled with a fabric filter takes advantage of the empirical observation that the standard deviation of particulate emissions from sources is positively correlated to the average particulate emissions of sources. Based on this observation, we use regression analysis to determine the best fitting curve to explain the relationship of average value to standard deviation.

In the final rule, we use the actual sample size, rather than an assumed sample size of nine used at proposal, to determine the degrees of freedom for the t-statistic to calculate the floor using the standard deviation imputed from the universal variability factor for particulate matter controlled by a fabric filter.

At proposal, we used eight degrees of freedom to identify the t-statistic to account for within-test condition variability (i.e., run-to-run variability) for standard deviations imputed from the universal variability factor regression.²⁸ This is because, on average, about three test conditions with nine individual test runs are associated with each source used to develop the regression curve.

A commenter states, however, that this approach can dramatically understate variability when imputing a standard deviation for a source with only three runs because the t-statistic is substantially higher for 2 degrees of freedom than 8 degrees of freedom.

We agree with the commenter. Moreover, using the actual number of

runs to identify the t-statistic rather than assuming nine runs is appropriate given that the true test condition average is less certain for sources with only three runs, and thus there is less certainty in the imputed standard deviation. The higher t-statistic associated with a three-run data set reflects this uncertainty.

In addition, we include emissions data classified as "normal" in the regression analysis for the final rule. At proposal, we used only data classified as CT (i.e., highest compliance test condition in a test campaign) or IB (i.e., a compliance test condition that achieved lower emissions than another compliance test condition in the test campaign). We conclude that normal data (i.e., emissions data that were not used to establish operating limits and thus do not reflect variability in controllable operating parameters) should also be considered in the regression analysis because particulate matter emissions are relatively insensitive to baghouse inlet loading and operating conditions.²⁹ Including normal emissions in the analysis provides additional data to better quantify these devices' performance variability.

IV. Compliance Assurance for Fabric Filters, Electrostatic Precipitators, and Ionizing Wet Scrubbers

The final rule provides additional requirements to clarify how you determine the duration of periods of operation when the alarm set point has been exceeded for a bag leak detection system or a particulate matter detection system:

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

The final rule also establishes revised procedures for establishing the alarm set point if you elect to use a particulate matter detector system in lieu of site-

specific operating parameter limits for compliance assurance for sources equipped with electrostatic precipitators and ionizing wet scrubbers. The rule explicitly allows you to maximize controllable operating parameters during the comprehensive performance test to account for variability by, for example, detuning the APCD or spiking ash. To establish the alarm set-point, you may either establish the set-point as the average of the test condition run average detector responses during the comprehensive performance test or extrapolate the detector response after approximating the correlation between the detector response and particulate matter emission concentrations. You may extrapolate the detector response up to a response value that corresponds to 50% of the particulate matter emission standard or 125% of the highest particulate matter concentration used to develop the correlation, whichever is greater. To establish an approximate correlation of the detector response to particulate matter emission concentrations you should use as guidance Performance Specification-11 for PM CEMS (40 CFR Part 60, Appendix B), except that you need conduct only 5 runs to establish the initial correlation rather than a minimum of 15 runs required by PS-11.

The final rule also notes that an exceedance of a detector response that corresponds to the particulate matter emission standard is not evidence that the standard has been exceeded because the correlation is an approximate correlation used for the purpose of compliance assurance to determine when corrective measures must be taken. The correlation, however, does not meet the requirements of PS-11 for compliance monitoring.

In addition, if you elect to use a particulate matter detection system in lieu of site-specific control device operating parameter limits on the electronic control device, the ash feedrate limit for incinerators and boilers under § 63.1209(m)(3) is waived. The ash feedrate limit is waived because the particulate matter detection system continuously monitors relative particulate matter emissions and the alarm set point provides reasonable assurance that emissions will not exceed the standard.³⁰

³⁰ Note that if your incinerator or boiler is equipped with a fabric filter and you elect under § 63.1206(c)(8)(i) to use a particulate matter detection system in lieu of a bag leak detection system for compliance assurance, the ash feedrate limit is waived. The ash feedrate limit is not waived if you use a bag leak detection system, however, because the alarm level may not ensure compliance with the emission standard when you follow the

²⁸ USEPA, "Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards," March 2004, p. 5-4.

²⁹ USEPA, "Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 5.3. See also Part Four, Section III.C of this preamble.

Finally, you must submit an excessive exceedance notification within 30 days of the date that the alarm set-point is exceeded more than 5 percent of the time during any 6-month block period of time, or within 30 days after the end of the 6-month block period, whichever is earlier. The proposed rule would have required you to submit that notification within 5 days of the end of the 6-month block period.

V. Health-Based Compliance Alternative for Total Chlorine

The final rule includes the following major changes to the proposed health-based compliance alternative for total chlorine:

(1) You must use 1-hour Reference Exposure Levels (aRELs) rather than 1-hour acute exposure guideline levels (AEGL-1) as the acute health risk threshold metric when calculating 1-hour HCl-equivalent emission rates;

(2) You must establish a long-term average chlorine feedrate limit (i.e., 12 hour rolling average or an (up to) annual rolling average) as the annual average HCl-equivalent emission rate limit divided by $[1 - \text{system removal efficiency}]$. You establish the total chlorine system removal efficiency during the comprehensive performance test. The proposed rule would have required you to establish the long-term average chlorine feedrate limit as the average of the test run averages of the comprehensive performance test.³¹

(3) At proposal, we requested comment on whether and how to establish a short-term chlorine feedrate limit to ensure that the acute exposure Hazard Index of 1.0 is not exceeded. See 69 FR at 21304. We conclude for the final rule that a 1-hour rolling average feedrate limit may be needed for some situations (i.e., if chlorine feedrates can vary substantially during the averaging period for the long-term feedrate limit and potentially result in an exceedance of the 1-hour average HCl-equivalent emission rate limit). Accordingly,

concepts in the Agency's guidance document on bag leak detection systems to establish the alarm level.

³¹ Note that, as a practical matter, most sources must establish the chlorine feedrate limit as the average of the test run average feedrate limit during the comprehensive performance test to demonstrate compliance with the semivolatile emission standard. This is because chlorine feedrate is a compliance assurance parameter for the semivolatile metal emission standard. That feedrate limit is based on a 12-hour rolling average. To ensure compliance with the annual average HCl-equivalent emission rate limit, however, that feedrate limit cannot exceed the value calculated as the annual average HCl-equivalent emission rate limit divided by $[1 - \text{system removal efficiency}]$, where you demonstrate the total chlorine system removal efficiency during the performance test.

although your eligibility for the health-based compliance alternatives is based on annual average HCl-equivalent emissions, you must determine considering prescribed criteria whether your 1-hour HCl-equivalent emission rate may exceed the national exposure standard (i.e., Hazard Index not exceeding 1.0 considering the maximum 1-hour average ambient concentration of hydrogen chloride and chlorine at an off-site receptor location³²) and thus may exceed the 1-hour average HCl-equivalent emission rate limit absent an hourly rolling average limit on the feedrate of chlorine. If the acute exposure standard may be exceeded, you must establish an hourly rolling average chlorine feedrate limit as the 1-hour HCl-equivalent emission rate limit divided by $[1 - \text{system removal efficiency}]$. You establish the system removal efficiency during the comprehensive performance test.

(4) When calculating HCl-equivalent emission rates, rather than partitioning total chlorine emissions between chlorine and HCl (i.e., the Cl_2/HCl volumetric ratio) based on the comprehensive performance test as proposed, you must establish the Cl_2/HCl volumetric ratio used to calculate the annual average HCl-equivalent emission rate based on the historical average ratio from all regulatory compliance tests. You must establish the Cl_2/HCl volumetric used to calculate the 1-hour average HCl-equivalent emission rate as the highest of the historical ratios from all regulatory compliance tests. The rule allows you to exclude ratios from historical compliance tests where the emission data may not be representative of the current Cl_2/HCl ratio for reasons such as changes to the design or operation of the combustor or biases in measurement methods. The rule also explicitly allows the permitting authority to require periodic emissions testing to obtain a representative average and maximum ratio;

(5) The look-up table analysis has been refined by presenting annual average and 1-hour HCl-equivalent emission rate limits as a function of stack height, stack diameter, and distance to property line. In addition, separate look-up tables are presented for flat terrain and simple elevated terrain;

(6) The proposed rule required approval of the eligibility demonstration before you could comply with the alternative health-based emission limits

³² Under the site-specific risk assessment approach to demonstrate eligibility, you must consider locations where people reside and where people congregate for work, school, or recreation.

for total chlorine. Under the final rule, if your permitting authority has not approved your eligibility demonstration by the compliance date, and has not issued a notice of intent to disapprove your demonstration, you may nonetheless begin complying, on the compliance date, with the annual average HCl-equivalent emission rate limits you present in your eligibility demonstration. In addition, if your permitting authority issues a notice of intent to disapprove your eligibility demonstration, the authority will identify the basis for that notice and specify how much time you will have to submit additional information or to comply with the MACT total chlorine standards. The permitting authority may extend the compliance date of the total chlorine standards to allow you to make changes to the design or operation of the combustor or related systems as quickly as practicable to enable you to achieve compliance with the MACT total chlorine standards;

(7) We have revised the approach for determining chlorine emissions if you feed bromine or sulfur during the comprehensive performance test at levels higher than those specified in § 63.1215(e)(3)(ii)(B). Under the final rule, you must use EPA Method 320/321 or ASTM D 6735'01, or an equivalent method, to measure hydrogen chloride, and Method 26/26A, or an equivalent method, to measure chlorine and hydrogen chloride. You must determine your chlorine emissions to be the higher of: (1) The value measured by Method 26/26A, or an equivalent method; or (2) the value calculated by difference between the combined hydrogen chloride and chlorine levels measured by Method 26/26a, or an equivalent method, and the hydrogen chloride measurement from EPA Method 320/321 or ASTM D 6735-01, or an equivalent method; and

(8) The proposed rule would have required you to conduct a new comprehensive performance test if you planned to make changes to the facility that would lower the annual average HCl-equivalent emission rate limit. Under the final rule, you would be required to conduct a performance test as a result of a planned change only for a change to the design, operation, or maintenance of the combustor that could affect the system removal efficiency for total chlorine if the change could reduce the system removal efficiency, or if the change would increase the system removal efficiency and you elect to increase the feedrate limits on total chlorine and chloride.

Part Four: What Are the Responses to Major Comments?

I. Database

A. Revisions to the EPA's Hazardous Waste Combustor Data Base

Comment: Several commenters identify sources which have ceased operations as a hazardous waste combustor and should be removed from EPA's data base.

Response: We agree with commenters that data and information from sources no longer burning hazardous waste should not be included in our hazardous waste combustor data base and should not be used to calculate the MACT standards. We consider any source that has initiated RCRA closure procedures and activities as a source that is no longer burning hazardous waste. This data handling decision is consistent with the approach we used in the 1999 final rule. See 64 FR at 52844. As we stated in that rule, ample emissions data remain to support calculating the MACT standards without using data from sources that no longer burn hazardous waste.

As a result, we removed the following former hazardous waste combustors from the data base: the Safety-Kleen incinerator in Clarence, New York, the Dow Chemical Company incinerators in Midland, Michigan, and LaPorte, Texas, the two Holcim wet process cement kilns in Holly Hill, South Carolina, the Dow Chemical Company liquid fuel-fired boiler in Freeport, Texas, the Union Carbide liquid fuel-fired boilers in Hahnville, Louisiana, and Texas City, Texas, and six Dow Chemical Company hydrochloric production furnaces in Freeport, Texas.

We are retaining, however, Solite Corporation's lightweight aggregate facility in Cascade, Virginia, in the data base. Even though the facility recently initiated RCRA closure procedures, this data handling decision differs from those listed in the preceding paragraph because Solite Corporation provided this new information in February 2005 while information on the other closures was reported or available to us in 2004. Because we cannot continually adjust our data base and still finalize this rulemaking by the court-ordered deadline, we stopped making revisions to the data base in late 2004. Additional facility changes after that date, like Solite Corporation's Cascade facility closure, simply could not be incorporated.

Comment: One commenter identifies a source in EPA's data base that should be classified as a boiler instead of a hydrochloric acid production furnace.

Response: We agree with the commenter. In today's rule, Dow Chemical Company's boiler F-2820, located in Freeport, Texas, is reclassified in our data base as a boiler. This source is identified as unit number 2020 in our data base.

B. Use of Data From Recently Upgraded Sources

Comment: Many commenters recommend that EPA remove from the data base (or not consider for standards-setting purposes) emissions data from sources that upgraded their emissions controls to comply with the promulgated emission standards of either the 1999 rule or the 2002 interim standards. Several commenters also state that any emissions data that were obtained or used to demonstrate compliance with the promulgated standards of 1999 or 2002 should not be used for standard-setting purposes by the Agency. That is, EPA must evaluate the source category as it existed at the beginning of the rule development process and not after emissions controls are later added to comply with the 1999 or 2002 standards. Several commenters also state that EPA is only partly correct in claiming that the interim standards are not MACT standards because the interim standards were established and considered to be MACT until the Court issued its opinion in July 2001. Until that time, sources proceeded to upgrade their facilities to achieve the standards promulgated in 1999. The rationale for these recommendations is threefold: (1) Use of the data unfairly ignores the MACT-driven reductions already achieved by some sources; (2) it is contrary to sound public policy to use data from upgraded facilities to "ratchet down" the MACT floors to a level more stringent because these sources would not have increased their level of performance but for the legal obligation to comply with the standards; and (3) EPA's reliance on *National Lime Ass'n v. EPA*, 233 F.3d 625, 640 (D.C. Cir. 2000), for the proposition that the motivation for a source's performance is legally irrelevant in developing MACT floor levels is misplaced because that case involved the initial MACT standard setting process, and not a subsequent rule.

One commenter agrees with EPA's proposed position and states that use of data from sources that have upgraded is not only appropriate, but also required by the Clean Air Act. This commenter states that the actual performance of sources that have upgraded their emissions equipment—to meet the 1999 standards or for any reason—is reflected only by the most recently generated

emissions data for the source. Thus, the Clean Air Act requires EPA to use the most recently generated data available to it and precludes the Agency from using older, out-of-date performance data.

EPA also received several comments stating that the language of section 112(d)(3)(A) of the Clean Air Act informs how the Agency should consider emissions data from sources that conducted testing after that 1999 rule was promulgated. One commenter states that the only data which should not be used in calculating the MACT floors are from sources that are subject to lowest achievable emission rates (LAER). Thus, the commenter states, Congress considered the possibility of significant and recent upgrades, and concluded that EPA should use up-to-date data to reflect source's performance, but must exclude certain sources from the floor calculation if their upgrades were of a specific degree and were accomplished within a specific period of time. Another commenter states that Congress did not intend to pile technology upon technology as confirmed by section 112(d)(3)(A) that specifically excludes sources that implemented LAER from consideration when establishing section 112(d) standards. Thus, the commenter states, considering data from sources that have upgraded violates both the language and intent of the Clean Air Act. Another commenter states that, while Congress no doubt contemplated that EPA should use all available emissions information in setting initial MACT standards, neither the statute nor the legislative history suggest that follow-up MACT rulemakings require the use of data reflecting compliance efforts with previous MACT standards or interim standards.

Response: As proposed, EPA maintains its position on use of post-1999 emissions data. The statute indicates that EPA is to base MACT floors on performance of sources "for which the Administrator has emissions information." Section 112(d)(3)(A); *CKRC*, 255 F. 3d at 867. There can be no dispute that post-1999 performance data in EPA's possession fits this description. We also reiterate that the motivation for the control reflected in data available to us is irrelevant. See 69 FR at 21217–218. We further agree with those commenters who pointed out that Congress was explicit when it wanted certain emissions information (i.e., sources operating pursuant to a LAER standard) excluded from consideration in establishing floors. There is, of course, no such enumerated exception

for sources that have upgraded their performance for other reasons.

We also do not agree with those commenters arguing (with respect to the standards for the Phase 1 sources (incinerators, cement kilns, and lightweight aggregate kilns)) in effect that the present rulemaking involves revision of an existing MACT standard. If this were indeed a revision of a MACT standard under section 112(d)(6), then EPA would not redetermine floor levels. See 70 FR at 20008 (April 15, 2005). However, EPA has not to date promulgated valid MACT floors or valid MACT standards for these sources. The 1999 standards do not reflect MACT, as held by the *CKRC* court. The interim standards likewise do not reflect MACT, but were designed to prevent a regulatory gap and were described as such from their inception. 67 FR at 7693 (Feb. 13, 2002); see also *Joint Motion of all Parties for Stay of Issuance of Mandate* in case no. 99-1457 (October 19, 2001), pp. 11-12 (“The Parties emphasize that the contemplated interim rule is in the nature of a remedy. It would not respond to the Court’s mandate regarding the need to demonstrate that EPA’s methodology reasonably predicts the performance of the average of the best performing twelve percent of sources (or best-performing source). EPA intends to address those issues in a subsequent rule, which will necessarily require a longer time to develop, propose, and finalize.”) EPA consequently believes that it is adopting in this rule the initial section 112(d) MACT standards for hazardous waste burning incinerators, cement kilns, and lightweight aggregate kilns, and that the floor levels for existing sources are based, as provided in section 112(d)(3), on performance of those sources for which EPA has “emissions information.”

However, we disagree with the comment that we must make exclusive use of the most recent information from hazardous waste combustion sources. There is no such restriction in section 112(d)(3). EPA has exhaustively examined all of the data in its possession for all source categories covered by this rule, and determined (and documented) which data are suitable for evaluating sources’ performance.

C. Correction of Total Chlorine Data to Address Potential Bias in Stack Measurement Method

Comment: Several commenters state that EPA’s proposed total chlorine standards of 1.5 ppm for existing incinerators and 0.18 ppm for new incinerators are based on biased data of

indeterminate quality and are unachievable. Commenters assert that Method 26A and its RCRA equivalent, SW 846 Method 0050, have a negative bias at concentrations below 20 ppmv when used on stacks controlled with wet scrubbers. Commenters cite two recurring situations when this bias is likely to occur: (1) hydrogen chloride dissolving in condensed moisture in the sampling train; and (2) hydrogen chloride reacting with alkaline compounds from the scrubber water that are collected on the filter ahead of the impingers.

Commenters are particularly concerned about the negative bias associated with stack gas containing substantial water vapor. Commenters note that EPA found in a controlled laboratory study by Steger³³ that the bias is between 17 and 29 percent at stack gas moisture content of 7 to 9 percent. This stack gas moisture is much less than the nominal 50% moisture contained in some hazardous waste combustor stacks according to the commenters. Commenters believe this is why EPA’s Method 0050, which was used to gather most of the data in the HWC MACT data base, states in Section 1.2 that “this method is not acceptable for demonstrating compliance with HCl emission standards less than 20 ppm.”

Moreover, commenters state that the procedures in Method 0050 to address the negative bias caused by condensed moisture were not followed for many RCRA compliance tests. The method uses an optional cyclone to collect moisture droplets, and requires a 45 minute purge of the cyclone and sampling train to recover hydrogen chloride from water collected by the cyclone and any condensed moisture in the train. The cyclone is not necessary if the stack gas does not contain water droplets. According to commenters, the cyclone and subsequent purge were often not used in the presence of water droplets because a potential low bias below 20 ppmv was irrelevant when demonstrating compliance with emission standards on the order of 100 ppmv. There was no need for the extra complexity and expense of using a cyclone and train purge given the purpose of the test. Although the data were acceptable for their intended purpose, commenters conclude that the data are not useful for establishing standards below 20 ppmv.

For these reasons, commenters suggest that EPA not consider total

chlorine measurements below 20 ppmv when establishing the standards.

Response: For the reasons discussed below, we corrected all total chlorine measurements in our data base for all source categories that were below 20 ppmv to 20 ppmv to establish the total chlorine floors. Moreover, to address run-to-run variability given that all runs for several data sets are now corrected to 20 ppmv, we impute a run standard deviation based on a regression analysis of run standard deviation versus total chlorine concentration for sources with total chlorine measurements greater than 20 ppmv. This is the same approach we used to impute variability from sources using fabric filters when determining the particulate matter MACT floors.

Effect of Moisture Vapor. Commenters imply that stack gas with high levels of gas phase water vapor will inherently be problematic, particularly at emissions less than 20 ppmv. There is no basis for claiming that water vapor, per se, causes a bias in SW-846 Method 0050 or its equivalent, Method 26A. Condensed moisture (i.e., water droplets), however, can cause a bias because it can dissolve hydrogen chloride in the sampling train and prevent it from being captured in the impingers if the sampling train is not properly purged. Water droplets can potentially be present due to entrainment from the wet scrubber, condensation in cooler regions of the stack along the stack walls, and entrainment from condensed moisture dripping down the stack wall across the inlet duct opening.

Although Method 0050 addresses the water droplet issue by use of a cyclone and 45 minute purge, the Steger paper (Ibid.) concludes that a 45 minute purge is not adequate to evaporate all water collected by the cyclone in stacks with a total moisture content (vapor and condensed moisture) of 7 to 9%. At those moisture levels, Steger documented the negative bias that commenters reference. Steger’s recommendation was to increase the heat input to the sample train by increasing the train and filter temperature from 120C (248F) to 200C (392F). We agree that increasing the probe and filter temperature will provide a better opportunity to evaporate any condensed moisture, but another solution to the problem is to require that the post-test purge be run long enough to evaporate all condensed moisture. That is the approach used by Method 26A, which EPA promulgated after Method 0050, and which sources must use to demonstrate compliance with the final standards. Method 26A uses an extended purge time rather than

³³ Steger, J.L., et al, “Laboratory Evaluation of Method 0050 for Hydrogen Chloride”, Proc of 13th Annual Incineration Conference, Houston, TX, May 1994.

elevating the train temperature to address condensed moisture because that approach can be implemented by the stack tester at the site without using nonstandard equipment.

We attempted to quantify the level of condensed moisture in the Steger study and to compare it to the levels of condensed moisture that may be present in hazardous waste combustor stack gas. This would provide an indication if the bias that Steger quantified with a 45 minute purge might also be applicable to some hazardous waste combustors. We conclude that this comparison would be problematic, however, because: (1) given the limited information available in the Steger paper, it is difficult to quantify the level of condensed moisture in his gas samples; and (2) we cannot estimate the levels of condensed moisture in hazardous waste combustor stack gas because, even though condensed moisture may have been present during a test, method protocol is to report the saturation moisture level only (i.e., the amount of water vapor present), and not the total moisture content (i.e., both condensed and vapor phase moisture).

We can conclude, however, that, if hazardous waste combustor stack gas were to contain the levels of condensed moisture present in the gas that Steger tested, the 45 minute purge required by Method 0050 would not be sufficient to avoid a negative bias. We also conclude that this is potentially a practical issue and not merely a theoretical concern because, as commenters note, hazardous waste combustors that use wet scrubbers are often saturated with water vapor that will condense if the flue gas cools.

Data from Wet Stacks When a Cyclone Was Not Used. Commenters state that Method 0050 procedures for addressing water droplets (adequate or not, as discussed above) were not followed in many cases because a low bias below 20 ppmv was not relevant to demonstrating compliance with standards on the order of 100 ppmv. We do not know which data sets may be problematic because, as previously stated, the moisture concentration reported was often the saturation (vapor phase only) moisture level and not the total (vapor and liquid) moisture in the flue gas. We also have no documentation that a cyclone was used—even in situations where the moisture content was documented to be above the dew point. We therefore conclude that all data below 20 ppmv from sources controlled with a wet scrubber are suspect and should be corrected.

Potential Bias Due to Filter Affinity for Hydrogen Chloride. Studies by the American Society of Testing and

Materials indicate that the filter used in the Method 0050 train (and the M26/26A trains) may adsorb/absorb hydrogen chloride and cause a negative bias at low emission levels. (See ASTM D6735-01, section 11.1.3 and “note 2” of section 14.2.3) This inherent affinity for hydrogen chloride can be satisfied by preconditioning the sampling train for one hour. None of the tests in our database were preconditioned in such a manner.

We are normally not concerned about this type of bias because we would expect the bias to apply to all sources equally (e.g., wet or dry gas) and for all subsequent compliance tests. In other words, we are ordinarily less concerned if a standard is based on biased data, as long as the means by which the standard was developed and the means of compliance would experience identical bias.

However, we did correct the wet gas measurements below 20 ppmv to address the potential low bias caused by condensed moisture. This correction would also correct for any potential bias caused by the filter’s inherent affinity for hydrogen chloride. This results in a data set that is partially corrected for this issue—sources with wet stacks would be corrected for this potential bias while sources with dry stacks would not be corrected. To address this unacceptable mix of potentially biased and unbiased data (i.e., dry gas data biased due to affinity of filter for hydrogen chloride and wet gas data corrected for condensed moisture and affinity of filter for hydrogen chloride), we also correct total chlorine measurements from dry gas stacks (i.e., sources that do not use wet scrubbers).

Deposition of Alkaline Particulate on the Filter. Commenters are also concerned that hydrogen chloride may react with alkaline compounds from the scrubber water droplets that are collected on the filter ahead of the impingers. Commenters suggest this potential cause for a low bias at total chlorine levels below 20 ppmv is another reason not to use measurements below 20 ppmv to establish the standards.

Although alkaline particulate deposition on the method filter causing a negative bias is a much greater concern for sources that have stack gas containing high levels of alkaline particulate (e.g., cement kilns, sources equipped with dry scrubbers), we agree with commenters that this may be of concern for all sources equipped with wet scrubbers. Our approach to correct all data below 20 ppmv addresses this concern.

Decision Unique to Hazardous Waste Combustors. We note that the rationale for our decision to correct total chlorine data below 20 ppmv to account for the biases discussed above is unique to the hazardous waste combustor MACT rule. Some sources apparently did not follow Method 0050 procedures to minimize the low bias caused by condensed moisture for understandable reasons. Even if sources had followed Method 0050 procedures to minimize the bias (i.e., cyclone and 45 minute purge) there still may have been a substantial bias because of insufficient purge time, as Steger’s work may indicate. We note that the total chlorine stack test method used by sources other than hazardous waste combustors—Method 26A—requires that the cyclone and sampling train be purged until all condensed moisture is evaporated. We believe it is necessary to correct our data below 20 ppmv data because of issues associated exclusively with Method 0050 and how it was used to demonstrate compliance with these sources.

Determining Variability for Data at 20 ppmv. Correcting those total chlorine data below 20 ppmv to 20 ppmv brings about a situation identical to the one we confronted with nondetect data. See Part Four, Section V.B. below. The MACT pool of best performing source(s) for some data sets is now comprised of largely the same values. This has the effect of understating the variability associated with these data.

To address this concern, we took an approach similar to the one we used to determine variability of PM emissions for sources equipped with a fabric filter. In that case, we performed a linear regression on the data, charting variability against emissions, and used the variability that resulted from the linear regression analysis as the variability for the sources average emissions. In this case, most or all of the incinerator and liquid fuel boiler sources in the MACT pool have average emissions at or near 20 ppmv. We therefore performed a linear regression on the total chlorine data charting average test condition results above 20 ppmv against the variability associated with that test condition. The variability associated with 20 ppmv was the variability we used for incinerator and liquid fuel boiler data sets affected by the 20 ppmv correction.

We also considered using the statistical imputation approach we used for nondetect values. See discussion in Section IV.B below. The statistical imputation approach for correcting data below 20 ppmv without dampening variability would involve imputing a value between the reported value and 20

ppmv because the “true” value of the biased data would lie in this interval. This approach would be problematic, however, given that many of the reported values were much lower than 20 ppmv; our statistical imputation approach would tend to overestimate the run to run variability. Consequently, we conclude that a regression analysis approach is more appropriate. A regression analysis is particularly pertinent in this situation because: (1) We consider data above 20 ppmv used to develop the regression to be unbiased; and (2) all the corrected data averages for which we are imputing a standard deviation from the regression curve are at or near 20 ppmv. Thus, any potential concern about downward extrapolation from the regression would be minimized.

We note that, although a regression analysis is appropriate to estimate run-to-run variability for the corrected total chlorine data, we could not use a linear regression analysis to address variability of nondetect values. To estimate a standard deviation from a regression analysis, we would need to know the test condition average emissions. This would not be feasible, however, because some or all of the run measurements for a test condition are nondetect. In addition, we are concerned that a regression analysis would not accurately estimate the standard deviation at low emission levels because we would have to extrapolate the regression downward to levels where we have few measured data (i.e., data other than nondetect). Moreover, the statistical imputation approach is more suitable for handling nondetects because the approach calculates the run-to-run variability by taking into account the percent nondetect for the emissions for each run.³⁴ A regression approach would be difficult to apply particularly in the case of test conditions containing partial nondetects or a mix of detect and nondetect values. Given these concerns with using a regression analysis to estimate the standard deviation of test conditions with runs that have one or more nondetect (or partial nondetect) measurements, we conclude that the statistical imputation approach best assures that the calculated floor levels account for run-to-run emissions variability.

Compliance with the Standards. The final standards are based on data that were corrected to address specific issues concerning these data. See the above

³⁴ For multi-constituent HAP (e.g. SVM) the emissions for a run could be comprised of fully detected values for some HAP and detection limits for other HAP that were nondetect.

discussion regarding stack gas moisture, filter affinity for hydrogen chloride, and alkaline compound reactions with hydrogen chloride in the sampling train.

Sources must demonstrate compliance using a stack test method that also addresses these issues. Sources with wet stacks must use Method 26A and follow those procedures regarding the use of a cyclone and the purging of the system whenever condensed moisture may be present in the sampling system.

Finally, all sources—those with either wet or dry gas—should precondition the sampling train for one hour prior to beginning the test to satisfy the filter’s affinity for hydrogen chloride. The permitting authority will ensure that sources precondition the sample train (under authority of § 63.1209(g)(2)) when they review and approve the performance test plan.

D. Mercury Data for Cement Kilns

Comment: Several commenters state that EPA’s data base of mercury emissions data (and associated feed concentrations of mercury in the hazardous waste) are unrepresentative and unsuitable for use in determining MACT standards for cement kilns. These comments are supported by an extensive amount of data submitted by the cement manufacturing industry including three years of data documenting day-to-day levels of mercury in hazardous waste fuels fired to all 14 hazardous waste burning cement kilns.³⁵ The commenters recommend that EPA use the commenter-submitted data as the basis for assessing cement kilns’ performance for control of mercury because it is the most complete and representative data available to EPA.

Response: We agree that the commenter-submitted mercury data are more representative than those we used at proposal. First, these data represent a significantly larger and more comprehensive dataset compared to the one used to support the proposed mercury standard. The commenter-submitted data document the day-to-day levels of mercury in hazardous waste fired to all cement kilns for a three year period covering 1999 to 2001. In total, approximately 20,000 measurements of the concentration of mercury in hazardous waste are included in the dataset. When considered in whole, these data describe the performance (and variability thereof) of all cement kilns for the three year period because each measurement represents the mercury concentration in the burn tank

³⁵ See docket item OAR–2004–0022–0049.

used to fire the kiln over the course of a day’s operation (or longer period).³⁶ In comparison, the data used to support the proposed floor level consisted of a much smaller dataset of approximately 50 test conditions representing a snapshot of performance somewhere in the range of normal operations, with each test condition representing a relatively short period of time (e.g., several hours).³⁷ As discussed at proposal, we were concerned regarding the representativeness of this smaller dataset. See 69 FR at 21251. In addition, the commenter-submitted dataset allows us to better evaluate the only mercury control technique used by existing hazardous waste burning cement kilns—controlling the feed concentration of mercury in the hazardous waste. The commenters have demonstrated convincingly that the mercury dataset used at proposal does not properly show the range of performance and variability in performance these cement kilns actually experience, while the significantly more robust dataset submitted by commenters does illustrate this variability. Thus, we conclude the larger commenter-submitted dataset is superior to EPA’s smaller testing dataset.

We note that our MACT floor analysis of the commenter-submitted dataset to determine which sources are the best performers and to identify a mercury standard for cement kilns is discussed in the background document.³⁸ Additional discussion of issues related to the mercury standard for cement kilns is found in Part Four, Section VI.B of the preamble.

³⁶ Mercury is a volatile compound at the typical operating temperatures of the air pollution control devices used by cement kilns (i.e., baghouses and electrostatic precipitators). Most of the mercury exits the cement kiln system as volatile stack emissions, with a smaller fraction partitioning to the clinker product or cement kiln dust. Thus, in general, there is a proportional relationship between the mercury concentration in the hazardous waste and stack emissions of mercury (i.e., as the mercury concentration in hazardous waste increases (assuming mercury concentrations in other inputs such as raw materials and fossil fuels (coal) and other factors remain constant), emissions of mercury will correspondingly increase).

³⁷ EPA’s dataset for mercury for cement kilns is not like the RCRA compliance test emission data for other HAPs where each source designs the compliance test such that the operating limits it establishes account for the variability it expects to encounter during its normal operations (e.g., semi- and low volatile metals). This is not necessarily true for mercury for cement kilns as shown in our analysis of our mercury dataset at proposal. See 69 FR at 21251.

³⁸ USEPA, “Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards,” Sections 7.5.3 and 11.0, September 2005.

E. Mercury Data for Lightweight Aggregate Kilns

Comment: One commenter, an owner and operator of seven of the nine operating lightweight aggregate kilns, states that the mercury dataset used by EPA at proposal is a limited and unrepresentative snapshot of performance of their seven kilns. To support their position that the snapshot emissions data are unrepresentative, the commenter submitted eight months of data documenting levels of mercury in hazardous waste fuels fired to their lightweight aggregate kilns.³⁹

Response: We agree with the commenter that their mercury data submission is more representative than those used at proposal. As discussed in a notice for public comment sent directly to certain commenters,⁴⁰ the commenter-submitted dataset documents the day-to-day levels of mercury in hazardous waste fuels fired to Solite Corporation's Arvonias kilns between October 2003 and June 2004. The dataset consists of over 310 measurements of the concentration in mercury in hazardous waste. Each measurement represents the mercury concentration of the burn tank used to fire the kiln over the course of a day's operation (or longer period). In comparison, the data used to support the proposed floor level consisted of a smaller dataset of 15 test conditions.

The nature of the mercury data submitted by the commenter is the same as we received for the cement kiln category discussed in the preceding section. For similar reasons, we accept the more comprehensive commenter-submitted dataset as one that better shows the range of performance and variability in performance for these lightweight aggregate kilns. One notable difference, however, is that the commenter submitted mercury data only for its company (representing seven of nine lightweight aggregate kilns). Thus, we received no data documenting day-to-day levels of the concentration of mercury in hazardous waste fuels for the other two lightweight aggregate kilns owned by a different company. For these two lightweight aggregate kilns, we continue to use available data available in our database.⁴¹

³⁹ See docket items OAR-2004-0022-0270 and OAR-2004-0022-0333.

⁴⁰ See docket item OAR-2004-0022-0370.

⁴¹ Unlike that is available for the commenter's kilns, we note that we have compliance test emissions data, which is designed to maximize operating parameters (e.g., HAP feedrates) that affect emissions, for the other two kilns. For additional discussion on how these data were analyzed in conjunction with the commenter-

Comment: One commenter opposes the use of the commenter-submitted mercury data because EPA would be uncritically accepting a limited and select data set from a commenter with a direct interest in the outcome of its use. Instead, the commenter suggests EPA use its section 114 authority to obtain all data that are available, not just the data selected by that commenter.

Response: We disagree that we uncritically accepted the commenter-submitted mercury data. The reason the commenter submitted data collected between October 2003 and June 2004 is that the facility was, prior to October 2003, in the process of upgrading its on-site analysis equipment. One outcome of this laboratory upgrade was its capability to detect mercury in hazardous waste at lower concentrations. Prior to the upgrade, the facility's on-site laboratory was capable of detecting mercury in the hazardous waste at a concentration of approximately 2 ppmw, which is a level such that the vast majority of measurements would neither be detected nor useful for identifying best performers and their level of performance.⁴² The June 4, 2004 cutoff date represents a practicable date that measurements could still be incorporated into the commenter's public comments to the proposed rule, which were submitted on July 6, 2004. Finally, the commenter provided all waste fuel measurements during this period and states reliably that no measurements made during this period were selectively excluded.⁴³

We also reject the commenter's suggestion that we use our authority under section 114 of the Clean Air Act to obtain additional hazardous waste mercury concentration data from the facility. There is no obligation for us to gather more performance data, given that the statute indicates that we are to base floor levels on performance of sources "for which the Administrator has emissions information." Section 112(d)(3)(A); *CKRC*, 255 F. 3d at 867. In addition, given our concerns about the usefulness of measurements with high detection limits discussed above, the collection of additional data prior to the laboratory upgrade would not be productive. When balanced against the

submitted data, see the document "Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards," Section 7.5.3 and 12.0, September 2005.

⁴² A mercury concentration of 2 ppmw in the hazardous waste corresponds to a stack concentration of approximately 200 µg/dscm, which is well above the interim standard of 120 µg/dscm for mercury.

⁴³ See also docket items OAR-2004-0022-0233 and OAR-2004-0022-0367.

expenditure of significant resources, both in time and level of effort, to collect several more months of data, we conclude that obtaining additional mercury measurements is unnecessary because the available eight months of data—including over 310 individual measurements—represent a significant amount of data that we judge to be adequately reflective of the source's performance and variability in performance.

F. Incinerator Database

Comment: Commenters state that many of the top performers (e.g., 3011, 3015, 3022, 349) dilute emission concentrations in the stack by burning natural gas to initiate reactive waste (e.g., explosives, inorganic hydrides) or to decontaminate inert material. Commenters do not believe these units should be considered "representative" of the overall incinerator source category and should not be used to establish standards for incinerators combusting primarily organic wastes.

Response: Source 3022 has closed and has been removed from the database. Emission data from source #3015 (ICI explosives) has been excluded for purposes of calculating the particulate matter floor because the test report indicates this source was primarily feeding scrap metal, which we conclude to be an atypical waste stream from a particulate matter compliance perspective.⁴⁴

The sources identified by the commenter are among the best performing sources in two instances. Source 3011 is the second ranked best performer for the particulate matter standard. This source is among the best performers for particulate matter because it uses a state-of-the-art baghouse that is equipped with Teflon coated bags. There is no evidence to suggest that this source was diluting its particulate matter emissions. We acknowledge that we do not have ash feed data for the test conditions that were used in the particulate matter standard analysis. However, this source had the third and fourth highest metal feed control levels among all the sources used in the MACT analysis for the semivolatile and low volatile metal

⁴⁴ We did not have ash feed data for source 3015. We acknowledge that ash feed control levels do not significantly affect particulate matter emissions from sources equipped with baghouses. However, in this instance, the particulate matter emissions from this source may not be representative because this source may not have been feeding any appreciable levels of ash given that scrap metal feeds generally would not contribute to the ash loading into the baghouse.

standards.⁴⁵ We therefore conclude that it is appropriate to include this source in the MACT analysis that determines the relevant best performers for particulate matter.

Source 349 is the eighth ranked (out of 11) best performer for the particulate matter standard. We acknowledge that the ash feed level for this source is lower than most incinerators equipped with baghouses. However, particulate matter emissions from sources equipped with baghouses are not significantly affected by the ash inlet loading to the baghouse.⁴⁶ This is further supported by the fact that this source is ranked eighth among the best performers. We conclude source 349 is a best performer not because of its relatively low ash feed level, but rather because it is equipped with a well designed and operated baghouse. It is therefore appropriate to include this source in the MACT analysis.

Comment: Commenters state that source 341 should not be considered in the MACT analysis because it is a small laboratory waste burner that processes only 900 lbs/hr of waste. Commenters claim that more than 80 percent of the waste profile is non-hazardous waste.

Response: We approached this comment by asking if it would be appropriate to create a separate subcategory for source 341. We conclude it is not necessary to subcategorize hazardous waste incinerators based on the size of combustion units. This is because the ranking factors used to identify the relevant best performing sources are normalized in order to remove the influence that combustion unit size would otherwise have when identifying best performing sources. See part 4 section III.D below. Air pollution control system types (a ranking factor for particulate matter) are generally sized to match the corresponding volumetric gas flow rate in order to achieve a given control efficiency. The size of the combustor therefore does not influence a source's ability to achieve a given control efficiency. System removal efficiency and hazardous waste feed control MTECs (ranking factors used by the SRE/Feed methodology as described in part 4 section III.B below)

⁴⁵ We note that feed control levels are normalized based on each source's gas flowrate. The feed control levels used to assess performance are therefore appropriate indicators that directly address whether emissions of these pollutants are in fact being diluted by the combustion of natural gas.

⁴⁶ See USEPA, "Technical Support Document for the HWC MACT Standards, Vol I: Description of Source Categories," September 2005, Section 3.2.2, for further discussion.

are also not influenced by the size of the combustor.⁴⁷

Emission limitations are similarly normalized to remove the influence of combustion unit size by expressing the standards as emission concentration limits rather than as mass emission rate limits. See section III.D. This is illustrated in the following example. Assume there are two cement kilns side by side with similar designs, the only difference being one is twice the size of the other, producing twice as much clinker. They both have identical types of air pollution control systems (the larger source is equipped with a larger control device that is appropriately sized to accommodate the larger volumetric gas flow rates and achieves the same control efficiency as the smaller control device). If we were to assess performance based on HAP mass emission rates (e.g., pounds per hour), the smaller source would be the better performer because its mass emission rates would be half of the mass emission rate of the larger source, even though they both are achieving the same back-end control efficiency. Emission concentrations, on the other hand, are calculated by dividing the HAP mass emission rate (e.g., pounds per hour) by the volumetric gas flowrate (e.g., cubic feet per hour). In the above example, both sources would have identical HAP emission concentrations (the larger source has twice the mass emission rate, but twice the volumetric gas flow rate), accurately reflecting their identical control efficiency. Emission concentrations normalize the size of each source by accounting for volumetric gas flowrate, which is directly tied to the amount of raw material each source processes (and subsequently the amount of product that is produced). This is a reason we point out that normalization eliminates the need to create subcategories based on unit size. See part four section III.D.

Further, it would be difficult to determine an appropriate minimum size cutoff in which to base such a subcategorization determination. Such a subcategorization scheme could also yield nonsensical floor results, as was the case when we assessed

⁴⁷ System removal efficiency is a measure of the amount of the pollutant that is removed from the flue combustion gas prior to being emitted and likewise is not influenced by the size of the combustor because back-end control systems are sized to achieve a given performance level. Hazardous waste feed control levels are normalized to remove the influence of combustor size by dividing each source's mass feed rate by its volumetric gas flowrate.

subcategorizing commercial incinerators and on-site incinerators.⁴⁸

We have identified source 341 as the best performing source for particulate matter and low volatile metals. It is the single best performing source for these standards because it is equipped with a state-of-the-art baghouse.⁴⁹ This source, which simultaneously feeds hazardous and nonhazardous wastes, conducted several emission tests that reflected different modes of operation. The amount of nonhazardous waste that was processed in the combustion unit varied across test conditions. We could not ascertain the exact amount of hazardous waste processed in the test condition that was used in the MACT analysis for low volatile metals because the test report stated the wastes that were processed were a mixture of hazardous and nonhazardous wastes, although we estimate that at least 26% of the waste processed was nonhazardous.⁵⁰ We note that we are aware of several other incinerators that processed nonhazardous waste at levels greater than 26 percent during their emission tests. We therefore do not believe this to be atypical operation that warrants subcategorization.

Moreover, the fact that this source was feeding nonhazardous wastes does not result in atypically low hazardous waste low volatile metal feed control levels, as evidenced by the relative feed control ranking for this source of thirteenth among the 26 sources assessed in the MACT analysis. It also has the highest normalized hazardous waste feed control level among the best performing sources, and has the fifth best low volatile metal system removal efficiency among those same 26 sources. We repeat that this source is being identified as the best performing source primarily because it is equipped with a highly efficient baghouse, not because it is feeding low levels of HAP metals attributable to its hazardous waste.

Furthermore, this source is not the lowest emitting source in the database. There are two sources with similar, but slightly lower low volatile metal compliance test emissions (one commercial incinerator and one onsite, non-commercial incinerator). This provides further evidence that the

⁴⁸ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards", September 2005, Section 4.3.2 for further discussion.

⁴⁹ See USEPA, "Final Technical Support Document for the HWC MACT Standards, Volume I: Description of Source Categories", September 2005, Section 3.2.1, for further discussion.

⁵⁰ See USEPA, "Final Technical Support Document for the HWC MACT Standards, Volume I: Description of Source Categories", September 2005, Section 2.1 for further discussion.

emissions from this source appropriately represent emissions of a relevant best performing source.

Regarding the particulate matter standard, source 341 does not have atypically low ash feed rates as compared to other sources equipped with baghouses. Out of the nine best performing particulate matter sources for which we have ash feed information, this source ranks fourth (a ranking of one is indicative of the lowest ash feed rate). Nonetheless, as previously discussed, particulate matter emissions from sources equipped with baghouses are not significantly affected by the ash inlet loading to the baghouse. We note that particulate matter emissions from the second and third best performing source are not significantly different from this source, providing further evidence that this source is representative of the range of emissions exhibited by other well designed and operating incinerators equipped with baghouses.⁵¹

Comment: Commenters state that sources 3018 and 3019 are identified as best performers for mercury emissions for incinerators. After evaluating the trial burn plans for these sources, the commenter believes the data should not be used to calculate the MACT floor because the spiking rate for mercury was extremely low for a compliance test. The ranking for feedrate is therefore unrepresentative. The commenter suggests that these test results should be characterized as "normal".

Response: We have verified that the emission tests performed for sources 3018 and 3019 reflect the upper range of mercury emissions that are not to be exceeded by these sources, and that their spiked mercury feed rates were back-calculated from a risk assessment. We therefore conclude that we properly characterized these emissions as compliance test emissions data because they reflect the emissions resulting from the upper bound of hazardous waste mercury feedrates from these sources.⁵² Consequently, these data are properly included with the other data used to calculate floor standards for mercury for incinerators.

Comment: Commenters state the trial burn plan for sources 3018 and 3019 describes these units to be of similar design. Thus the difference in results between these two similar sources is

indicative of additional variability above and beyond the run-to-run variability and should be assessed if the data are deemed usable at all.

Response: We conclude both of these sources are in fact unique sources that should be assessed as individual sources for purposes of the MACT analysis. Although these sources are of similar design, we do not believe they are identical, in part because: (1) The facility itself conducted separate emission tests for the two units (rather than trying to avail itself of the 'data in lieu' option, which could save it the expense of a second compliance test, the obvious inference being that the source or regulatory official regards the two units as different); and (2) discussions with facility representatives indicated these units are similar, but not identical.⁵³ As a result, it would be inappropriate to assess emissions variability by combining the emissions of these two sources into one test condition given they are not identical units.

Comment: Commenters state that emissions data from source 327 should not be used to calculate dioxin/furan and mercury floors because they claim the carbon injection system did not appear to function properly during the test.

Response: We agree with the commenters. We have determined that this source encountered problems with its carbon injection system during the emissions test from which the data were obtained and subsequently used in EPA's proposed MACT analysis. We have also verified that this source did not establish operating parameter limits for the carbon injection system as a result of this test.⁵⁴ We therefore have excluded this mercury and dioxin data from the MACT analysis, and have instead used emissions data from an older test condition to represent this source's emissions.

Comment: Commenters state that the emissions data from source 3006 were based on a miniburn to determine how close the unit was to achieving the interim MACT standards. The commenter questions whether these data should be used for purposes of calculating MACT standards.

Response: The fact that a source conducts a voluntary emissions test (e.g., a miniburn) to determine how close it is operating to upcoming emission standards does not necessarily

lead us to conclude that the emission data are inappropriate for purposes of calculating MACT standards. However, since proposal, we have determined that this source did not measure cadmium emissions during this emissions test. As a result, we conclude the semivolatile metal emissions data from this source should not be used in the MACT standard calculation for semivolatile metals because the data do not represent the source's combined emissions of lead and cadmium.

II. Affected Sources

A. Area Source Boilers and Hydrochloric Acid Production Furnaces

Comment: Five commenters state that the area sources subject to the proposed rule are negligible contributors to 112(c)(6) HAP emissions and should not be subject to major source standards for 112(c)(6) HAP. Commenters note that requiring compliance with MACT for 112(c)(6) HAP and RCRA for other toxic pollutants is more complicated and burdensome for sources than complying only with RCRA. Although an area source can choose to become regulated as a major source in order to reduce some RCRA requirements, they would become subject to more onerous emissions limits under Subpart EEE and the other MACT requirements.

One of these commenters states that subjecting an area source to major source standards under 112(c)(6) sends a negative message to industry that EPA does not value emissions reduction and/or chemical substitution, or other methods used by area sources to achieve that status. EPA is no longer providing any incentive for sources to take such difficult yet environmentally beneficial steps to become an area source.

Imposing Title V permitting requirements on an entire facility that operates as an area source of hazardous air pollutants (HAPs) will impose an unfair and undue burden on the facility.

Another of these commenters states that section 112(c)(6) requires in pertinent part that EPA list categories and subcategories of sources assuring that sources accounting for not less than 90% of the aggregate emissions of each pollutant (specified in 112(c)(6)) are subject to standards under Section 112(d)(2) or (d)(4). In 1998, EPA published a notice identifying the list of source categories accounting for the section 112(c)(6) HAP emissions and to be regulated under section 112(d) to meet the 90% requirement. (63 FR 17838) At the time, EPA acknowledged that MACT standards for a number of the source categories had not yet been promulgated, and stated that when the

⁵¹ Source 341 particulate matter emissions, after accounting for variability, equated to 0.0015 gr/dscf. The second and third ranked particulate matter sources emissions, considering variability, equated to 0.0018 and 0.0023 gr/dscf, respectively.

⁵² See February 11, 2005 memo to docket titled "October 20 Conference Call with Squibb Manufacturing regarding Source # 3018 and 3019".

⁵³ Also see February 11, 2005 memo to docket titled "October 20 Conference Call with Squibb Manufacturing regarding Source # 3018 and 3019".

⁵⁴ See July 15, 2005 memo to docket titled "Telephone Conversation with Utah DEQ Regarding 2001 Clean Harbor Emission Test."

regulations for each of those categories are developed, EPA will analyze the data specific to those sources and determine, under Section 112(d), in what manner requirements will be established. EPA also stated that:

“Some area categories may be negligible contributors to the 90% goal, and as such pose unwarranted burdens for subjecting to standards. These trivial source categories will be removed from the listing as they are evaluated since they will not contribute significantly to the 90% goal.” (63 FR 17841)

The commenter believes the “two or fewer” area source boilers identified by EPA in the present rulemaking are “negligible contributors” to the 90% goal and therefore, should not be required to adopt the same MACT emission limitations and requirements as major sources of the 112(c)(6) pollutants. The commenter believes EPA’s decision to subject area source boilers and hydrochloric acid production furnaces is incorrect, unsupported by the administrative record, and therefore arbitrary and capricious.

One commenter states that, if EPA regulates area sources, it should significantly reduce the administrative burden for area sources by: exempting them from Title V provisions for Subpart EEE requirements; exempting them from compliance with the General Provisions of 63 Subpart A; limiting them to a one-time comprehensive performance test; or limiting other applicable requirements.

Response: We continue to believe that boiler and hydrochloric acid furnace area sources warrant regulation under the major source MACT standards for mercury, dioxin/furan, carbon monoxide/hydrocarbons, and destruction and removal efficiency pursuant to section 112(c)(6).

As discussed at proposal (69 FR at 21212), section 112(c)(6) of the CAA requires EPA to list and promulgate section 112(d)(2) or (d)(4) standards (i.e., standards reflecting MACT) for categories and subcategories of sources emitting seven specific pollutants. Five of those listed pollutants are emitted by boilers and hydrochloric acid production furnaces: mercury, 2,3,7,8-tetrachlorodibenzofuran, 2,3,7,8-tetrachlorodibenzo-p-dioxin, polycyclic organic matter, and polychlorinated biphenyls.

As discussed below, EPA must assure that source categories accounting for not less than 90 percent of the aggregated emissions of each enumerated pollutant are subject to MACT standards (and of course is not prohibited from requiring more than 90 percent of aggregated emissions to be controlled by MACT

standards). Congress singled out the pollutants in section 112(c)(6) as being of “specific concern” not just because of their toxicity but because of their propensity to cause substantial harm to human health and the environment via indirect exposure pathways (i.e., from the air through other media, such as water, soil, food uptake, etc.). Furthermore, these pollutants have exhibited special potential to bioaccumulate, causing pervasive environmental harm in biota and, ultimately, human health risks.

Section 112(c)(6) of the CAA requires EPA to list categories and subcategories of sources of seven specified pollutants to assure that sources accounting for not less than 90 percent of the aggregate emissions of each such pollutant are subject to standards under CAA section 112(d)(2) or 112(d)(4). In 1998, EPA issued the list of source categories pursuant to section 112(c)(6), and that list is published at 63 Fed. Reg. 17838, 17849, Table 2 (April 10, 1998).

In the 1998 listing, EPA identified the following three subcategories of the HWC source category that emit one or more of the seven section 112(c)(6) pollutants: (1) Hazardous waste incinerators—(emit mercury, dioxin, furans, polycyclic organic matter (POM) and polychlorinated biphenyls (PCBs)); (2) Portland cement manufacture: hazardous waste kilns—(emit mercury, dioxin, furans, and POM); and (3) lightweight aggregate kilns: hazardous waste kilns—(emit dioxin, furans, and mercury). These three subcategories are all subject to today’s rule, which is issued pursuant to CAA section 112(d)(2). As explained below, the HWC NESHAP effectively controls emissions of the identified section 112(c)(6) pollutants from the identified subcategories. Accordingly, EPA considers the sources in these three subcategories as being “subject to standards” for purposes of section 112(c)(6).

Specifically, with regard to hazardous waste-burning incinerators, cement kilns, and lightweight aggregate kilns, EPA is adopting in this final rule MACT standards for mercury and dioxins/furans. EPA has already adopted MACT standards for control of POM and PCBs emitted by these sources in the 1999 rule, which standards were not reopened or reconsidered in this rulemaking. These standards are the CO/HC standards, which in combination with the Destruction Removal Efficiency (DRE) requirement, assure that these sources operate continuously under good combustion conditions which inhibit formation of POM and PCBs as combustion by-

products, or destroy these HAP if they are present in the wastes being combusted.⁵⁵ See discussion in Part Four, Sections V.A and V.B of this preamble.

The HWC NESHAP also applies to hazardous waste-burning boilers and hydrochloric acid production furnaces. In particular, for these boilers and furnaces, this rule addresses emissions of dioxin/furan, mercury, POM and PCBs either through specific numeric standards for the identified HAP, or through standards for surrogate pollutants which control emissions of the identified HAP.

We estimate that approximately 620 pounds of mercury are emitted annually in aggregate from hazardous waste burning boilers in the United States.⁵⁶ Also, we estimate that hazardous waste burning boilers and hydrochloric acid production furnaces emit in aggregate approximately 2.3 and 0.2 grams TEQ per year of dioxin/furan, respectively. Controlling emissions of these HAP from area sources consequently reduces emissions of these HAP through application of MACT standards. We note that only major source boilers and hydrochloric acid furnaces are subject to the full suite of subpart EEE emission standards.⁵⁷ Section 112(c)(3) of the CAA requires us to subject area sources to the full suite of standards applicable to major sources if we find “a threat of adverse effects to human health or the environment” that warrants such action. We cannot make this finding for area source boilers and halogen acid production furnaces. 69 FR at 21212. Consequently, as proposed, area sources in these categories would be subject only to the MACT standards for mercury, dioxin/furan, and polycyclic

⁵⁵ Courts have repeatedly upheld EPA’s authority under CAA section 112(d) to use a surrogate to regulate hazardous pollutants if it is reasonable to do so. See, e.g., *National Lime*, 233 F. 3d at 637 (holding that EPA properly used particulate matter as a surrogate for HAP metals).

⁵⁶ See USEPA “Technical Support Document for HWC MACT Standards, Volume V: Emission Estimates and Engineering Costs,” September, 2005, Section 3.

⁵⁷ We note that as a practical matter, however, the same MACT standards apply to both major and area source HCl production furnaces. This is because major sources are subject to the following standards: CO/HC, DRE, and total chlorine. Because the CO/HC and DRE standards are surrogates to control dioxin/furan, and the total chlorine standard is a surrogate to control metal HAP, area sources are subject to the same standards that address dioxin/furan, polycyclic organic matter, polychlorinated biphenyls, and mercury. There is an enforcement difference between the requirements, however. For area sources, an exceedance of the total chlorine standard (or failure to ensure that compliance is maintained) relates to control of mercury only while for a major source, the same failure relates to control of mercury, other metal HAP, and HCl and chlorine.

organic matter and polychlorinated biphenyls (through the surrogate standards for carbon monoxide/hydrocarbons and destruction and removal efficiency) to control the HAP enumerated in section 112(c)(6). RCRA standards under Part 266, Subpart H for particulate matter, metals other than mercury, and hydrogen chloride and chlorine gas would continue to apply to these area sources unless an area source elects to comply with the major source standards in lieu of the RCRA standards. See § 266.100(b)(3) and the revisions to §§ 270.22 and 270.66.

Commenters refer to the “two or fewer” potential area source boilers we identified at proposal as “negligible contributors” and, therefore, conclude that these area sources should not be subject to major source standards for emission of these HAPs. Commenters did not quantify the amount of emissions from area sources, and did not even identify how many area sources are at issue. We do not know how many boilers and hydrochloric acid furnaces are area sources. We apparently underestimated the number given that four companies commented on the proposed rule saying that area sources should not be subject to major source standards for mercury, dioxin/furan, PCBs, and polycyclic organic matter, and one of those companies indicates it operates multiple area sources. Consequently, we continue to believe that area sources in these categories may have the potential to emit more than negligible levels of these HAP.

We also note that the major source standards are tailored to minimize the compliance burden for sources that emit low levels of HAP. Commenters raise concerns about applying the major source standards for HAP enumerated in section 112(c)(6) to liquid fuel boiler area sources. The emission standard compliance burden for liquid fuel boilers that have the potential to emit only low levels of mercury, dioxin/furan, and polycyclic organic matter is minimal. For example, sources that emit low levels of mercury because their feedstreams have low levels of mercury can elect to comply with the mercury emission standard by documenting that the mercury in feedstreams will not exceed the standard assuming zero removal by emission control equipment. We note that 75% of the liquid fuel boilers in our data base, and the two boilers cited by commenters, do not have emission control devices.

The compliance burden for the major source standards for dioxin/furan and for the surrogates to control other polycyclic organic matter—carbon

monoxide/hydrocarbons and destruction and removal efficiency (DRE)—should also be minimal for area source liquid fuel boilers. The dioxin/furan standard applicable to the 90% of liquid fuel boilers with wet or no air pollution control equipment is compliance with the carbon monoxide/hydrocarbon standard and the DRE standard. Liquid fuel boilers already comply with these same standards under RCRA. The surrogate standards to control other polycyclic organic matter are also the carbon monoxide/hydrocarbon and DRE standards. Finally, we note that the DRE requirement under Subpart EEE is less burdensome than the DRE requirement under RCRA. Under Subpart EEE, a source needs to conduct a one-time only DRE test, provided that design and operation does not change in a manner than could adversely affect DRE. Under RCRA, the DRE test must be conducted each time the RCRA permit is renewed.

The incremental compliance burden associated with the other Subpart EEE major source requirements, such as the operations and maintenance plan, the startup, shutdown, and malfunction plan, operator training, and the automatic waste feed cutoff system should also be minimal for liquid fuel boilers without an emission control device. In addition, most of the requirements are either identical to or very similar to requirements under RCRA with which these area sources are already complying.⁵⁸

B. Boilers Eligible for the RCRA Low Risk Waste Exemption

Comment: Several commenters state that EPA should exempt those boilers that qualify as Low Risk Waste Exemption (LRWE) burners under the RCRA Boiler and Industrial Furnace Rule at § 266.109 from the MACT particulate matter and destruction and removal efficiency (DRE) standards because EPA has not: (1) Made a demonstration that the data used to provide the exemption to low risk burners under RCRA is no longer valid; or (2) established in the affirmative that regulating these units will provide any benefit to human, health and the environment. Commenters believe that

⁵⁸ RCRA, 40 CFR Part 264 requirements that are similar to MACT requirements include: the general inspection requirements and personnel training requirements of Subpart B; the preparedness and prevention requirements of Subpart C, including design and operation of facility, testing and maintenance of equipment, and access to communications or alarm system; the contingency plan and emergency procedures requirements of Subpart D; and the operating requirements and monitoring and inspection requirements of Subpart O.

regulating LRWE units under Subpart EEE is unnecessary and inconsistent with RCRA subtitle C and more importantly, appears to be controlling LRWE units for control's sake.

Commenters also state that EPA has not properly addressed the requirements of CAA section 112(n)(7) regarding the inconsistency between the requirements for Low Risk Waste Exempt (LRWE) units under RCRA and those of Subpart EEE. The purported purpose of section 112(n)(7) is to allow EPA to avoid imposing additional emission limitations on a source category subcategory when such limitations would be unnecessary and duplicative.

In addition, commenters state that the costs associated with this MACT are much more than improved feed control or better back-end control. This proposed rule also requires substantial dollar investment in improved data acquisition, computer controls and recordkeeping systems, performance testing, training, development of plans, and other regulatory requirements.

Response: Boilers and hydrochloric acid production furnaces that currently qualify for the RCRA § 266.109 low risk waste exemption are not exempt from Subpart EEE under the final rule.

The Administrator does not have the authority under CAA section 112(d) to exempt sources that comply with RCRA § 266.109. Indeed, there is no necessary connection between the two provisions, since one is technology-based and the other is risk-based. CAA section 112(d)(2) requires the Administrator to establish technology-based emission standards, standards that require the maximum degree of reduction in emissions that is deemed achievable. Although section 112(d)(4) gives the Administrator the authority to establish health-based emission standards in lieu of the MACT standards for pollutants for which a health threshold has been established, we cannot use that authority to develop health-based standards for sources that comply with RCRA § 266.109 because those sources emit HAP for which a health threshold has not been established.

The final rule complies fully with CAA section 112(n)(7) by coordinating applicability of the RCRA and CAA requirements and precluding dual requirements. For example, RCRA requirements that are duplicative of MACT requirements will be removed from the RCRA operating permit when the permitting authority issues a certification of compliance after the source submits a Notification of Compliance.

We also note that the MACT standards are tailored to impose

minimal burden on sources that have low emissions of HAP. The particulate matter emission standard and associated testing can be waived (similar to the § 266.109 exemption) for boilers that elect to document that emissions of total metal HAP do not exceed the limits provided by § 63.1206(b)(14). Hydrochloric acid production furnaces are not subject to a particulate matter emission standard.

The compliance burden with the destruction and removal efficiency (DRE) standard is also minimal given that it is a one-time test, provided that the source does not change its design or operation in a manner that would adversely affect DRE. In addition, the compliance burden for sources with low levels of metals in their feedstreams is minimal. Sources can document compliance with the metals emission standards by assuming all metals in the feed are emitted (i.e., by assuming zero system removal efficiency). Under this procedure, boilers burning relatively clean wastes are not required to conduct a performance test to document compliance with the metals emission standards.

Further, we note that the MACT standard to control organic HAP emissions other than dioxin/furan is the same as the RCRA standard—demonstrating good combustion conditions by complying with a carbon monoxide standard of 100 ppmv.

Finally, we note that the ancillary requirements under MACT (e.g., personnel training; operating and maintenance plan; startup, shutdown, and malfunction plan) should not pose substantially higher costs than similar requirements under RCRA. See response to comment in Section A above. To the extent that compliance costs increase, we have accounted for those costs in our estimates of the cost of the final rule.⁵⁹

C. Mobile Incinerators

Comment: A mobile incinerator used as a directly-fired thermal desorption unit at a Superfund remediation site should not be an affected source under this rule.

Response: EPA is not determining or changing the applicability of any hazardous waste burning unit under today's rule. A combustion unit that treats hazardous waste and meets the definition of incinerator at 40 CFR 260.10 is an affected source under this rule. 40 CFR part 63 also defines a source as any building, structure, facility, or installation which emits or

may emit any air pollutant. A mobile incinerator at a remediation site meets this definition.

Comment: One commenter states that a subcategory with different standards must be created for mobile incinerators, or the standards for incinerators must be calculated using actual emissions data from mobile units.

Response: EPA did not have any emissions data from mobile incinerators in the database for the proposed rule. That data base was developed over many years with ample opportunity for public comment. We developed a data base for incinerators to support the 1996 proposed rule (61 FR 17358) and noticed that data base for public comment on January 7, 1997 (64 FR 52828). We updated that data base in July 2002, and noticed the revised data base for public comment (67 FR 44452). We used that revised data base to support the proposed rule. We did not receive comments providing data for mobile incinerators as a result of either public notice.

One commenter on the proposed rule provided a summary of emissions data from one test at a mobile incinerator. The commenter suggested that the data support its view that its mobile incinerator is unique and that EPA should consider subcategorizing incinerators according to mobile incinerators versus other incinerators. We analyzed these data and conclude that the final standards are readily achievable by this source. Moreover, as explained elsewhere, EPA's approach to assess the need for subcategorization is to apply a statistical test to determine whether the emissions data are statistically different from the remaining group. Given that owners and operators of mobile incinerators have not provided emissions data prior to proposal, and that the commenter provides summarized data for only one mobile incinerator (which also indicate that the source can achieve the emission standards in the final rule); we are not compelled to gather additional information, particularly given our time constraints to promulgate the final rule under a court-ordered deadline.

Comment: In support of subcategorizing mobile incinerators, commenters state that mobile thermal treatment systems are substantially different from hazardous waste incinerators. They are much smaller in size, firing capacity rate, refractory lining, and operating temperatures. Most of them treat contaminated soil, so have very high particulate feedrate loading with high ash content, rapid kiln rotation rate, and counter-current flow design like cement kilns. This

results in high particulate matter emissions. They operate only for a short duration at a site (usually less than 6 months), and have no flexibility with regard to their waste feed.

Response: We recognize that there is variability between various sources' with regard to size, capacity, operating temperatures etc., and so we applied a statistical test to assess the need of subcategorization, as has been discussed above. The emissions data provided by the commenter also indicate the source can achieve the final standards. The soil entrained in desorber off-gases of mobile incinerators has a relatively large particle size, and is very easy to capture with conventional particulate control systems (such as a fabric filter) used by the incinerators.

Comment: Since mobile incinerators are relocated from site to site, the new source standard should not apply based on the erection date of the mobile unit.

Response: We are not changing the applicability of a new or reconstructed source designation in this rulemaking. The relocation issue is addressed in the definition of "construction" in 40 CFR Section 63.2, which states: "Construction does not include the removal of all equipment comprising an *affected source* from an existing location and the reinstallation of such equipment at a new location * * *" (emphasis added). Therefore, the relocation of an existing Subpart EEE affected source, such as a mobile incinerator, would not result in that mobile incinerator becoming a "new" source. Keep in mind also that the relocation exemption only applies to affected sources. If a mobile incinerator is relocated from an R&D facility (where the unit is not an affected source per Table 1 to Section 63.1200) to a location where the mobile incinerator would become an affected source, the relocation exemption within the definition of "construction" would not apply and the mobile incinerator would be a "new" source. Also, with regard to leased sources, the owner/operator of the facility is responsible for all affected sources operating at his/her facility regardless of whether the sources are owned or leased. The owner or operator should obtain from the leasing company all relevant information pertaining to the affected source in order to be able to demonstrate that the affected source is operating in compliance with the appropriate standards.

III. Floor Approaches

In this section we discuss comments addressing methodologies used in this rule for determining MACT floors. We address comments relating both to

⁵⁹ USEPA "Technical Support Document for HWC MACT Standards, Volume V: Emission Estimates and Engineering Costs," September, 2005.

general, overarching issues and to the specific methodologies used in the rule. Our most important point is that the methodologies EPA selected reasonably estimate the performance of the best performing sources by best accounting for these sources' total variability.

A. Variability

1. Authority To Consider Emissions Variability

Comment: Many commenters concur with our approach to account for emissions variability while several commenters believe that our approach does not adequately account for emissions variability. See discussions on separate topics below. One commenter, however, states that use of variability factors (however derived) is inherently unlawful and arbitrary and capricious. The commenter notes that, because floors for existing sources must reflect the "average" emission level achieved by the relevant best performing sources, they cannot reflect any worse levels of performance from the best performers. Indeed, the argument is that the Clean Air Act already accounts for variability by requiring EPA to base existing source floors on the average emission level achieved by the best performing sources.

The commenter continues by stating that EPA has added variability factors both to each individual source's performance and to the collective performance of the alleged best performers, in each case purporting to find an emission level that the individual or group would meet ninety-nine times out of 100 future emission tests. Thus, EPA ignores sources' measured performance in favor of the theoretical worst performance that might ever be expected from them. By looking to the best performers' worst performance rather than their average performance, EPA would set weaker floors than the Clean Air Act allows.

In addition, the commenter notes that EPA's approach to account for emissions variability is arbitrary and capricious because EPA never explains why it chose the 99th percentile for its variability adjustments rather than some other percentile.

Finally, the commenter notes that EPA appears to indicate that its variability analysis would either be applied to variation between sources or would affect EPA's statistical analysis of the variation between sources. The commenter states that any attempt by EPA to add a variability factor to adjust for intersource variability is unlawful and arbitrary and capricious.

Response: Our response explains our approach to estimating best performing sources' variability and addresses the following issues: (1) Considering the variability in each source's performance is necessary to identify the best performing sources and their level of performance; (2) EPA reasonably considered variability in ranking sources to identify the best performers and in considering the range of best performing sources' performance over time to identify an emission level that the average of those sources can achieve; (3) considering variability at the 99th percentile level is reasonable; (4) considering intersource variability by pooling run-to-run variability is appropriate; and (5) compliance test conditions do not fully reflect all of best performing sources' performance variability.

a. *Variability Must Be Considered.* Variability in each source's performance must be considered at the outset in identifying the best performing sources. This is simply another way of saying that best performers are those that perform best over time (i.e. day-in, day-out), a reasonable approach. This approach not only reasonably reflects the statutory language, but also furthers the ultimate objective of section 112 which is to reduce risk from exposure to HAP. Since most of the risk from exposure to emissions from this source category is associated with chronic exposure to HAP (see Part 1 section VI above), assessing a source's performance over time by accounting for variability is reasonable and appropriate.

For similar reasons, variability must be considered in ascertaining these sources' level of performance. Floors for existing sources must reflect "the average emission limitation achieved by the best performing 12 percent" of sources, and for new sources, must reflect "the emission control that is achieved in practice by the best controlled source." Section 112 (d) (3). EPA construes these requirements as meaning achievable over time, since sources are required to achieve the standards at all times. This interpretation has strong support in the case law. See *Sierra Club v. EPA*, 167 F. 3d 658, 665 (D.C. Cir. 1999), stating that "EPA would be justified in setting the floors at a level that is a reasonable estimate of the performance of the 'best controlled similar unit' under the worst reasonably foreseeable circumstances. It is reasonable to suppose that if an emissions standard is as stringent as 'the emissions control that is achieved in practice' by a particular unit, then that particular unit will not violate the standard. This only results if 'achieved

in practice' is interpreted to mean 'achieved under the worst foreseeable circumstances'; see also *National Lime Ass'n v. EPA*, 627 F. 2d 416, 431 n. 46 (D.C. Cir. 1980) (where a statute requires that a standard be 'achievable,' it must be achievable under "the most adverse circumstances which can reasonably be expected to recur");

The court has further indicated that EPA is to account for variability in assessing sources' performance for purposes of establishing floors, and stated that this assessment may require EPA to make reasonable estimates of performance of best performing sources. *CKRC*, 255 F. 3d at 865–66; *Mossville Environmental Action Now v. EPA*, 370 F. 3d 1232, 1242 (D.C. Cir. 2004)(maximum daily variability must be accounted for when establishing MACT floors).⁶⁰ Indeed, EPA's error in *CKRC* was not in estimating best performing sources' variability, but in using an unreasonable means of doing so. *CKRC*, 255 F. 3d at 866; *Mossville*, 370 F. 3d at 1241.

Since the emission standards in today's rule must be met at all times, the standards need to account for performance variability that could occur on any single day of these sources' operation (assuming proper design and operation). See *Mossville*, 370 F. 3d at 1242 (upholding MACT floor because it was established at a level that took into account sources' long term performance, not just performance on individual days). Moreover, since EPA's database consists of single data points (because there are no continuous emission monitors for HAPs in stack emissions), EPA must of necessity estimate long-term performance, including daily maximum performance, from this limited set of short term data.

b. *EPA Reasonably Considered Variability in Ranking Sources to Identify the Best Performers and in Considering the Range of Best Performing Sources' Performance Over Time to Identify an Emission Level that the Average of Those Sources Can Achieve.* (1) *Selecting Best Performing Sources.* Each of the floor methodologies used in the rule considers various factors in ranking which sources are the best performing. For each methodology, we therefore consider the quantifiable variability of

⁶⁰ See also *Chemical Manufacturers Ass'n v. EPA*, 870 F. 2d 177, 228 (5th Cir. 1989) ("The same plant using the same treatment method to remove the same toxic does not always achieve the same result. Tests conducted one day may show a different concentration of the same toxic than are shown by the same test the next day. This variability may be due to the inherent inaccuracy of analytical testing, (i.e. 'analytical variability,' or to routine fluctuations in a plant's treatment performance.")

the ranking factors in determining which are the best performing sources. 69 FR at 21230–31. Specifically, we assess run-to-run variability (normally the only type of variability which we can quantify) of the factors used under each methodology to rank best performers. Where SRE/Feed is the ranking methodology, we thus assess run-to-run variability of hazardous waste HAP feedrate and of system removal efficiency. Where ranking is based on sources' emissions (the straight emissions methodology), we assess the run-to-run variability of emission levels. Where we use the air pollution control device methodology for ranking, we assess the run-to-run variability of emissions of the lowest-emitting sources (as we do for straight emissions) using the best air pollution control devices. For hydrochloric acid production furnaces, we assess the run-to-run variability of total chlorine system removal efficiency. *Id.*⁶¹

To account for run-to-run variability in these ranking factors, we rank sources by the 99th percentile upper prediction limit (UPL99). The UPL99 is an estimate of the value that the source would achieve in 99 of 100 future tests if it could replicate the operating conditions of the compliance test. *Id.* at 21231.

(2). *Assessing the Best Performers' Level of Performance Over Time.* Once we identify the best performing sources, we need to consider their emissions variability to establish a floor level that the average of the best performing sources can achieve day-in, day-out. There are two components of emissions variability that must be considered: run-to-run variability and test-to-test variability. Run-to-run emissions variability encompasses variability in individual runs comprising the compliance tests, and includes uncertainties in correlation of monitoring parameters and emissions, and imprecision of stack test methods and laboratory analyses. See 69 FR at 21232.⁶² Test-to-test emissions variability is the variability that exists between multiple compliance tests conducted at different times and includes the variability in control device collection efficiency caused by testing at different points in the maintenance cycle of the emission

control device⁶³, and the variability caused by other uncontrollable factors such as using a different stack testing crew or different analytical laboratory, and by different weather conditions (e.g., ambient moisture and temperature) that may affect measurements.

We are able to quantify run-to-run variability. We do so by applying a 99th percentile *modified* upper prediction limit to the averaged emissions of the best performing sources. *Id.* at 21233 and Technical Support Document Volume III section 7.2. The modified upper prediction limit accounts for run-to-run variability of the best performers by pooling their run variance (i.e., within-test condition variability).⁶⁴ See *Chemical Manufacturer's Ass'n v EPA*, 870 F. 2d 177, 228 (5th Cir. 1989) (upholding use of a variability factor derived, as here, by pooling the performance variability of the best performing plants). Using this approach, we ensure that the average of the best performing sources will be able to achieve the floor in 99 of 100 future performance tests, assuming these best performing sources could replicate their performance when attempting to operate under identical conditions to those used for the compliance test establishing the source as best performing. As just noted, we call this value the modified UPL 99.

The only instance in which we are able to quantify test-to-test variability (as noted above, the other significant component of total operating variability) is for fabric filters (baghouses) when used to control emissions of particulate matter. The modified UPL 99 in these instances reflects not only run-to-run variability, but test-to-test variability as well. That total variability is expressed by the Universal Variability Factor which is derived from analyzing long-term variability in particulate matter emissions for best performing sources across all of the source categories sources that are equipped with fabric filters. 69 FR at 21233. See also the discussion below in Section III.A.2.

⁶³ There are myriad factors that affect performance of an emissions control device. These factors change over time, including during the maintenance cycle of the device, such that it is virtually impossible to conduct future compliance tests under conditions that replicate the performance of the control device. See USEPA, "Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 5.3.

⁶⁴ We note that the Agency used a statistical approach when proposing the NESHAP for Electric Utility Steam Generating Units. See memo from William Maxwell, EPA, to Utility MACT Project Files, entitled, "Analysis of variability in determining MACT floor for coal-fired electric utility steam generating units," dated Nov. 26, 2003, Docket A-92-55.

Test-to-test variability must be accounted for in other instances as well, however. It follows that if the performance of most efficient fabric filters varies over time relative to particulate matter emissions, then so does their performance relative to the non-mercury metal HAP emissions. We also believe that particulate matter emissions variability from sources equipped with back-end controls other than fabric filters also exists, and is furthermore likely to be higher than what was calculated for fabric filters because there are more uncertainties associated with the correlations between operating parameter limits and control efficiency for these devices.⁶⁵ Again, it clearly follows that if the performance of these other control devices varies relative to particulate matter emissions (perhaps even more than what has already been quantified for fabric filters), then so does their performance relative to the non-mercury metal HAP emissions.

Although we cannot quantify this test-to-test variability, we can document its existence and its significance. We conducted two parallel analyses examining all situations where we had multiple test conditions for the sources ranked as best performing performing (examining separate pools for best performing sources under both the straight emissions and SRE/feed ranking methodologies). These analyses showed that these sources' emissions do in fact vary over time, sometimes significantly. In many instances sources had poorer system removal efficiencies and higher emission levels than those in the compliance test used to identify the source as best performing. We further projected that in many instances these best performing sources would not achieve their own UPL 99, the statistically determined prediction limit which captures 99 out of 100 future three-run test averages for the source, if they were to operate at the poorer system removal efficiency of its earlier test and used the federate of its later (best-performing) compliance test. This is significant because the UPL 99 reflects all of a source's run-to-run

⁶⁵ For example, sources equipped with electrostatic precipitators generally establish multiple operating limits to best assure compliance with the emission standard (feed control limits, power input limits, etc.). There is not an exact correlation between emission levels and operating levels because there are several factors that can affect the control efficiency of these air pollution control systems, such as variations in inlet loads, power inputs, spark rates, humidity, as well as particle resistivity. See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Sections 16 and 17.

⁶¹ These ranking methodologies are discussed later in this section of the preamble, and in USEPA, "Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 7.

⁶² Analytic variability exists, and normally must be accounted for in establishing technology-based standards based on performance of the best-performing plants. *Chemical Manufacturers Ass'n v. EPA*, 870 F. 2d at 230.

variability. Failure to meet the UPL 99 thus shows both that further variability exists, namely test-to-test variability, and that it is a significant component of total variability. We obtained similar results when we projected best performing sources' performance based on each of these sources' overall system removal efficiency obtained by pooling the removal efficiencies of all of its tests. In many instances, moreover, these projected levels exceeded floor levels calculated by using the straight emissions approach, which ranks best performers as those with the lowest emission levels. This point is discussed further in Section III.B below. EPA's analysis is set out in detail in chapters 16 and 17 of Volume III of the Technical Support Document.⁶⁶

EPA's conclusion is that total variability includes both run-to-run and test-to-test variability, and that both must be accounted for in determining which are the best performing sources and what are their levels of performance over time. As explained in the following Sections B and C, EPA has accordingly adopted floor methodologies which account for this total variability either quantitatively or qualitatively. The approach advocated by the commenter simply ignores that variability exists. Since this approach is contrary to both fact and law, EPA is not adopting it.

c. *Quantifying Run-to-Run Variability at the 99th Percentile Level Is Reasonable.* We selected the 99% prediction limit to ensure a reasonable level "namely the 99th percentile—of achievability for sources designed and operated to achieve emission levels equal to or better than the average of the best performing sources.⁶⁷ Because of the randomness of the emission values, there is an associated probability of the average of the best performing sources, and similarly designed and operated sources, not passing the performance test conducted under the same conditions.⁶⁸ At a 99% confidence level, the average of the best performing sources could expect to achieve the floor in 99 of 100 future performance

tests conducted under the same conditions as its performance test.. The commenter thus sharply mischaracterizes a 99% confidence level as the worst performance of a best performing source.: the level in fact assumes identical operating conditions as those of the performance test.

EPA routinely establishes not-to-exceed standards (daily maximum values which cannot be exceeded in any compliance test) using the 99% confidence level. *National Wildlife Federation v. EPA*, 286 F. 3d 554, 572 (D.C. Cir. 2002).⁶⁹ At a confidence level of only 97% for example, the average of the best performing sources could expect to achieve the floor in only 97 of 100 future performance tests.

We note that the choice of a confidence level is *not* a choice regarding the stringency of the emission standard. Although the numerical value of the floor increases with the confidence level selected it only appears to become less stringent. If EPA selected a lower confidence interval, we would necessarily adjust the standard downward due to the expectation that a source would not be expected to achieve the standard for uncontrollable reasons a larger per cent of the time. We would then have to account in some manner for this inability to achieve the standard. See *Weyerhaeuser v. Costle*, 590 F. 2d 1011, 1056–57 (D.C. Cir. 1978) (also upholding standards established at 99% confidence level). The governing issue is what level of confidence should the average of the best performing sources, and similarly designed and operated sources, have of passing the performance test demonstrating compliance with the standard. We believe that the 99% confidence level is a confidence level within the range of values we could have reasonably selected.⁷⁰

d. *Considering Intersource Variability by Pooling Run-to-Run Variability is Appropriate.* The commenter believes that any attempt by EPA to add a variability factor to adjust for intersource variability is unlawful and arbitrary and capricious. We see no statutory prohibition in considering

intersource run-to-run variability of the best performing sources (which is all our floor calculation does, by considering the pooled run-to-run variability of the best performing sources). Section 112(d)(3) states that MACT floors are to reflect the "average emission limitation achieved" but does not specify any single method of ascertaining an average. Considering the average run-to-run variability among the group of best performing sources is well within the language of the provision (and was upheld in *CMA*, as noted above; see 870 F. 2d at 228). The commenter's further argument that 'average' can only mean average of emission levels achieved in performance tests is inconsistent with the holding in *Mossville*, 370 F. 3d at 1242, that EPA must account for variability in developing MACT floors and that individual performance tests do not by themselves account for such variability.

We believe that it is reasonable and necessary to account for intersource variability of the best performing sources by taking the pooled average of the best performing sources' run-to-run variability. This is an aspect of identifying the average performance of those sources. Emissions data for each best performing source are random in nature, and this random nature is characterized by a stochastic distribution. The stochastic distribution is defined by its central tendency (average value) and the amount of dispersion from the point of central tendency (variance or standard deviation). Consequently, to define the performance of the average of the best performing sources, we must consider the average of the average emissions for the best performing sources as well as the pooled variance for those sources. Hence, we must consider intersource variability to identify the floor—the average performance of the best performing sources.

The commenter further states that EPA's attempt to adjust for intersource variability is unlawful, arbitrary, and capricious. EPA set floors at the 99th percentile worst emission level that it believed any source within the group of best performers could achieve, according to the commenter. The 99th percentile worst performance that could be expected from a source within the best performers is, simply put, not the average performance of the sources in that group, according to the commenter.

The commenter misunderstands our approach to calculate the floor—the floor is not the 99th percentile highest emission level that any best performing source could achieve. The floor for

⁶⁶ We explain in those sections that these projections assume that system removal efficiencies are constant across differing HAP federates and that the sources' historical (poorer) system removal efficiencies were not the primary result of operating at poorer "controllable" conditions relative to the most recent test condition. These are reasonable assumptions, as explained in section 17. 3 of Volume III of the Technical Support Document, although these assumptions also create a measure of uncertainty regarding the emissions projections.

⁶⁷ Note, again, that the variability we quantify by these analyses is within-test condition variability only. We cannot quantify test-to-test variability and thus cannot quantify sources' total variability.

⁶⁸ See Volume III of the Technical Support Document, Section 7.2 .

⁶⁹ The opinion notes further that percentiles for standards expressed as long-term average typically use a lower confidence level (usually 95 %c) due to the opportunity to lower the overall distribution with multiple measurements. 286 F. 3d at 573. The standards in this rule are necessarily daily maximum standards because continuous emissions monitors for HAP do not exist or have not been demonstrated on all types of Subpart EEE sources.

⁷⁰ See also *Chemical Mfrs. Ass'n v. EPA*, 870 F. 2d at 229 (99th percentile daily variability factor is reasonable); 227 ("the choice of statistical methods is committed to the sound discretion of the Administrator").

existing sources is calculated as the 99th percentile modified upper prediction limit of the average of the best performing sources. It represents the average of the best performing sources' emissions levels plus the pooled within-test condition variance of the best performing sources. The floor for existing sources is not the highest 99th percentile upper prediction limit for any best performing source as the commenter states.

e. Why isn't Total Variability Already Accounted for by Compliance Test Conditions?

Comment: One commenter states that EPA's use of variability factors along with worst-case data is unlawful and arbitrary and capricious. EPA has stated that its use of worst case "compliance" data accounts for variability. EPA admits that compliance data reflect special worst case conditions created artificially for the purpose of obtaining lenient permit limits, according to the commenter. EPA provides no reason whatsoever to believe that a source would continue to operate under such conditions even one percent of the time. Thus, the commenter concludes, by applying a 99 percent variability factor to compliance test data, EPA ensures that the adjusted data do not accurately reflect the performance of any source. Accordingly, EPA's use of a variability factor is unlawful.

The commenter also states that, to increase compliance data with the reality that sources will not be operating under the worst case conditions except during permit setting tests, the Agency's use of a variability factor with compliance data is arbitrary and capricious.

Response: All but two standards in the final rule are based on compliance test data—when sources maximized operating parameters that affect emissions to reflect variability of those parameters and to achieve emissions at the upper end of the range of normal operations. Use of these data is appropriate both because they are data in EPA's possession for purposes of section 112(d)(3) and because these data help account for best performing sources' operating variability. *CKRC*, 255 F. 3d at 867.

The main thrust of the comment is that total variability is accounted for by the conditions of the performance test, so that making further adjustments to allow for additional variability is improper. The commenter believes that the floor should be calculated simply as the average emissions of the best performing sources and that this floor would encompass the range of

operations of the average of the best performing sources. We disagree.

The compliance test is designed to mirror the outer end of the *controllable* variability occurring in normal operations. These controllable factors include the amount of HAP fed to a source in hazardous waste, and controllable operating parameters on pollution control equipment (such as power input to ESPs, or pressure drop across wet scrubbers, factors which are reflected in the parametric operating limits written into the source's permit and which are based on the results of the compliance testing). However, this is plainly not all of the variability a source experiences. Other components of run-to-run variability, including variability relating to measuring (both stack measurements and measurements at analytic laboratories) are not reflected, for example. Nor is test-to-test variability reflected, notably the point in the maintenance cycle that testing is conducted and the variability associated with those inherently differing test conditions even though the source attempts to replicate the test conditions (e.g., measurement variability attributable to use of a different test crew and analytical laboratory and different weather conditions such as ambient temperature and moisture). Other changes that occur over time are due to a wide variety of factors related to process operation, fossil fuels, raw materials, air pollution control equipment operation and design, and weather. Sampling and analysis variations can also occur from test to test (above and beyond those accounted for when assessing within-test variability) due to differences in emissions testing equipment, sampling crews, weather, and analytical laboratories or laboratory technicians.

Thus, there is some need for a standard to account for this additional variability, and not simply expect for a single performance test to account for it. The analyses in Sections 16 and 17 of Volume III of the Technical Support Document confirm these points.

Moreover, the best performing sources (and the average of the best performers) must be able to replicate the compliance test if they are to be able to continue operating under their full range of normal operations. It is thus no answer to say that the best performing sources could operate under a more restricted set of conditions in subsequent performance tests and still demonstrate compliance, so that there is no need to assure that results of initial performance tests can be replicated. To do so would no longer allow the best performing sources (and thus the average of the best

performing sources) to operate under their full range of normal operations, and thus impermissibly would fail to account for their total variability.

As discussed throughout this preamble, emissions variability—run-to-run and test-to-test variability—is real and must be accounted for if a best performing source is to be able to replicate the emissions achieved during the initial compliance test. We consequently conclude that we must account for variability in establishing floor levels, and that merely considering the average of compliance test data fails to do so. We have therefore quantified run-to-run variability using standard statistical methodologies, and accounted for test-to-test variability either by quantifying it (in the case of fabric filter particulate matter removal performance) or accounting for it qualitatively (in the case of the SRE/feed ranking methodology).

Comment: The commenter notes that if EPA believes that single performance test results do not accurately capture source's variability, the solution is to gather more data, not to avoid using a straight emissions methodology. EPA cannot use this as an excuse for basing floor levels on a chosen technology rather than the performance of the best performing sources.

Response: There is no obligation for EPA to gather more performance data, since the statute indicates that EPA is to base floor levels on performance of sources "for which the Administrator has emissions information." Section 112(d)(3)(A); *CKRC*, 255 F. 3d at 867 (upholding EPA's decision to use the compliance test data in its possession in establishing MACT standards). Indeed, the already-tight statutory deadlines for issuing MACT standards would be even less feasible if EPA took further time in data gathering. EPA notes further that because particulate matter continuous emission monitors are not widely used, even further data gathering would be limited to snapshot, single performance test results, still leaving the problem of estimating variability from a limited data set.⁷¹ See also *Sierra Club v. EPA*, 167 F. 3d at 662 ("EPA typically has wide latitude in determining the extent of data-gathering necessary to solve a problem").

Thus, EPA has no choice but to assess best performers and their level of performance on the basis of limited amounts of data per source. As explained in the previous response to

⁷¹ Performance tests take an average of 5–8 days to conduct, and cost approximately from \$200,000–\$500,000 per test. The commenter's off-hand suggestion appears to have ignored these realities.

comments, EPA has selected a methodology that reasonably do so.

EPA notes further that it has carefully examined those instances where there are multiple test conditions (usually compliance tests conducted at different times) for sources ranked as best performing. This analysis confirms EPA's engineering judgment that total variability is not fully encompassed in the single test condition results used to identify these sources as best performing, and that without taking this additional variability into account, best performing sources would be unable to achieve the floor standard reflecting their own performance in those single test conditions.⁷²

2. Universal Variability Factor for Particulate Emissions Controlled with a Fabric Filter

Comment: One commenter states that, in calculating the universal variability factor (UVF) to account for total variability—test-to-test variability and within-test variability—for sources controlling particulate matter with a fabric filter, it appears that EPA considered the variability of sources that are not best performing sources. If so, EPA has contravened the law.

The commenter also states that EPA's attempt to use a variability factor derived from an analysis of variability of multiple sources is unlawful. If EPA considers variability at all, it must consider the relevant source's variability.

Response: We developed the particulate matter UVF for sources equipped with a fabric filter using data from best performing sources only.⁷³

It is reasonable to aggregate particulate matter emissions data across source categories for all best performing sources equipped with a fabric filter because the relationship between standard deviation and emissions of particulate matter is not expected to be impacted by the source category type.⁷⁴ Rather, particulate emissions from fabric filters are a function of seepage (i.e., migration of particles through the filter cake) and leakage (i.e., particles leaking through pores, channels, or pinholes formed as the filter cake builds up). The effect of seepage and leakage on emissions variability should not vary

across source categories.⁷⁵ Put another way, fabric filter particulate matter reduction is relatively independent of inlet loadings to the fabric filter. 69 FR 21233. This is confirmed by the fact that there are no operating parameters that can be readily changed to increase emissions from fabric filters, *id.*, so control efficiencies reflected in test conditions from different source types will still accurately reflect fabric filter control efficiency.

3. Test-to-Test Variability

Comment: Several commenters state that EPA seems to have ignored test-to-test variability resulting from changes that occur over time such as: normal and natural changes in a wide variety of factors related to process operation, fuels, raw materials, air pollution control equipment operation and design, and differences in emissions testing equipment, sampling crews, weather, analytical laboratories or laboratory technicians. All these sources of variation are expected in that they are typical and are not aberrations. In addition, there are unexpected sources of variability that occur in real-world operations, which also must be accommodated according to commenters.

Commenters state that using compliance test data and assessing within-test condition variability (i.e., run variance) do not fully account for test-to-test variability and thus understates total variability. Consequently, the average of the best performing sources may not be able to achieve the same emission level under a MACT performance test when attempting to operate under the same conditions as it did during the compliance test EPA used to establish the floor. Even though sources generally operated at the extreme high end of the range of normal operations during the compliance tests EPA uses to establish the standards, the average of the best performing sources would need to operate under those same compliance test conditions to establish the same operating envelope—the operating envelope needed to ensure the source can operate under the full range of normal emissions.

Response: We agree with commenters that we have not quantified test-to-test variability when establishing the floors for standards other than particulate matter where a best performing source uses a fabric filter. We are able to quantify only within-test variability

(i.e., run-to-run variability) for the other floors, which is only one component of total variability. This is one reason we use the SRE/Feed approach wherever possible rather than a straight emissions approach to rank the best performing sources to calculate the floor—the SRE/Feed ranking approach derives floors that better estimate the levels of best performing sources' performance. See also discussion in Part Four, Section III.A, and the discussion below documenting that test-to-test variability can be substantial.

Comment: One commenter states that EPA should use the universal variability factor (UVF) that accounts for total variability for particulate matter controlled with a fabric filter to derive a correction factor to account for the missing test-to-test variability component of variability for semivolatile metals and low volatile metals. The commenter then suggests that the within-test variability for semivolatile and low volatile metals be adjusted upward by the correction factor to correct for the missing test-to-test variability component.

The commenter focused on cement kilns and compared the total variability imputed from the UVF for the three cement kiln facilities used to establish the UVF to the within-test variability (i.e., run variance) for each facility. The commenter determined that, on average for the three facilities, total variability was a factor of 4.2 higher than within-test variability. Because semivolatile and low volatile metals are also controlled with a fabric filter, the commenter suggested that the total variability of particulate matter could be used as an estimate of the total variability for semivolatile and low volatile metals. Thus, the commenter suggested that the within-test condition variability for semivolatile and low volatile metals be increased by a factor of 4.2 to account for total variability when calculating floors.

Response: As stated throughout this preamble, we believe that there is variability in addition to within-test condition (i.e., run-to-run) variability that we cannot quantify—that we refer to as test-to-test variability. We also do not believe this test-to-test variability is captured by compliance test operating conditions as discussed above, and thus establishing the floor using emissions data representing the extreme high end of the range of normal emissions does not account for test-to-test variability. We disagree, however, with the commenter's attempts to quantify the remaining test-to-test variability for floors other than particulate matter

⁷² USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Sections 16 and 17.

⁷³ USEPA, "Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of MACT Standards," March 2004, p. 5–4.

⁷⁴ In addition, emissions are not generally affected by particulate inlet loading.

⁷⁵ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 5.3.

where all best performing sources are equipped with fabric filters.

We generally agree with the commenter's approach for extracting the test-to-test component of variability using the UVF curve for particulate matter controlled with a fabric filter.⁷⁶ The commenter has documented that for cement kilns, test-to-test variability of particulate emissions controlled with a fabric filter is on average a factor of 4.2 higher than within-test variability.

We believe the commenter's suggestion to adopt this correction factor to semivolatile and low volatile metals is technically flawed and for several reasons would present statistical difficulties. First, total variability for semivolatile metals and low volatile metals controlled with a fabric filter can be different from the total variability of particulate matter controlled with a fabric filter because: (1) The test methods are different (i.e., Method 5 for particulate matter and Method 29 for metals) and thus sample extraction and analysis methods differ; (2) the factors that affect partitioning of particulate matter to combustion gas (i.e., entrainment) are different from the factors that affect semivolatile metal partitioning to the combustion gas (i.e., metal volatility); and (3) the volatility of semivolatile metals is affected by chlorine feedrates.

Second, adopting a variability factor applicable to fabric filters for use on electrostatic precipitators⁷⁷ is problematic because both test-to-test and within-test variability of these emission control devices can be vastly different. Factors that affect emissions variability for sources equipped with a fabric filter include: (1) Bag wear and tear due to thermal degradation and chemical attack; and (2) variability in flue gas flowrate. Factors that affect emissions variability for sources equipped with an electrostatic precipitator are different (see discussion in Section III.B above) and include: variations in particle loading and particle size distribution, erosion of collection plates, and variation in fly ash resistivity due to changes atmospheric moisture and in sulfur feedrate (e.g. different type of coal).

Finally, the approach raises several difficult statistical questions including:

⁷⁶ We note, however, that an argument could be made for using a source or condition-specific correction factor rather than averaging the correction factors for all sources within a source category.

⁷⁷ We infer that the commenter suggests that we use this correction factor for semivolatile and low volatile metals controlled by both electrostatic precipitators and fabric filters since the majority of cement kilns are equipped with electrostatic precipitators.

(1) What is the appropriate number of runs to use to identify the degrees of freedom and the t-statistic in the floor calculations (e.g., should we use the number of runs available for metals emissions for the source or the number of runs available for particulate matter emissions from which the correction factor is derived); and (2) should we use a generic correction factor for all source categories or calculate source category-specific or source-specific correction factors.

For these reasons, we believe the approach we use for quantifying baghouse particulate matter collection variability is not readily transferable to other types of control devices and other HAP. We therefore are not applying a quantified correction factor in the final rule but rather are using a MACT ranking methodology that qualitatively accounts for total emission variability, notably test-to-test variability.

B. SRE/Feed Methodology

1. Description of the Methodology

As proposed, we are using the System Removal Efficiency (SRE)/Feed approach to determine the pool of best performing sources for those HAP whose emissions can be controlled in part by controlling the hazardous waste feed of the HAP—that is, controlling the amount of HAP in the hazardous waste fed to the source. These are HAP metals and chlorine. Our basic approach is to determine the sources in our database with the lowest hazardous waste feedrate of the HAP in question (semivolatile metals, low volatile metals, mercury, or chlorine), and the sources with the best system removal efficiency for the same HAP. The system removal efficiency is a measure of the percentage of HAP that is removed prior to being emitted relative to the amount fed to the unit from all inputs (hazardous waste, fossil fuels, raw materials, and any other input). The pool of best performing sources are those with the best combination of hazardous waste feedrate and system removal efficiency as determined by our ranking procedure, separate best performer pools being determined for each HAP in question (SVM, LVM, mercury, and chlorine), reflecting the variability inherent in each of these ranking factors (see A.2.a.(1) above). We then use the emission levels from these sources to calculate the emission level achieved by the average of the best performing sources, as also explained in the previous section. This is the MACT floor for the HAP from the source type. For new sources, we use the same methodology but select the emission

level (adjusted statistically to account for quantifiable variability) of the source with the best combined ranking. A more detailed description of the methodology is found in Volume III of the Technical Support Document, section 7.3.

This methodology provides a reasonable estimate of the best performing sources and their level of performance for HAP susceptible to hazardous waste feed control. As required by section 112(d)(2), EPA has considered measures that reduce the volume of emissions through process changes, or that prevent pollutant release through capture at the stack, and assessed how these control measures are used in combination. Section 112(d)(2)(A), (C) and (E). Hazardous waste feed control is clearly a process change that reduces HAP emissions; air pollution control systems collect pollutants at the stack. These are the best systems and measures for controlling HAP emissions from hazardous waste combustors. 69 FR at 21226. In considering these factors, EPA has necessarily considered such factors as design of different air pollution control devices, waste composition, pollution control operator training and behavior, and use of pollution control devices and methodologies in combination. *CKRC*, 255 F. 3d at 864–65 (noting these as factors, in addition to a particular type of air pollution control device, that can influence pollution control performance); 69 FR at 21223 n. 47 (system removal efficiency measures all internal control mechanisms as well as back-end emission control device performance).

EPA also believes that this methodology reasonably estimates the best performing sources' level of performance by accounting for these sources' total variability, including their performance over time. The methodology quantifies run-to-run variability. See 69 FR at 21232–33. It does not quantify test-to-test variability because we are unable to do so for these pollutants. (See sections A. 2.a.(2) and 3 above.) Although all variability must be accounted for when calculating floors, the only definitive way to accurately quantify this test-to-test emissions variability is through evaluation of long-term continuous emissions monitoring data, which do not presently exist. We believe, however, that SRE/Feed methodology provides some margin for estimating this additional, non-quantifiable variability. This is illustrated in the technical support document (volume III section 17), which clearly shows that the straight emissions approach underestimates (indeed, fails to account

for) lower emitting sources' long-term emissions variability. These lower emitting sources that would otherwise not meet the floor levels on individual days under the straight emission approach would be able (or otherwise are more capable) to do so under the SRE/feed approach.

EPA further believes that the SRE/Feed methodology appropriately accounts for design variability that exists across sources for categories, like those here, which consist of a diverse and heterogeneous mixture of sources. This is especially true of incinerators and boilers, for which there are smaller on-site units that are located at widely varying industrial sectors that essentially combust single, or multiple wastestreams that are specific to their industrial process, and off-site commercial units dealing with many different wastes of different origins and HAP metal and chlorine composition. EPA believes that these variations are best encompassed in the SRE/Feed approach, rather than with a subcategorization scheme that could result in anomalous floor levels because there are fewer sources in each source subcategory from which to assess relative performance.⁷⁸ See *Mossville*, 370 F. 3d at 1240 (upholding floor methodology involving reasonable estimation, rather than use of emissions data, when sources in the category have heterogeneous emission characteristics due to highly variable HAP concentrations in feedstocks).

Use of the SRE/Feed approach also avoids basing the floor standards on a combination of the lowest emitting low feeding sources and the lowest emitting high feeding sources. For example, the five lowest emitting incinerators for semivolatile metals that would comprise the MACT pool using a straight emissions methodology include three sources that are the first, second, and fourth lowest feeding sources among all the incinerators.⁷⁹ The other two best

performing incinerators have the first and second best system removal efficiencies (and the highest two metal feedrates). It is noteworthy that the highest feed control level among these best performing sources is over three orders of magnitude higher than the feed control level of the lowest feeding best performing source.⁸⁰ Establishing limits dominated by both superior feed control sources and back-end controlled sources would result in floor levels that are not reflective of the range of emissions exhibited by either low feeding sources or high feeding sources and would more resemble new source standards for both of these different types of combustors. Such floors could lead to situations, for example, where commercial sources could find it impracticable to achieve the standards without reducing the overall scope of their operations (since the standard could operate as a direct constraint on the amount of hazardous waste that could be fed to the device, in effect depriving a combustion source of its raw material). Similarly, low feeding sources that cannot achieve this floor level may be required to add expensive back-end control equipment that would result in minimal emission reductions, likely forcing the smaller on-site source to cease hazardous waste treatment operations and to instead send the waste to a commercial treatment unit.

The inappropriateness of a straight emissions-based approach for feed controlled pollutants for commercial hazardous waste combustors is further highlighted by the fact that several commercial hazardous waste combustors that are achieving the design level of the particulate matter standard are not achieving the semivolatile and/or low volatile metals straight emissions based design level, and, in some instances, floor level.⁸¹ This provides further evidence that low feeding sources are in fact biasing some of the straight emissions-based floors to the extent that even the sources with the most efficient back-end control devices would be incapable of achieving the emission standards calculated on a straight emission basis.

These results are inconsistent with the intent of the section 112 (d) (see 2 Legislative History at 3352 (House

Report) stating that MACT is not intended to drive sources out of business). Standards that could force commercial sources to reduce the overall scope of their operations are also inconsistent with requirements and objectives of the Resource Conservation and Recovery Act to require treatment of hazardous wastes before the wastes can be land disposed, and to encourage hazardous waste treatment. RCRA sections 3004 (d), (e), (g) and 1003 (a) (6); see also section 112 (n) (7) of the CAA, stating that section 112 (d) MACT standards are to be consistent with RCRA subtitle C emission standards for the same sources to the maximum extent practicable (consistent with the requirements of section 112 (d)); moreover, EPA doubts that a standard which precludes effective treatment mandated by a sister environmental statute must be viewed as a type of best performance under section 112 (d). The SRE/Feed methodology avoids this result by always considering hazardous waste feed control in combination with system removal efficiency and according equal weight to both means of control in the ranking process.

It is also important to emphasize what the SRE/Feed methodology does not evaluate: Feed control of HAP in fossil fuel or raw material inputs to these devices. Emission reduction of these HAP are controllable by back-end pollution control devices which remove a given percentage of pollutants irrespective of their origin and is assured by the system removal efficiency portion of the methodology, as well as through the particulate matter standard (see section IV.A below). Feed control of these inputs is not a feasible means of control, however. HAP content in raw materials and fossil fuel can be highly variable, and so cannot even be replicated by a single source. Raw material and fossil fuel sources are also normally proprietary, so other sources would not have access to raw material and fossil fuel available (in its performance test) to a source with low HAP fossil fuel and raw material inputs. Such sources would thus be unable to duplicate these results. Moreover, there are no commercial-scale pretreatment processes available for removing or reducing HAP content in raw materials or fossil fuels to these units. See technical support document volume III section 17.5 and 25; see also 69 FR at 21224 and n. 48.

2. Why Aren't the Lowest Emitters the Best Performers?

Some commenters nonetheless argue that best performing sources can only mean sources with the lowest HAP

⁷⁸ At proposal, we conducted a technical analysis to determine potential subcategorization options. We then conducted an analysis to determine if these different types of sources exhibited statistically different emissions. Although EPA in the end determined that these source categories should not be subcategorized further, this decision was based in part because the SRE/Feed methodology better accounts for the range of emissions from the best performing sources for these diverse combustion types. See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 4, for an explanation of the subcategorization assessment, which includes examples of anomalous floor results for certain subcategorization approaches.

⁷⁹ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Appendix C,

Table "E_INC_SVMCT" and, to determine relative feed control and SRE rankings for these sources, Appendix E Table "SF_INC_SVMCT".

⁸⁰ Source 340 had a semivolatile metal feed control MTEC of 892 µg/dscm, whereas source 327 had a semivolatile metal feed control MTEC of 3,080,571 µg/dscm.

⁸¹ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 17.4

emissions, and that the SRE/Feed methodology is therefore flawed because it does not invariably select lowest emitters as best performers.⁸² The statute does not compel this result. There is no language stating that lowest emitting sources are by definition the best performers. The floor for existing sources is to be based on the average emission limitation achieved by the “best performing” 12 per cent of sources. Section 112(d)(3)(A). This language does not specify how “best performing” is to be determined: by means of emission level, emission control efficiency, measured over what period of time, etc. See *Sierra Club v. EPA*, 167 F. 3d at 661 (language of floor requirement for existing sources “on its own says nothing about how the performance of the best units is to be calculated”). Put another way, this language does not answer the question of which source is the better performing: one that emits 100 units of HAP but also feeds 100 units of that HAP, or one that emits 101 units of the HAP but feeds 10,000 units. See 69 FR at 21223. Moreover, new source floors are to be based on the performance of the “best controlled” similar source achieved in practice. Section 112(d)(3). “Best controlled” can naturally be read to refer to some means of control such as system removal efficiency as well as to emission level.

Use of a straight emissions approach to identify floor levels can lead to arbitrary results. Most important, as explained above, it leads to standards which cannot be achieved consistently even by the best performing sources because operating variability is not accounted for. This is shown in section 17 of volume III of the technical support document. These analyses show that (a) emissions from these sources do in fact vary from test-to-test, and that no two snapshot emission test results are identical; (b) our statistical approach that quantifies within test, run-to-run variability underestimates the best performing sources’ long term, test-to-test variability;⁸³ (c) best performing sources under the straight emissions approach advocated by the commenter (i.e. the lowest emitting sources) had other test conditions that did not achieve straight emission floor levels;

⁸² In fact, many of the sources identified as best performing under the SRE/Feed methodology are also the lowest emitting, although this is not invariably the case.

⁸³ Best performing sources pursuant to the straight emissions methodology are projected to be unable to achieve the level of their of their performance test emissions even after they are adjusted upward to account for run-to-run variability.

(d) best performing sources under the straight emissions approach are projected, based on two separate analyses using reasonable assumptions, not to achieve the straight emissions floor standard based on these sources’ demonstrated variations in system removal efficiencies over time (i.e., from test-to-test); and (e) SRE/feed methodology yields floor levels (i.e. the floor standards in the rule) that better estimate the emission levels reflecting the performance over time of the best performing sources. See *Mossville*, 370 F. 3d at 1242 (floor standard is reasonable because it accommodated best performing source’s highest level of performance (i.e. its total variability), even though the level of the standard was higher than any individual measurement from that source).

As noted earlier, the straight emissions methodology can also limit operation of commercial units because the standard reflects a level of hazardous waste feed control which could force commercial units to burn less hazardous waste because such standards more resemble new source standards. The straight emissions methodology also arbitrarily reflects HAP levels in raw materials and fossil fuels, an infeasible means of control for any source.

Another arbitrary, and indeed impermissible, result of the straight emissions methodology is that in some instances (noted in responses below) the methodology results in standards which would force sources identified as best performing to install upgraded air pollution control equipment. This result undermines section 112 (d) (2) of the statute, by imposing what amounts to a beyond the floor standard without consideration of the beyond the floor factors: the cost of achieving those reductions, as well as energy and nonair environmental impacts.

Comment: The commenter states that because MACT floors must reflect the “actual performance” of the relevant best performing hazardous waste combusters, this means that the lowest emitters must be the best performers. The commenter cites *CKRC v. EPA*, 255 F. 3d at 862 and other cases in support.

Response: As explained in the introduction above, the statute does not specify that lowest emitters are invariably best performers. Nor does the caselaw cited by the commenter support this position. The D.C. Circuit has held repeatedly that EPA may determine which sources are best performing and may “reasonably estimate” the performance of the top 12 percent of these sources by means other than use of actual data. *Mossville*, 370 F. 3d at

1240–41 (collecting cases). In *Mossville*, sources had varying levels of vinyl chloride emissions due to varying concentrations of vinyl chloride in their feedstock. Individual measurements consequently did not adequately represent these sources’ performance over time. Not-to-exceed permit limits thus reasonably estimated sources’ performance, corroboration being that individual sources with the lowest long-term average performance occasionally came close to exceeding those permit limits. *Id.* at 1241–42. The facts are similar here, since our examination of best performing sources with multiple test conditions likewise shows instances where these sources would be unable to meet floors established based solely on lowest emissions (including their own). As here, EPA was not compelled to base the floor levels on the lowest measured emission levels.

Comment: The same commenter maintains that it is clear from the caselaw that MACT floors must reflect the relevant best performing sources’ “actual performance”, and that this must refer to the emissions level it achieves.

Response: As just stated, the D.C. Circuit has repeatedly stated that EPA may make reasonable estimates of sources’ performance in assessing both which sources are best performing and the level of their performance. The court has further indicated that EPA is to account for variability in assessing sources’ performance for purposes of establishing floors, and this assessment may require that EPA make reasonable estimates of performance of best performing sources. *CKRC*, 255 F. 3d at 865–66; *Mossville*, 370 F. 3d at 1241–42. See discussion in A.1.a above.

Comment: The commenter generally maintains that EPA’s floor approaches consider only the performance of back-end pollution control technology and so fail to capture other means of HAP emission control that otherwise would be captured if EPA were to assess performance based on the emission levels each source achieved.

Response: EPA agrees that factors other than end-of-stack pollution control can affect metal HAP and chlorine emissions. This is why EPA assesses performance for these HAP by considering combinations of system removal efficiency (which measures every element in a control system resulting in HAP reduction, not limited to efficiency of a control device), and hazardous waste HAP feed control. Standards for dioxins and other organic HAP (which have no hazardous waste feed control component) likewise assess every element of control.

EPA also accounts for the variability of HAP levels in the (essential) use of raw materials and fossil fuels by assessing performance of back-end control but not evaluating fuel/raw material substitution, which, as discussed later in the response to comments section, are infeasible means of control. *Mossville*, 370 F. 3d at 1241–42, is instructive on this point. The court held that the constant change in raw materials justified EPA's use of a regulatory limit to estimate a floor level. The reasonableness of this level was confirmed by showing that the highest individual data point of a best performing source was nearly at the level of the regulatory limit. Under the commenter's approach, the court would have had no choice but to hold that the level the source achieved in a single test result using 'clean' raw materials—i.e. the 'level achieved' in the commenter's language—dictated the floor level.

See part four, section III.C for EPA's response to this comment as it relates to the methodologies for the particulate matter standard and total chlorine standard for hydrochloric acid production furnaces.

Comment: The commenter notes that the SRE/Feed methodology does not account for all HAP emissions, failing to account for metal and chlorine feedrates in raw materials and fossil fuels.

Response: The methodology does not assess the effect of feed "control" of HAP levels in raw materials or fossil fuels which may be inputs to the combustion units. This is because such control may not be replicable by an individual source, or duplicable by any other source. See 69 FR at 21224 and n. 48; *Sierra Club v. EPA*, 353 F. 3d 976, 988 ("substitution of cleaner ore stocks was not * * * a feasible basis on which to set emission standards. Metallic impurity levels are variable and unpredictable both from mine to mine and within specific ore deposits, thereby precluding ore-switching as a predictable and consistent control strategy").⁸⁴ EPA's methodology does account for HAP control of all inputs by assessing system removal efficiency, which measures reductions of HAPs in all inputs (including fossil fuel and raw materials) to a hazardous waste combustion unit. Further, nonmercury metal HAP emissions attributable to raw

materials and fossil fuels are effectively controlled with the particulate matter standard, a standard that is based on the sources with best back-end control devices. The only element which is not controlled is what cannot be: HAP levels in feeds for which fuel or raw material switching is simply not an available option.

Comment: The commenter further maintains, however, that the means by which sources may be achieving levels of performance are legally irrelevant (citing *National Lime Ass'n v. EPA*, 233 F. 3d 625, 634 and 640 (D.C. Cir. 2000)). The fact that sources with "cleaner" raw material and fossil fuel inputs may not intend to have resulting lower HAP emissions is therefore without legal bearing.

Response: The issue here is not one of intent. The Court, in *National Lime*, rejected the argument that sources' lack of intent to control a HAP did not preclude EPA from establishing a section 112(d) standard for that HAP. See 233 F. 3d at 640, rejecting the argument that HAP metal control achieved by use of back-end control devices (baghouses) could not be assessed by EPA because the sources used the back-end control devices to control emissions of particulate matter. The case did not consider the facts present here, where the issue is not a source's intent, but rather a means of control which involves happenstance (composition of HAP in raw materials and fossil fuel used the day the test was conducted) and so is neither replicable nor duplicable.

National Lime also held that EPA must establish a section 112(d) emission standard for every HAP emitted by a major source. 233 F. 3d at 634. EPA is establishing emission standards for all HAP emitted by these sources. In establishing these standards, EPA is not evaluating emission reductions attributable to the type of fossil fuel and raw material used in the performance tests, because this is not a "feasible basis on which to set emission standards." *Sierra Club*, 353 F. 3d at 988.

EPA thus does not agree with this comment because the issue is not a source's intent but rather whether or not to assess emission reductions from individual test results which reflect an infeasible means of control.

Comment: The commenter maintains, however, that even if individual sources (including those in the pool of best performing sources) cannot reduce HAP concentrations in raw materials and fossil fuels, they may achieve the same reductions by adding back-end pollution control. Nothing in section

112(d)(3) says that sources have to use the means of achieving a level of performance that other best performing sources used.

Response: The thrust of this comment is essentially to impermissibly bypass the beyond-the-floor factors set out in section 112(d)(2) under the guise of adopting a floor standard. Suppose that EPA were to adopt a floor standard dominated by emission levels reflecting HAP concentrations present in a few sources' raw materials and fossil fuels during their test conditions. Suppose further that some sources have to upgrade their back-end control equipment to operate at efficiencies better than the average level demonstrated by the best performing sources, because test results based on fossil fuel and raw material levels are neither replicable nor duplicable. In this situation, EPA believes that it would have improperly adopted a beyond-the-floor standard because EPA would have failed to consider the beyond-the-floor factors (cost, energy, and nonair environmental impacts) set out in section 112(d)(2).⁸⁵

Comment: EPA has not substantiated its claim that sources cannot switch fossil fuels or raw materials.

Response: At proposal we evaluated fuel switching and raw material substitution as beyond-the-floor technologies for cement kilns and lightweight aggregate kilns and stated these technologies would not be cost effective.⁸⁶ We also discussed why fuel switching is not an appropriate floor control technology for solid fuel-fired boilers. 69 FR at 21273. Upon further evaluation, we again conclude that fuel switching and raw material substitution are not floor control technologies and are not cost effective beyond-the-floor technologies for cement kilns, lightweight aggregate kilns, and solid fuel-fired boilers.⁸⁷

Comment: EPA has failed to document the basis for its SRE ranking.

⁸⁵ Analysis of the levels of HAP in raw material and nonhazardous waste fuels suggests that this is a realistic outcome. Our analysis shows that emissions attributable to raw material and fossil fuel can be significant relative to the level of the straight emissions-based floor design level and floor (the methodology advocated by the commenter), and therefore could inappropriately impact a source's ability to comply with such a floor standard. See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 17.6.

⁸⁶ See, for example, 69 FR at 21252, where we discuss the use of fuel-switching or raw material substitution as a possible beyond-the-floor control for mercury at cement kilns.

⁸⁷ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards, September 2005, Sections 11 and 25, for further discussion.

⁸⁴ Although this language arose in the context of a potential beyond-the-floor standard, EPA believes that the principle stated is generally applicable. MACT standards, after all, are technology-based, and if there is no technology (i.e. no available means) to achieve a standard—i.e. for a source to achieve a standard whenever it is tested (as the rules require)—then the standard is not an achievable one.

Specifically, EPA has not stated how it measured sources' SREs, or how it knows those rankings are accurate.

Response: System removal efficiency is a parameter that is included in our

database that is calculated by the following formula:

$$\text{SRE} = 100 \times \frac{[(\text{total HAP mass feedrate}) - (\text{stack gas HAP mass emission rate})]}{\text{total HAP mass feedrate}}$$

The HAP feedrate and emission data are components of the database that were extracted from emission test reports for each source. We use system removal efficiency for each relevant pollutant or pollutant group (e.g., semivolatile metals, low volatile metals, mercury, total chlorine) whenever the data allows us to calculate a reliable system removal efficiency. For example, we generally do not use system removal efficiencies that are based on normal emissions data because of the concern that normal feed data are too sensitive to sampling and measurement error. See 69 FR at 21224.⁸⁸

The system removal efficiencies used in our ranking process are reliable and accurate because the feed and emissions data originate from compliance tests that demonstrate compliance with existing emission standards (primarily RCRA requirements). As such, the data are considered to have excellent accuracy and quality. RCRA trial burn and certification of compliance reports are typically reviewed in detail by the permitting authority. The compliance tests and test reports generally contain the use of various quality assurance procedures, including laboratory, method, and field blanks, spikes, and surrogate samples, all of which are designed to minimize sampling and analytical inaccuracies. EPA also noticed the data base for this rule for multiple rounds of comment and has made numerous changes in response to comment to assure accuracy of the underlying data. Thus, EPA concludes the calculated system removal efficiencies used in the ranking process are both reliable and accurate.

Comment: EPA's approach with regard to use of stack data is internally contradictory. EPA uses stack data in establishing floors, but does not use stack data to determine which performers are best. EPA has failed to explain this contradiction.

⁸⁸ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume II: Database," September 2005, Section 2, for further discussion on system removal efficiencies, which includes sample calculations and references to the database that contain the calculated system removal efficiencies for each source and each HAP or HAP group.

Response: Emission levels are used to calculate system removal efficiencies in order to assess each source's relative back-end control efficiency. Also, as explained in the introduction to this comment response section, the SRE/Feed methodology uses the stack emission levels of the sources using the best combinations of hazardous waste feed control and system-wide air pollution control (expressed as HAP percent removal over the entire system) to calculate the floors. The data are adjusted statistically to account for quantifiable forms of variability (run-to-run variability). This methodology reasonably selects best performing sources (for HAP amenable to these means of control), and reasonably estimates these sources' performance over time. As further stated in section B.2 above, using a straight emissions approach to identify best performers and their level of performance can lead to standards for these HAP that do not fully account for variability (including variability resulting from varying and/or uncontrollable amounts of HAP in raw materials and fossil fuels) and could force installation of *de facto* beyond-the-floor controls without consideration of the section 112(d)(2) beyond-the-floor factors.

EPA thus does not see the contradiction expressed by the commenter. Use of the straight emissions approach as advocated by the commenter would lead to standards that do not reasonably estimate sources' performance and which could not be achieved even by the best performers with individual test conditions below the average of the 12 percent of best performing sources. These problems would be compounded many-fold if the data were not normalized and adjusted to at least account for quantifiable variability, steps the commenter also opposes. EPA's use of emissions data (suitably adjusted) after identifying best performers through the ranking methodology avoids these problems and reasonably estimates best performers' level of performance.

Comment: The commenter rejects EPA's finding (69 FR at 21226) that individual test results in the data base do not fully express the best performing sources' performance. The commenter

gives a number of reasons for its criticisms, which we answer in the following sequence of comments listed a though f.

a. *Comment:* The commenter states that EPA claims emission levels do not fully reflect variability in part because they are sometimes based on tests where the source was feeding low levels of HAP during the test. The commenter claims this is inconsistent with the fact that EPA preferentially uses worst-case emissions obtained from tests where the sources spiked their feedstreams with metals, and that the mere possibility that these emissions do not reflect test data from conditions where variability was not maximized does not mean those data fail to represent a source's actual performance. The commenter also states that "EPA's apparent suggestion that the best performing sources could not replicate the average performance of the sources with the lowest emissions is unsubstantiated and unexplained. Assuming that EPA accurately assesses a source's actual performance, the source can replicate that performance."

Response: HAPs in raw materials and fossil fuels contribute to a source's emissions. EPA has concerns that a straight emissions approach to setting floors may not be replicable by the best performing sources nor duplicable by other non-best performing sources because of varying concentration levels of HAP in raw material and nonhazardous waste fuels. The best performing sources operated under compliance test conditions as the commenter suggests. However, raw material and nonhazardous fuel HAP concentrations for the best performing sources will change over time, perhaps due to a different source of fuel or raw material quarry location, which could affect their ability to achieve the floor level that was based on emissions obtained while processing different fossil fuel or raw materials. EPA takes sharp issue with the commenter's statement that a single performance test result is automatically replicable so long as it is measured properly in the first instance. This statement is incorrect even disregarding HAP contributions in raw materials and fossil fuels since, as noted previously in section A.2.e, there are many other sources of variability

which will influence sources' performance over time (i.e., in subsequent performance tests).

A straight emissions approach for establishing semivolatile and low volatile metal floors may result in instances where the best performing sources would not be capable of achieving the standards if their raw material and nonhazardous waste fuel HAP levels change over time. For each cement kiln and lightweight aggregate kiln, we estimated the emissions attributable to these raw materials and fossil fuels assuming each source was operating with hazardous waste HAP feed and back-end control levels equivalent to the average of the best performing sources (the difference in emissions across sources only being the result of the differing HAP levels in the nonhazardous waste feeds). The analysis shows that emissions attributable to these nonhazardous waste feedstreams (raw materials and fossil fuels) varies across sources, and can be significant relative to the level of the straight emissions-based floor design level and floor, and therefore could inappropriately impact a source's ability to comply with the floor standard.⁸⁹

b. *Comment:* The commenter states that EPA must consider contributions to emissions from raw materials and fossil fuels, that it is irrelevant if sources from outside the pool of best performing sources can duplicate emission levels reflecting "cleaner" raw materials and fossil fuels used by the best performing sources, and that sources unable to obtain such "cleaner" inputs may always upgrade other parts of their systems to achieve that level of performance.

Response: As previously discussed, EPA's methodology does account for HAP control of all inputs by assessing system removal efficiency, which measures reductions of HAPs from all inputs. Further, nonmercury metal HAP emissions attributable to raw materials and fossil fuels are effectively controlled with the particulate matter standard, a standard that is based on the sources with lowest emissions from best back-end control devices. We are not basing any standards on performance of sources not ranked as among the best performing.

c. *Comment:* The commenter disputes EPA's conclusions that failure of sources to meet all of the standards based on a straight emissions methodology at once shows that the

methodology is flawed. The standards are not mutually dependent, so the fact that they are not achieved simultaneously is irrelevant. There is no reason a best performer for one HAP should be a best performer for other HAP.

Response: EPA agrees with this comment. On reflection, EPA believes that because all our standards are not technically interdependent (i.e., implementation of one emission control technology does not prevent the source from implementing another control technology), the fact that sources are not achieving all the standards simultaneously does not indicate a flaw in a straight emissions approach. See *Chemical Manufacturers Ass'n*, 870 F. 2d at 239 (best performing sources can be determined on a pollutant-by-pollutant basis so that different plants can be best performers for different pollutants).

d. *Comment:* Several commenters took the opposite position that EPA must assure that all existing source standards must be achievable by at least 6 percent of the sources, and that all new source standards must be achievable by at least one existing source.

Response: As discussed above, we are not obligated to establish a suite of floors that are simultaneously achievable by at least six percent of the sources because the standards are not technically interdependent. Nonetheless, the SRE/Feed methodology does result in existing floor levels (when combined with the other floor levels for sources in the source category) that are simultaneously achievable by at least six percent of the sources (or, for source categories that have fewer than 30 sources, by at least two or three sources).⁹⁰ However, for the new source standards, three of the source categories do not include any sources that are simultaneously achieving all the standards (incinerators, cement kilns, and lightweight aggregate kilns). Again, similar to existing sources, EPA is not obligated to establish a suite of new source floors that are simultaneously achievable by at least one existing source because these standards are not technically interdependent. We conclude that a new source can be designed (from a back-end control perspective) to achieve all the new source standards.⁹¹

⁹⁰ These achievability analyses did not account for the additional test-to-test variability that we cannot quantify.

⁹¹ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume V: Emission Estimates and Engineering Costs," September 2005, Section 4.2.3 for a discussion that explains how

e. *Comment:* The commenter criticizes EPA's discussion at 69 FR 21227–228 indicating that both hazardous waste feed control and back-end pollution control are superior means of HAP emission control and treatment standards should be structured to allow either method to be the dominant control mechanism.

Response: EPA is not relying on this part of the proposed preamble discussion as justification for the final rule, with the one exception noted in the response to the following comment.

f. *Comment:* Considerations of proper waste disposal policy are not relevant to MACT floor determinations. In any case, the possibility that some commercial waste combustors may upgrade their back-end pollution control systems to meet standards reflecting low hazardous waste HAP feedrates, or divert wastes to better-controlled units, is positive, not negative.

Response: As discussed in section B.1 above, there are instances where standards derived by using a straight emissions approach are based on a combination of lowest emitting low feeding sources and lowest emitting higher feeding sources. Resulting floor standards would thus reflect these low hazardous waste feedrates and could put some well-controlled commercial incinerators in the untenable situation of having to reduce the amount of hazardous waste that is treated at their source. Our database verifies that such an outcome is in fact realistic.⁹²

This type of standard would operate as a direct constraint on the amount of hazardous waste that could be fed to the device, in effect depriving a combustion source of its raw material. In this instance, hazardous wastes could not be readily diverted to other units because the low feeding hazardous waste sources tend not to be commercial units. In these circumstances, there would be a significant adverse nonair environmental impact. Hazardous waste is required to be treated by Best Demonstrated Available Technology (BDAT) before it can be land disposed. RCRA sections 3004 (d), (e), (g), and (m); *Hazardous Waste Treatment Council v. EPA*, 866 F. 2d 355, 361 (D.C.Cir. 1990) (upholding Best Demonstrated Available Technology treatment requirement). Most treatment standards for organic pollutants in hazardous waste can only be achieved by combustion. Leaving some hazardous wastes without a

such a new source could be designed to achieve the new source standards.

⁹² See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards", September 2005, Section 17.4.

⁸⁹ See USEPA, "Final Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 17.6.

treatment option is in derogation of these statutory requirements and goals, and calls into question whether a treatment standard that has significant adverse nonair environmental impacts must be viewed as best performing. See *Portland Cement Ass'n v. Ruckelshaus*, 486 F. 2d 375, 386 (D.C. Cir. 1973); *Essex Chemical Co. v. EPA/EPA*, 486 F. 2d 427, 439 (D.C. Cir. 1973). The commenter's statement that waste disposal policy is not relevant to the MACT standard-setting process is not completely correct, since section 112 (n) (7) of the Clean Air Act directs some accommodation between MACT and RCRA standards for sources combusting hazardous waste. Part of this accommodation is using a methodology to evaluate best performing sources that evaluates as best performers those using the best combination of hazardous waste feed control (among other things, an existing control measure under RCRA rules) and system-wide removal.

We assessed whether we could address this issue by subcategorizing commercial incinerators and on-site incinerators. Applying the straight emission approach to such a subcategorization scheme, however, yields anomalous results due to the scarcity of available and complete compliance test data from commercial incinerators. Calculated floor levels for semivolatile metals and low volatile metals for the commercial incinerator subcategory equate to 2,023 and 111 µg/dscm, respectively (both higher than the current interim standards).⁹³ We conclude that the SRE/Feed methodology better addresses this issue because it yields floor levels that better represent the performance of the best performing commercial incinerators and onsite incinerators alike by applying equal weights to hazardous waste feed control and back-end control in the ranking process.

EPA notes, however, that its choice of the SRE/Feed methodology is justified independent of considerations of adverse impact on hazardous waste treatment and disposal.

Comment: The commenter reiterates its comments with respect to floor levels for new sources.

Response: EPA's previous responses to comments apply to both new and existing source standards.

Comment: Two commenters recommend that EPA define the single best performing source as that source with the lowest aggregated SRE/Feed

aggregated score (as proposed), as opposed to the source with the lowest emissions among the best performing existing sources (an approach on which we requested comment).

Response: We agree with the commenters because this is consistent with our methodology for defining best performers for existing sources and assessing their level of performance. We note, however, that with respect to the new source standards, we encountered two instances where the SRE/Feed methodology identified multiple sources with identical single best aggregated scores, resulting in a tie for the best performing source. This occurred for the mercury and low volatile metal new source standards for incinerators. In these instances, EPA applied a tie breaking procedure that resulted in selecting as the single best performing source as that source (of the tied sources) with the lowest emissions. We believe this is a reasonable interpretation of section 112(d)(3), which states the new source standard shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source ("source" being singular, not plural). Moreover, we believe use of the emission level as the tie-breaking criteria is reasonable, not only because it is a measure of control, but because we have already fully accounted for hazardous waste feedrate control and system removal efficiency in the ranking methodology. To choose either of these factors to break the tie would give that factor disproportionate weight.

C. Air Pollution Control Technology Methodologies for the Particulate Matter Standard and for the Total Chlorine Standard for Hydrochloric Acid Production Furnaces

At proposal, EPA used what we termed "air pollution control technology" methodologies to estimate floor levels for particulate matter from all source categories as a surrogate for non-mercury HAP metals, and for total chlorine from hydrochloric acid furnace production furnaces. 69 FR at 21225–226. Under this approach, we do not estimate emission reductions attributable to feed control, but instead assess the performance of back-end control technologies.⁹⁴ We are adopting the same methodologies for these HAP in the final rule. Because the details of the approaches differ for particulate

matter and for total chlorine, we discuss the approaches separately below.

1. Air Pollution Control Device Methodology for Particulate Matter

Our approach to establishing floor standards for particulate matter raises three major issues.

The first issue is whether particulate matter is an appropriate surrogate for non-enumerated HAP metals from all inputs, and for all non-mercury HAP metals in raw material and fossil fuel inputs. This issue is discussed at section IV.A of this part, where we conclude that particulate matter is indeed a reasonable surrogate for these metal HAP.

The second issue is why EPA is not evaluating some type of feed control for the particulate matter floor. There are two potential types of feed control at issue: hazardous waste feed control of nonenumerated metals, and feed control of non-mercury HAP metals in raw material and fossil fuel inputs. With respect to feed control of non-enumerated metals in hazardous waste, as discussed in more detail in section IV.A of this part, we lack sufficient reliable data on non-enumerated metals to assess their feedrates in hazardous waste. In addition, there are significant questions about whether feedrates of the non-enumerated metals can be optimized along with SVM and LVM feedrates. We also have explained elsewhere why control of hazardous waste ash feedrate would be technically inappropriate, since it would not properly assess feed control of nonenumerated metals in hazardous waste. See also 69 FR at 21225.

We have also explained why we are not evaluating control of feedrates of HAP metals in raw materials and fossil fuels to hazardous waste combustors: it is an infeasible means of control. See section B of this part. We consequently are not evaluating raw material and fossil fuel ash feed control in determining the level of the various floors for particulate matter.

a. *The methodology.* The final issue is the means by which EPA is evaluating back-end control. Essentially, after determining (as just explained) that back-end control is the means of controlling non-mercury metal HAP and that particulate matter is a proper surrogate for these metals, EPA is using its engineering judgment to determine what the best type of air pollution control device (i.e., back-end control) is to control particulate matter (and, of course, the contained HAP metals). We then ascertain the level of performance by taking the average of the requisite number of sources (either 12 % or five,

⁹³ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards", September 2005, Section 4. and Appendix C, Table "E-INC-SVM-CT-COM" and Table "E-INC-LVM-CT-COM"

⁹⁴ See generally USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards", September 2005, Section 7.4 and 7.5.

depending on the size of the source category) equipped with the best back-end control with the lowest emissions.⁹⁵ These floor standards are therefore essentially established using a straight emissions methodology. We have determined that baghouses (also termed fabric filters) are generally the best air pollution control technology for control of particulate matter, and that electrostatic precipitators are the next best.

b. *Why not select the lowest emitters?* Although sources with baghouses tended to have the lowest emission levels for particulate matter, this was not invariably the case. There are certain instances when sources controlled with electrostatic precipitators (or, in one instance, a venturi scrubber) had lower emissions in individual test conditions than sources we identified as best performing which were equipped with baghouses.⁹⁶ Under the commenter's approach, we must always use these lowest emitting sources as the best performers.

We again disagree. We do not know if these sources equipped with control devices other than baghouses with lower emissions in single test conditions would actually have lower emissions over time than sources equipped with baghouses because we cannot assess their uncontrollable emissions variability over time. Our data suggests that they likely are not better performing sources. We further conclude that our statistical procedures that account for these sources' within test, run-to-run emissions variability underestimates these sources long-term emissions variability. This is not the case for sources equipped with baghouses, where we have completely assessed, quantified, and accounted for long-term, test-to-test emissions variability through application of the universal variability factor.⁹⁷ The sources equipped with control devices other than baghouses with lower snapshot emissions data could therefore have low emissions in part because they were operating at the low end of the "uncontrollable" emissions variability profile for that particular snapshot in time. The basis for these conclusions, all

of which are supported by our data, are found in section 16 of volume III of the technical support document.

We therefore conclude sources equipped with baghouses are the best performers for particulate matter control not only based on engineering judgment, but because we are able to reliably quantify their likely performance over time. The straight emissions methodology ignores the presence of long-term emissions variability from sources not equipped with baghouses, and assumes without basis that these sources are always better performing sources in instances where they achieved lower snapshot emissions relative to the emissions from baghouses, emissions that have notably already been adjusted to account for long-term emissions variability.

A straight emissions approach also results in inappropriate floor levels for particulate matter because it improperly reflects/includes low ash feed when identifying best performing sources for particulate matter. 69 FR at 21228. For example, the MACT pool of best performing liquid fuel boilers for particulate matter under the straight emissions approach includes eight sources, only one of which is equipped with a back-end control device. These sources have low particulate matter emissions solely because they feed low levels of ash. The average ash inlet loadings for these sources are well over two orders of magnitude lower than the average ash inlet loading for the best performing sources that we identify with the Air Pollution Control Technology approach. (Of course, since ash loadings are not a proper surrogate for HAP metals, these sources' emissions are lowest for particulate matter but not necessarily for HAP metals.) The straight emissions approach would yield a particulate matter floor level of 0.0025 gr/dscf (with a corresponding design level of 0.0015 gr/dscf). There is not one liquid fuel boiler that is equipped with a back-end control that achieved this floor level, much less the design level. The best performing source under the air pollution control technology approach, which is equipped with both a fabric filter and HEPA filter, did not even make the pool of best performing sources for the straight emissions approach. Yet this unit has an excellent ash removal efficiency of 99.8% and the lower emitting devices' removal efficiencies are, for the most part, 0% because they do not have any back-end controls. EPA believes that it is arbitrary to say that these essentially uncontrolled devices must be regarded as "best performing" for purposes of

section 112(d)(3). We therefore conclude that a straight emissions floor would not be achievable for any source feeding appreciable levels of ash, even if they all were to upgrade with baghouses, or baghouses in combination with HEPA filters, and that a rote selection of lowest emitters as best performers can lead to the nonsensical result of uncontrolled units being classified as best performers.

Comment: Commenter claims end-of-stack control technology is not the only factor affecting emissions of particulate matter, stating that EPA admits that particulate matter emission levels are affected by the feedrate of ash. Accordingly, the performance of a source's end-of-stack control technology is not a reasonable estimate of that source's total performance.

Response: The particulate matter standard serves as a surrogate control for the non-enumerated metals in the hazardous waste streams (for all source categories), and all nonmercury metal HAP in the nonhazardous waste process streams (essentially, raw materials and fossil fuels) for cement kilns, lightweight aggregate kilns, and liquid fuel boilers. The commenter suggests that the APCD approach inappropriately ignores HAP feed control in the assessment of best performing sources. We conclude that it would not be appropriate to use a methodology that directly assesses feed control, such as the SRE/Feed methodology, to determine particulate matter floors. First, direct assessment of total ash feed control would inappropriately assess and seek to control (even though variability of raw material and fossil fuel inputs are uncontrollable) raw material and fossil fuel HAP input, as well as raw material and fossil fuel input. Controlling raw material and fossil fuel HAP input is infeasible, as previously discussed. It also inappropriately limits these sources' feedstocks that are necessary for their associated production process.

Second, we do not believe that developing a floor standard based on hazardous waste feed control of nonenumerated metals (as opposed to feed control of these metals in raw material and fossil fuels) is appropriate or feasible. In part four, section IV.A, we explain that we lack the data to reliably assess direct feedrate of these metals in hazardous waste. In addition, we also discuss that it is unclear (the lack of certainty resulting from the sparse available data) that hazardous waste feed control of the nonenumerated metals is feasible. The majority of these metals are not directly regulated under existing RCRA requirements, so sources have optimized control of the other HAP

⁹⁵ As explained in the responses below, the approach varies slightly if the requisite number of sources do not all use the best back-end pollution control technology. In that case, EPA includes in its pool of best performers the lowest emission levels from sources using the next best pollution control technology.

⁹⁶ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 22.

⁹⁷ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 5.3.

metals, raising issues of whether simultaneous optimization of feed control of the remaining metals is feasible. Moreover, even if one were to conclude that hazardous waste feed control is feasible for the nonenumerated metal HAPs, hazardous waste ash feedrates are not reliable indicators of nonmercury metal HAP feed control levels and are therefore inappropriate parameters to assess in the MACT evaluation process. For example, a source could reduce its ash feed input by reducing the amount of silica in its feedstreams. This would not result in feed control or emission reductions of metal HAP.⁹⁸

Finally, hazardous waste ash feed control levels do not significantly affect particulate matter emissions from cement kilns, lightweight aggregate kilns, and solid fuel-fired boilers because the majority of particulate matter that is emitted originates from the raw material and nonhazardous fuel. Hazardous waste ash feed control levels also do not significantly affect particulate matter emissions from sources equipped with baghouses because these control devices are not sensitive to particulate matter inlet loadings.⁹⁹

Thus, even if one were to conclude that the nonenumerated metal HAPs are amenable to hazardous waste feed control, explicit use of ash feed control in a MACT methodology would not assure that each source's ability to control either nonmercury metal HAP or surrogate particulate matter emissions is assessed. The Air Pollution Control Device methodology identifies and assesses (with the surrogate particulate matter standard) the known technology that always assures metal HAP emissions are being controlled to MACT levels—that technology being back-end control.

Comment: Commenter claims the Air Pollution Control Device approach to calculate particulate matter floors is flawed because the performance of back-end control technology alone does not reflect the performance of the relevant best sources that otherwise would be reflected if EPA were to assess performance based on the emission

levels each source achieved because, as EPA admits, it fails to account for the effect of ash feed rate.

Response: We explain above why the Air Pollution Control Technology approach properly identifies the relevant best performing sources for purposes of controlling non-mercury metal HAP (measured as particulate matter), irrespective of ash feed rates. Typically, this results in selecting the sources with the lowest particulate matter emission rates, the result the commenter advocates. This is because we evaluate sources with the best-performing (e.g. lowest emitting) baghouses, and particulate matter emissions from baghouses are not significantly affected by inlet particulate matter loadings. Where the pool of best performing sources includes sources operating some other type of back-end control device (because insufficient numbers of sources are equipped with baghouses to comprise 12% of sources, or five sources (depending on the size of the source category)), we again use the lowest particulate matter emission level from the sources equipped with second best technology. Although these data do not reflect test-to-test variability, they are the best remaining data in EPA's possession to estimate performance and EPA is therefore, as required by section 112 (d) (3) (A) and (B), using the data to fill out the requisite percentage of sources for calculating floors.

Comment: Commenter states that EPA has failed to demonstrate how it reasonably estimated the actual performance of each source's end-of-stack control technology because: (1) It failed to acknowledge that there can be substantial differences between the performance of different models of the same type of technology; and (2) it did not explain or support its rankings of pollution control devices.

Response: As discussed in sections 7.4 and 16.2 of volume III of the technical support document and C.1 of this comment response section, we rank associated back-end air pollution control device classes (e.g., baghouses, electrostatic precipitators, etc.), after assessing particulate matter control efficiencies from hazardous waste combustors that are equipped with the associated back-end control class. The data used to make this assessment are included in our database. We also evaluated particulate matter control efficiencies from other similar source categories that also use these types of control systems, such as municipal waste combustors, medical waste incinerators, sewage sludge combustors, coal-fired boilers, oil fired boilers, non-

hazardous industrial waste combustors, and non-hazardous waste Portland cement kilns.¹⁰⁰

After we assign a ranking score to each back-end control class, we determine the number of sources that are using each of these control technology classes. We then identify the MACT control technology or technologies to be those best ranked back-end controls that are being used by 12 percent of the sources (or used by five sources in instances where there are fewer than 30 sources). We then look only at those sources using MACT back-end control and rank order all these sources first by back-end control type, and second by emissions. For example, in instances where there is more than one MACT back-end control, we array the emissions from the sources equipped with the top ranked back-end controls from best to worst (i.e., lowest to highest), followed by the emissions from sources equipped with the second ranked back-end controls from best to worst, and so on. We then determine the appropriate number of sources to represent 12 percent of the source category (5 in instances where there are fewer than 30 sources). If 10 sources represented 12% of the sources in the source category, we would then select the emissions from best ranked 10 sources in accordance with this ranking procedure to calculate the MACT floor. This methodology results in selection of lowest emitters using best back-end air pollution control as pool of the best performing sources.

The commenter is correct that there can be differences between the performance of different models of the same type of technology. We are not capable of thoroughly assessing differences in designs of each air pollution control device in a manner that could be used in the MACT evaluation process, so that we would only select, for example, baghouses of a certain type. Each baghouse, for example, will be designed differently and thus will have different combinations of design aspects that may or may not make that baghouse better than other baghouses (e.g., bag types, air to cloth ratios, control mechanisms to collect accumulated filter cake and maintain optimum pressure drops). We also do not have detailed design information for each source's air pollution control system; such an assessment would therefore not be

⁹⁸ For the same reason, even if feed control of total inputs (i.e. raw material and fossil fuel as well as hazardous waste fuel) were feasible, it would be technically inappropriate to use ash feedrates as a surrogate: ash feed control allows sources to selectively reduce the ash feeds without reducing the metal HAP portion of that feed. Back-end control, in contrast, unselectively removes a percentage of everything that is fed to the combustor.

⁹⁹ See USEPA, "Technical Support Document for the HWC MACT Standards, Volume III: Selection of Mact Standards," September 2005, Section 3.1.

¹⁰⁰ See USEPA, "Technical Support Document for th HWC MACT Standards, Volume III: Selection of MACT Standards," September 2005, Section 5.3 and 16.2, for further discussion.

possible even if the information could be used to assess relative performance.

We instead account for this difference by selecting sources with the lowest emissions that are using the defined MACT back-end controls to differentiate the performance among those sources that are using that technology (the best performer being the source with the lowest emissions, as just explained). For example, in situations where more than 12% of the sources are using the single best control technology (e.g., more than 12% of incinerators use baghouses to control particulate matter), we use the emissions from the lowest emitting sources equipped with baghouses to calculate the MACT floor. In instances where there are two defined MACT technologies (i.e., 12% of sources do not use the single best control technology), we use all the emissions data from sources equipped with the best ranked control class, and then subsequently use only the lowest emissions from the sources equipped with the second ranked back-end controls.

Comment: EPA did not say how it picked the best performers if more than twelve percent used the chosen technologies. If EPA used emissions data to differentiate performance, the Agency is necessarily acknowledging that emissions data are a valid measure of sources' performance—in which case the Agency's claims to the contrary are arbitrary and capricious.

Response: We did use emissions data to select the pool of best performers where over 12% use the best type of emissions control technology, as explained in the previous response. Emissions data is obviously one means of measuring performance. EPA's position is that it need not be the exclusive means, in part because doing so leads to arbitrary results in certain situations. Our use of emission levels to rank sources that use the best particulate matter control (i.e., baghouses) does not lead to arbitrary results, however. First, we are assessing emission levels here as a means of differentiating sources using a known type of pollution control technology. More importantly, the adjusted emission levels from sources equipped with baghouses are the most accurate measures of performance because these emissions have been statistically adjusted to accurately account for long-term variability through application of the universal variability factor.

Comment: Commenter states that EPA, in its support for its Air Pollution Control Technology Approach used to calculate particulate matter floors, claims that an emissions-based approach would result in floor levels

that "could not necessarily be achieved by sources using the chosen end-of-stack technology," citing 69 FR at 21228. Commenter claims that it is settled law that standards do not have to be achievable through the use of any given control technology, and that it is also erroneous to establish floors at levels thought to be achievable rather than levels sources actually achieve.

Response: EPA is not establishing floor levels based on assuring the standards are achievable by a particular type of end-of-stack technology (or, for that matter, any end-of-stack technology). The floor levels in today's final rule reasonably estimate average performance of the requisite percent of best performing sources without regard for whether the levels themselves can be achieved by a particular means. Floor standards for particulate matter are based on the performance of those sources with the lowest emissions using the best back-end control technology (most often baghouses, and sometimes electrostatic precipitators). EPA uses this approach not to assure that the floors are achievable by sources using these control devices, but to best estimate performance of the best performing sources, including these sources' variability.

2. Total Chlorine Standard for Hydrochloric Acid Production Furnaces

We are adopting the methodology we proposed to estimate floor levels for total chlorine from hydrochloric acid production furnaces. 69 FR at 21225–226. As stated there, we are defining best performers as those sources with the best total chlorine system removal efficiency. We are not assessing a level of control attributable to control of chlorine in feedstocks because this would simply prevent these furnaces from producing their ultimate product. Further details are presented in responses below.

Comment: Basing the standard for hydrochloric acid production furnaces on the basis of system removal efficiency rather than chlorine emission reduction is impermissible. Even though these devices' purpose is to produce chlorinated product, the furnaces can use less chlorinated inputs. EPA's proposed approach is surreptitious, an impermissible attempt to assure that the standards are achievable by all sources using EPA's chosen technology, the approach already rejected in *CKRC*.

Response: EPA disagrees. There is nothing in the text of the statute that compels an approach that forces sources to produce less product to achieve a MACT floor standard. Yet this is the consequence of the comment. If

standards were based on levels of chlorine in feedstock to these units, less product would be produced since there would be less chlorine to recover. EPA has instead reasonably chosen to evaluate best performing/best controlled sources for this source category by measuring the efficiency of the entire chlorine emission reduction system. Indeed, the situation here is similar to that in *Mossville*, where polyvinyl chloride production units fed raw materials containing varying amounts of vinyl chloride depending on the product being produced. This led to variable levels of vinyl chloride in plant emissions. Rather than holding that EPA must base a floor standard reflecting the lowest amount of vinyl chloride being fed to these units, the court upheld a standard estimating the amount of pollution control achievable with back-end control. 370 F. 3d at 1240, 1243. In the present case, as in *Mossville*, the standard is based on actual performance of back-end pollution control (although here EPA is assessing actual performance of the control technology rather than estimating performance by use of a regulatory limit, making the situation here *a fortiori* from that in *Mossville*), and does not reflect "emission variations not related to technological performance". 370 F. 3d at 1240.

It also should be evident that EPA is not establishing a standard to assure its achievability by a type of pollution control technology, as the commenter mistakenly asserts. The standard for total chlorine is based on the average of the best five sources "best meaning those sources with greatest (most efficient) system removal efficiencies. EPA did not, as in *CKRC*, establish the standard using the highest emission limit achieved by a source operating a particular type of control.

Comment: The commenter generally maintains that EPA's methodology to determine total chlorine floors for hydrochloric acid production furnaces fails to capture other means of HAP emission control that otherwise would be captured if EPA were assess performance based on the emission levels each source achieved.

Response: As discussed above, the standard for total chlorine is based on the sources with the best system removal efficiencies. System removal efficiency encompasses all means of MACT floor control when assessing relative performance because: (1) Chlorine feed control is not a MACT floor technology for these sources; and (2) the measure of system removal efficiency accounts for every other controllable factor that can affect